



# 8th Conference of the European Ornithologists' Union 27–30 August 2011, Riga

## Programme and Abstracts

Edited by Leonida Fusani,  
Timothy Coppack & Māris Strazds



Latvian Ornithological Society  
Riga, 2011

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## 8TH CONFERENCE OF THE EUROPEAN ORNITHOLOGISTS' UNION

RĪGA, 27–30 AUGUST 2011

### Conference Organisers:

University of Latvia, Riga

University of Daugavpils

Latvian Ornithological Society (LOB) / BirdLife Latvia

### Local Organising Committee:

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**Māris Strazds**, University of Latvia, Riga

**Tomasz Wesolowski**, Dept. of Avian Ecology, Wroclaw University, Poland



## **Welcome to the EOU's 2011 conference**

Despite downturns and disasters the world is a better place for most people than it was a generation ago: not only are we materially more prosperous but restrictions on travel have been hugely diminished. Science has become international not just in principle but in practice, with many scientists having worked in several different countries by the mid-point of their careers, producing great benefits in terms of the cross-fertilization of ideas and practices. Our biennial EOU conferences provide an important means for us all to broaden our perspectives by talking to colleagues from across the continent.

The EOU, without staff and almost without financial resources, depends on the voluntary efforts of many people. Conferences depend on the hard work of the organizing team in the host country and our Latvian hosts have done us proud this year. Even more, conferences depend on the quality of the scientific programme, for which we have to thank not only the speakers and presenters of posters but especially the Scientific Programme Committee for pulling together an exciting and coherent programme. Continuity and communication between conferences depends on the Council — and the Council depends on those who attend the general meeting at each conference both for electing new Council members and for raising ideas about how the work of the union may be developed.

I thank everyone for their support and express my hope that those attending the conference will find it an enjoyable and stimulating experience. Welcome to Riga and to EOU 2011!

**Tomasz Wesółowski**  
EOU President



## **Welcome to the University of Latvia for the EOU 2011 conference**

On behalf of the University of Latvia I am delighted to welcome all of you at the 8th Conference of the European Ornithologists' Union.

In the modern society we are increasingly concerned about the future of the environment in which we are living in general and about the wildlife in particular. Many professional ornithologists together with thousands of volunteers including bird watchers, continuously are joining forces and studying all aspects of birds life — biology and physiology, migration patterns, ecology, preservation and many other aspects.

As it easily can be seen from the list of topics these are issues that are important not only for professionals, but for everybody who cares about the world in which we are living. And this is why we at the University of Latvia are so proud to host this international conference. It exceeds the frame of professional forum only. Alongside with very specific aspects of birdlife, it will discuss many issues that are important for the society in general. The fact that the opening of the conference takes place in the Aula Magna of our University proves the importance of this meeting for all of us, and the whole society. It proves the thesis that here at the University of Latvia we are the center not only for research and studies, but center for cultural events as well.

I am sure that during this conference you will have a lot of high level scientific presentations, but I equally hope that you will have enough time for informal interactions and possibilities to exchange the ideas and thoughts about different activities in your countries. And who knows may be the new initiatives and new joint projects that will advance within your research fields will make our world a better place to live. I sincerely hope for that.

**Mārcis Auziņš,**  
Rector of the University of Latvia





# Programme

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## SATURDAY, 27 AUGUST 2011

### 9:00—10:50      **Symposia<sup>1</sup> & Parallel Orals**

Room: Raven (264) Symposium 4

#### **Avian brood parasitism — a model system for co-evolution**

Conveners: Petr Procházka, Bård G. Stokke

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9:00	Introduction	
9:05	<b>Bård G. Stokke</b>	Egg phenotype and genetic differentiation among sympatric cuckoo host races
9:25	<b>Juan José Soler</b>	Eggshell bacterial load and foreign egg recognition ability of hosts of the European cuckoo. Comparative evidence of costs associated with cognitive proficiency of birds
9:45	<b>Daniela Campobello</b>	Old versus new world: adaptive significance of nest defence in two brood parasitism systems
10:00	<b>Hannu Pöysä</b>	Ecological context and information use in conspecific brood parasitism
10:15	<b>Jakob Kreisinger</b>	Analysis of conspecific brood parasitism in Common Pochard ( <i>Aythya ferina</i> )
10:30	General Discussion	

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Room: Goldeneye (363) Symposium 5

#### **Bayesian analysis in avian population ecology**

Conveners: Beth Gardner, Marc Kéry, Andy Royle, Michael Schaub

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9:00	Introduction	
9:03	<b>Michael Schaub</b>	The estimation of demographic processes in local populations using integrated population models
9:23	<b>Beth Gardner</b>	Incorporation of spatial information in capture — recapture modeling: comparing movement patterns of adults and juveniles
9:43	<b>Alison Johnston</b>	Who ate what and when? Applying Bayesian methods to improve estimates of forager functional response curves
10:03	<b>Marc Kéry</b>	How I became a Bayesian — or did I?

<sup>1</sup> Each Symposium has a free time format and is NOT synchronized with other Symposia or Oral sessions.

10:23 **Andy Royle** Non-Bayesian analysis of hierarchical models for sampling bird populations

10:43 General Discussion

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Room: Martin (353) Symposium 6

## **Impacts of environmental change on birds in alpine environments**

Conveners: Dan Chamberlain, Niklaus Zbinden

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9:00 Introduction

9:10 **Raphael Arlettaz** Integrated disturbance ecology: from the impact of outdoor winter sports on Alpine wildlife to the creation of winter preserves

9:30 **Enrico Caprio** The impact of ski-runs on alpine bird communities: a landscape approach

9:50 **Ramona Maggini** Predicting future ranges and assessing vulnerability for breeding birds in Switzerland as a consequence of climate and land use change

10:10 **Paola Laiolo** Biotic and abiotic factors affecting the eco-physiology of alpine birds along altitudinal gradients

10:30 **Paolo Pedrini** The role of raptors as indicators of environmental changes in the Alpine region

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Room: Snipe (258) Oral session

## **Birds and Humans**

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9:00 **Petra Sumasgutner** City slickers — Habitat use, breeding biology and feeding ecology of urban Kestrels (*Falco tinnunculus*)

9:16 **Hugo Robles** How does cavity availability influence community structure of secondary cavity-nesting birds?

9:32 **Roel May** Spatio-temporal collision risk and avoidance in white-tailed eagles

9:48 **Jonne Hartman** Effectiveness of a new type of wire markings on high tension power lines to mitigate nocturnal bird collisions

10:04 **Katalin Pap** What is cosy for waterbirds? Habitat choice along an urbanized shoreline of a lake ecosystem

10:20 **Martin Rössler** Glass strikes — the use of flight tunnels to evaluate mitigation methods

10:36 **Guillam McIvor** Birds nesting on electricity poles: Why it occurs and what can be done

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Room: Whimbrel (355) Oral session:

## Evolution

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9:00	<b>Daniel Cox</b>	Mass variation as a life history trait in tropical birds
9:16	<b>Martin Korňan</b>	Search for convergence patterns in foraging guild structure of bird assemblages between forests in three zoogeographic regions
9:32	<b>Irene Pellegrino</b>	Little owl ( <i>Athene noctua</i> ): nuclear and mitochondrial DNA analysis reveals divergence of southwestern and central European subspecies
9:48	<b>Magdalena Zagalska-Neubauer</b>	MHC, malaria and lifetime reproductive success in collared flycatchers ( <i>Ficedula albicollis</i> )
10:04	<b>Dieter Thomas Tietze</b>	Comparative phylogeography of East Asian passerines and the evolution of migration
10:20	<b>Toni Laaksonen</b>	Character displacement and gradual change in plumage trait complex of the pied and collared flycatcher
10:36	<b>Frédéric Angelier</b>	Inter-individual variation in telomere length: causes and consequences in a migratory bird species

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10:50—11:20 *Coffee break*

11:20—12:00 **Posters**

12:00—12:30 **Opening ceremony** Aula Magna

12:30—13:30 **Plenary lecture** Aula Magna

**Susanne Jenni-Eiermann**

The glucocorticoid stress response: adaptive modulation and application in conservation biology

13:30—15:10 *Lunch break*

15:10—17:00     **Symposia & Parallel Orals**

Aula Magna Symposium 14

**New insights in population dynamics  
from multi-state mark-recapture models**

Conveners: Henk van der Jeugd, Ali Johnston

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- |       |                                 |   |
|-------|---------------------------------|---|
| 15:10 | <b>Henk van der Jeugd</b>       | Brief history and impact of mark-recapture modeling in ornithological research  |
| 15:20 | <b>Jean-Dominique Lebreton</b>  | Analyzing demographic flows in bird populations: an overview of approaches and applications to bird population biology and conservation                       |
| 15:40 | <b>Jean-Baptiste Mihoub</b>     | Analysing survival when birds live longer than their ring: a case study on Griffon vultures in France   |
| 16:00 | <b>Fränzi Korner-Nievergelt</b> | Migratory connectivity derived from combining ring recovery data with unknown numbers of ringed birds and tracking data: The Common Nightingale as an example |
| 16:20 | <b>Arie J. van Noordwijk</b>    | Low capture rates for young males show breeding surplus in an island population of great tits   |
| 16:40 | <b>Pascaline Le Gouar</b>       | Spatial heterogeneity of recapture probability is substantial in most species and has consequences for survival estimates                                     |
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Room: Raven (264) Symposium 19

**Selection for urban life — from the individual to the community**

Conveners: Davide M. Dominoni, Juan Diego Ibáñez-Álamo

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- |       |                                     |  |
|-------|-------------------------------------|--|
| 15:10 | <b>Caroline Isaksson</b>            | Oxidative stress and Urbanization: Genetic Variation, Dietary Modulation and the Survival Value of Glutathione   |
| 15:30 | <b>Juan Diego Ibáñez-Álamo</b>      | Urbanization affects selective pressures and life-history strategies in common blackbirds                        |
| 15:50 | <b>Davide Michelangelo Dominoni</b> | Artificial lights and timing of reproduction in European blackbirds ( <i>Turdus merula</i> )                     |
| 16:10 | <b>Sue Anne Zollinger</b>           | Impacts of urban noise on song learning and vocal production in birds  |
| 16:30 | <b>Anja Nordt</b>                   | Artificial night light vs. urban noise — Drivers of the shift in dawn song in urban dwelling European blackbirds |
| 16:50 | <b>General Discussion</b>           |  |
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Room: Goldeneye (363) Symposium 10

## **Non-native birds in Europe: driving forces, mechanisms and consequences**

Conveners: Diederik Strubbe, Pim Edelaar, Darius Stiels

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15:10 Introduction

- 15:15 **Pim Edelaar** Understanding and predicting avian invasions: individual variation versus species-specific traits
- 15:32 **Darius Stiels** Predicting the potential distribution of invasive Estrildid finches (*Estrildidae*)
- 15:49 **Diederik Strubbe** Invasive alien birds in Europe: evidence for climatic niche shifts?
- 16:06 **Hans-Günther Bauer** Purported or real invasiveness of non-native birds in Central Europe
- 16:23 **Assaf Shwartz** Concerns regarding impact risk assessment and management recommendations for invasive birds
- 16:40 **Iain Henderson** Ruddy Duck Eradication in the UK
- 16:57 General Discussion
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Room: Martin (353) Oral session

## **Conservation (I)**

- 15:10 **Krystyna Stachura-Skierczyńska** Habitat selection of the middle spotted woodpecker in Polish lowland forests based on predictive mapping approach
- 15:26 **Flavio Monti** Parallel conservation strategies of Osprey (*Pandion haliaetus*) in the central Mediterranean basin
- 15:42 **Mattia Brambilla** Mid-season habitat shifts in farmland birds: implications for research and conservation
- 15:58 **Viesturs Ķerus** Status assessment and conservation priorities of forest birds in Latvia
- 16:14 **Martin Gruebler** The reproductive benefits of livestock farming in barn swallows: quality of nest site or foraging habitat?
- 16:30 **Job Aben** Dispersal, connectivity and viability of forest bird populations in a fragmented cloudforest in the Taita Hills, SE Kenya
- 16:46 **Veli-Matti Pakanen** Can grazing management create ecological traps for waders breeding on coastal meadows?
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Room: Snipe (258) Oral session

## Immunology

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- 15:10 **Tuul Sepp** Behavioural trait covaries with immune responsiveness in a wild passerine
- 15:26 **Andreas Nord** Ecoimmunological correlates of rest-phase hypothermia in wintering birds
- 15:42 **Arne Hegemann** Patterns of baseline and induced immune function over the entire annual cycle in a free-living bird — consistency and flexibility at the same time!
- 15:58 **Edyta Podmokła** Blood parasites affect reproductive investments in blue tits (*Cyanistes caeruleus*)
- 16:14 **Anvar Kerimov** The effect of moult on immunity of Pied Flycatcher males differing in melanin-based coloration
- 16:30 **Kevin Matson** Island life and immune function: combining experimental and comparative approaches to gain new insights into immune evolution
- 16:46 **Patricia Soares Castro Lopes** Social context modulates sickness behavior
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Room: Whimbrel (355) Oral session

## Migration

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- 15:10 **Endre Knudsen** Time-series modelling of the dynamics of changing bird migration phenologies
- 15:26 **Herbert Stark** Sea crossings by soaring and gliding — are there thermals over the sea?
- 15:42 **Dario Massimino** Identification of putative wintering areas and ecological determinants of population dynamics of Common House Martin (*Delichon urbicum*) and Common Swift (*Apus apus*) breeding in Northern Italy
- 15:58 **Krzysztof Stępniewski** What influence does the migratory strategy of the species have on the differences in wing parameters between juveniles and adults?



- 16:14 **Katarzyna**  
**Stępniewska** Similar, yet different: migration strategies of the Reed (*Acrocephalus scirpaceus*) and Sedge (*A. schoenobaenus*) Warblers in autumn on their south-eastern flyway
- 16:30 **Thibaut Powolny** Differential migration by sexes in Eurasian Skylarks (*Alauda arvensis*) and the “dominance hypothesis”: A multi-spatial scale assessment
- 16:46 **Bart Nolet** From functional and aggregative response to stopover site use in migratory swans
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17:00—17:30 *Tea break*

17:30—18:30 **Plenary lecture** Aula Magna  
**Rob Bijlsma**  
Timing and breeding success of European Honey-buzzards in the past century

18:30—19:30 **General Meeting** Aula Magna

19:30—21:00 *Dinner break*

21:00—22:00 **Latvian evening** Aula Magna



## SUNDAY, 28 AUGUST 2011

- 09:00-10:00     **Plenary lecture**     Aula Magna  
                         **Michaela Hau**  
                         Hormone-behavior relationships: from ecology to evolutionary physiology
- 10:00—10:30     *Coffee break*
- 10:30—12:20     **Symposia & Parallel Orals**

Room: Raven (264) Symposium 11

### **Ecological immunology of birds**

Conveners: Indrikis Krams, Peeter Hõrak

- 
- 10:30 Introduction
- 10:35 **Peter Laszlo Pap**     Seasonality in coccidian parasitism and immune function in the house sparrow: natural covariation or just coincidence?
- 11:00 **Matti Kervinen**     Parasite resistance and sexual selection in the black grouse (*Tetrao tetrix*)
- 11:25 **Alexandre Roulin**     Sexual selection to signal resistance to parasites or to the full range of stressful factors?
- 11:50 **Peeter Hõrak**     Avian immunoecology — where next?
- 12:15 General Discussion

Room: Goldeneye (363) Symposium 13

### **Information use and adaptive habitat selection**

Conveners: Mikko Mönkkönen, Blandine Doligez, Jukka Forsman

- 
- 10:30 Introduction
- 10:35 **Aurore Ponchon**     Large scale prospecting and breeding colony selection in the Kittiwake
- 10:55 **Tomas Pärt**     Prospectors combine social and environmental information to improve habitat selection in the subsequent year
- 11:15 **Christoph Meier**     Timing of prospecting on nesting opportunities
- 11:35 **Piotr Tryjanowski**     Does a cue species population crash cause a decline in heterospecifically attracted species?

11:55 **Janne-Tuomas Seppänen** Selective use of heterospecific presence, behaviour and performance in decision-making

12:15 General Discussion

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Room: Martin (353) Symposium 9

### **Predictive modeling in ornithology - recent problems, novel solutions and future challenges**

Conveners: Jan Engler, Kathrin Schidelko, Darius Stiels, Morgane Barbet-Massin, Dennis Rödder

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- 10:30 **Thomas Gottschalk** Forecasting bird population changes in response to global warming using high resolution models — lessons learned from Germany
- 11:05 **Dennis Rödder** Species distribution modelling in ornithology: recent problems, novel solutions and future challenges
- 11:20 **Morgane Barbet-Massin** How much do we overestimate future local extinction rates when restricting the range of occurrence data in climate suitability models?
- 11:35 **Sven Trautmann** Including preselected land-use variables improves species distribution models for birds in Europe
- 11:50 **Andreas Lindén** Mean-variance relationships in overdispersed bird count data
- 12:05 General Discussion
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Room: Snipe (258) Oral session

### **Movement ecology**

- 10:30 **Nikita Chernetsov** Not all songbirds calibrate their magnetic compass from twilight cues: a telemetry study
- 10:46 **Christina Kassara** Home-range and resource use by Eleonora's falcon (*Falco eleonorae*) in its wintering quarters inferred by satellite telemetry data
- 11:02 **Volker Salewski** Identifying migration routes and non-breeding areas of the globally threatened Aquatic Warbler using light-level geolocators
- 11:18 **Valère Martin** The use of radar to estimate the potential impact of wind turbines on bird migration in the mountainous areas of Switzerland
- 11:34 **Bernd Meyburg** Tracking the intercontinental migrations of Eurasian Hobbies (*Falco subbuteo*) using 5 g satellite transmitters

- 11:50 **Matthias Kopp** Breeding in sympatry, wintering far separated — changes in foraging patterns of two southern skua species in the annual cycle
- 12:06 **Emily A. McKinnon** Geolocators and stable-hydrogen isotope analysis reveal the influence of reproductive success and moult on autumn migration strategy in a songbird
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Room: Whimbrel (355) Oral session

## **Reproduction**

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- 10:30 **Marta Cholewa** Great Tits' breeding and the nestling food availability in a primeval forest: is synchronisation important?
- 10:46 **Patrik Byholm** Parental experience and local food availability as drivers of parental care in goshawks
- 11:02 **Raivo Mänd** Why feeding frequency is not reliable measure of the quality of parental care in birds
- 11:18 **Oscar Vedder** Effects of experimental manipulation of temperature in the laying phase on incubation onset and clutch size in the blue tit (*Cyanistes caeruleus*)
- 11:34 **Anke Rehling** Parental care in lesser black-backed gulls (*Larus fuscus*) is state dependent
- 11:50 **João Paulo Silva** Intraspecific and inter-annual spatial patterns of breeding activity in a lekking grassland bird: a study using satellite telemetry
- 12:06 **Maja Roodbergen** Effects of grassland characteristics on chick growth in a meadow breeding wader
- 

12:20—14:00 *Lunch break*

14:00—16:00 **Posters**

16:00—16:40 *Tea break*

16:40—18:30 **Symposia & Parallel Orals**

Room: Raven (264) Symposium 1

**Ecological energetics**

Conveners: Esa Hohtola, Jan-Åke Nilsson

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16:40 Introduction

- 16:45 **Jan-Ake Nilsson** Body temperature regulation as a way to save energy
- 17:05 **Harto Lindén** The strenuous first year of capercaillie male; ecological energetics and growth patterns
- 17:25 **Esa Hohtola** Thermoregulatory adaptations to fasting and starvation in birds
- 17:45 **Claus Bech** Energetics of breeding in an Arctic seabird: the black-legged kittiwake (*Rissa tridactyla*)
- 18:05 **Simone Webber** The energetic consequences of ecological mismatch: the effects of food supplementation on seasonal timing and Daily Energy Expenditure

18:25 General Discussion

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Room: Goldeneye (363) Symposium 15

**Bird collisions — more than meets the (human) eye**

Conveners: Christoph Kulemeyer, Mark Desholm.

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16:40 Introduction

- 16:42 **Graham Martin** Understanding avian collisions: a birds' eye view
- 17:03 **Wolfgang Fiedler** A clear threat — preventing birds from hitting windows
- 17:24 **Eileen Rees** Tracking migratory swans and geese in relation to offshore wind farm sites
- 17:39 **Ricardo Tomé** Species-specific reactions of migrating raptors towards wind turbines: a case study from southern Europe
- 17:54 **Christoph Kulemeyer** Nocturnal bird migration near offshore wind farms — from visual perception to phototactic reactions
- 18:09 **Michael Kemp** Modeling avian altitude distribution to improve flight safety

18:24 General Discussion

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Room: Martin (353) Symposium 17

## **Africa matters! A sub-Saharan perspective of Life History and Ecology of Palearctic migrant birds**

Conveners: Ulf Ottosson, Kaspar Thorup, Soladoye Iwajomo.

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- 16:40 Introduction
- 16:45 **Steffen Hahn** Migratory connectivity in nightingale populations differing in migration routes
- 17:05 **Soladoye Iwajomo** Do Garden warblers *Sylvia borin* winter in Obudu, southeast Nigeria?
- 17:25 **Danae Sheehan** Why Africa matters: distribution and habitat associations of Palearctic-African migrant birds in West Africa
- 17:45 **Yahkat Barshep** The timing of primary moult in the Curlew Sandpiper varies with environmental variables
- 18:05 **Christiane Trierweiler** Wintering of Montagu's Harriers in the Sahel — results from satellite tracking and field work
- 18:25 General Discussion
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Room: Snipe (258) Oral session

## **Conservation (II)**

- 16:40 **Mark Wilson** Ecology of Hen Harriers (*Circus cyaneus*) in forested landscapes in Ireland
- 16:56 **Jānis Kuze** The microreserve approach in conservation of White-tailed eagle in Latvia — a tool in protecting dispersed species in fragmented forest landscape
- 17:12 **Heidi Björklund** Breeding success of forest-dwelling birds of prey in natural vs. artificial nests
- 17:28 **Michael Gerber** Territory choice of the Wood Warbler (*Phylloscopus sibilatrix*) in relation to habitat structure and rodent density
- 17:44 **Stoyan Nikolov** The effects of pasture management and structure on farmland bird communities in Bulgaria
- 18:00 **Jeremy Greenwood** Assessing population declines: the value of a Bayesian approach
- 18:16 **Caspar Hallmann** Modelling transient spatio-temporal population recovery dynamics of Common Buzzards and Goshawks in Dutch Limburg
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Room: Whimbrel (355) Oral session

## Stress

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16:40	Marju Männiste	Acute glucocorticoid administration suppresses feather growth in greenfinches
16:56	Lukas Jenni	Relationships between glucocorticoids levels and fitness: what are the predictions?
17:12	Benjamin Homburger	Influence of moderate stress on immunocompetence and resistance to oxidative stress in the grey partridge ( <i>Perdix perdix</i> )
17:28	Adam Z. Lendvai	Natural variation in stress response influences post-stress parental effort in male house sparrows
17:44	Bettina Almasi	Farmland use and human sound affect the hormonal response to an acute stressor in barn owls
18:00	Johan Nilsson	Early growth, metabolism and oxidative stress
18:16	Miia Koivula	Does metal pollution increase oxidative stress in small passerine species?

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18:30—20:00 *Dinner break*

20:00—21:50 **Round Tables**

Room: Raven (264) Round Table 12

## Charismatic species as a tool in nature conservation: the White Stork as an example

Conveners: Leszek Jerzak, Jose I. Aguirre, Piotr Tryjanowski

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20:00	Andreja Radović	Habitat suitability and potential expansion of the White Stork ( <i>Ciconia ciconia</i> ) breeding population in Slovenia
20:10	Kai-Michael Thomsen	Home Range and habitat use of wintering White Storks
20:20	Hélène Gadenne	Predicting White stork distribution in western France based on ecological niche modelling
20:30	Judy Shamoun-Baranes	A multi-scale approach to white stork migration research
20:40	Jill Shephard	Unravelling the effects of translocation history vs population decline on a widespread migrant: The case of the European White Stork

20:50	Leszek Jerzak	Condition of the White Stork ( <i>Ciconia ciconia</i> ) under environmental stress: Eco-physiological and related responses (causes of changes in White Stork populations in disturbed environments)
21:00	Sergei Soloviev	The most northern in the world a colony dalmatian pelican ( <i>Pelecanus crispus</i> ) and cormorant ( <i>Phalacrocorax carbo</i> ) of the lake system Saltaim-Tenis (northern forest-steppe of Omsk Region, Western Siberia)
21:10	Damijan Denac	Resources, conditions and interactions influencing White Stork ( <i>Ciconia ciconia</i> ) fecundity
21:20	Irina Samusenko	Influence of habitat structure, climatic and hydrological conditions on White Stork ( <i>Ciconia ciconia</i> ) breeding population parameters at the Pripyat River floodplain (southern Belarus)
21:30	Ute Eggers	Land use and climate change as determinants of White stork reproduction

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Room: Goldeneye (363) Round Table 18

### **Assessing new threats to birds in agricultural landscapes and implication for conservation strategies in Europe**

Conveners: Oskars Keiřs, Kees Kofijberg, Jean Secondi

20:00	Barbara Lukasch	Short-term effects of recent land use changes in Eastern Austria on bird assemblages in a human-dominated landscape
20:20	Oskars Keiřs	Conservation of Corncrakes in Latvia 1989—2010: agricultural landscapes vs. Natura 2000 sites
20:40	General Discussion	

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Room: Martin (353) Round Table 20

### **Flagship at risk — large-scale monitoring of Black Stork (*Ciconia nigra*) populations**

Conveners: Tamás Enikő Anna, Piotr Zieliński

20:00	Introduction	
20:10	Urmaz Sellis	Satellite GPS tracking as a tool for black stork ( <i>Ciconia nigra</i> ) studies



- 20:30 **Eniko Anna Tamas** Importance and evaluation of the International Black Stork colour ringing programme
- 20:50 **Maryna Dzmitranok** Preliminary data of Black Stork monitoring in Belarus
- 21:10 **Piotr Zielinski** Present situation of the Black Stork (*Ciconia nigra*) in Poland
- 21:30 General Discussion
- 

20:00 Room: Snipe (258) Panel Discussion 22  
**Bad practice in field biology — what should be done?**  
Conveners: Tomasz Wesołowski, Rob G. Bijlsma, Andy Gosler



MONDAY, 29 AUGUST 2011

07:00—18:00 **Excursion**



18:00—23:00 **Social Dinner**



## TUESDAY, 30 AUGUST 2011

09:00—10:00 **Plenary lecture** Aula Magna  
**Zoltan Barta**  
Optimal annual routines of avian life

10:00—10:30 *Coffee break*

10:30—12:20 **Symposia & Parallel Orals**

Aula Magna Symposium 7

### **Impact of forestry on populations of threatened bird species, conservation strategies and methods**

Conveners: Janis Priednieks, William Sutherland

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10:30 Introduction

10:40 **Rob Fuller** Interactions between forest management, deer browsing and habitat quality for birds in historically fragmented British woodlands

11:00 **Jean-Michel Roberge** Woodpeckers as focal species for forest conservation planning

11:20 **Wieslaw Walankiewicz** Population decline of the White-backed Woodpecker (*Dendrocopos leucotos*) in the Białowieża Forest: forest management, habitat loss and conservation implications

11:40 **Māris Strazds** Impact of forestry on breeding performance of black stork and implications for conservation

12:00 General Discussion

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Room: Raven (264) Symposium 16

### **Why are hormone concentrations so variable within and between species?**

Conveners: Wolfgang Goymann, Leonida Fusani

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10:30 Introduction

10:33 **Martina Muller** Does Mother really know best? Why are yolk hormone concentrations so variable within and between avian species

10:51 **Olivier Chastel** Stress response variation within and between species: The influence of the brood value

- 11:09 **Alexander Baugh** Circulating corticosterone in great tits: understanding the individual
- 11:27 **Katharina Hirschenhauser** Winning and losing in public: Audience as a catalyst for androgen responsiveness and future success?
- 11:45 **Beate Apfelbeck** Territorial behaviour and testosterone in male black redstarts (*Phoenicurus ochruros*): from plasma to brain
- 12:03 General Discussion
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Room: Goldeneye (363) Symposium 21

### **The applicability and usefulness of bio-logging for terrestrial ornithological studies**

Conveners: Olivier Duriez, Giacomo Dell’Omo, Yan Ropert-Coudert

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- 10:30 Introduction
- 10:40 **Yan Ropert-Coudert** A — brief — historical account of the use of bio-logging in marine studies
- 10:55 **Olivier Duriez** GPS, accelerometry and flight energetics: a study case with vultures
- 11:10 **Willem Bouten** Combining GPS and accelerometer data to study bird behaviour
- 11:25 **Giacomo Dell’Omo** Flying into the pigeon’s brain
- 11:40 **Bruno Ens** Using biologgers to test predictions from a distribution model on the carrying capacity for Oystercatchers wintering in the Wadden Sea
- 11:55 **Sarah Davidson** Integrating, archiving, and sharing biologging data from wild birds in Movebank
- 12:10 General Discussion
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Room: Martin (353). Oral session

### **Population ecology**

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- 10:30 **Diego Pavon Jordan** Effects of environmental changes in survival and population trends in ural owl (*Strix uralensis*) and tawny owl (*Strix aluco*) in southern Finland
- 10:46 **Lesley Szostek** Is immigration linked to natal recruitment in a Common Tern colony?

11:02	<b>Jan Husek</b>	Dynamics of pulsed prey abundance shapes avian reproduction: study on the common vole ( <i>Microtus arvalis</i> ) and its predator, the white stork ( <i>Ciconia ciconia</i> )
11:18	<b>Daniel Burgas</b>	Raptor assemblage shaping prey distributions
11:34	<b>Ville Vasko</b>	High population turnover of Eurasian kestrels caused by dispersal and fluctuating main food abundance
11:50	<b>Gilberto Pasinelli</b>	Small and large local populations in the reed bunting: curse or blessing for species conservation?
12:06	<b>Alexander Grendelmeier</b>	Breeding success and nest predation of Wood Warbler ( <i>Phylloscopus sibilatrix</i> ) in Northern Switzerland

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Room: Snipe (258). Oral session

### **Climate change**

10:30	<b>Kalle Meller</b>	Does hatching date affect the timing of departure in partial migrants?
10:46	<b>Aleksi Lehikoinen</b>	Climate change has altered the predation risk of autumn migrating passerines
11:02	<b>Claudia Burger</b>	Long-distance Dispersal to the North as an Adaptation to Climate Warming: an Experiment in Pied Flycatchers
11:18	<b>Grzegorz Hebda</b>	Climate warming and woodpeckers' breeding in a primeval temperate forest: a 35 years perspective
11:34	<b>Emma Vatka</b>	Climate warming affects phenologies at several trophic levels — a northern perspective
11:50	<b>Michelangelo Morganti</b>	Can trans-saharan migrants adapt to climate change by wintering north of the Sahara?
12:06	<b>Kalle Rainio</b>	Arrival time changes of North European birds

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Room: Whimbrel (355). Oral session

### **Behaviour**

10:30	<b>Gábor Seress</b>	Stronger response to predation risk in urban than rural house sparrows ( <i>Passer domesticus</i> )
10:46	<b>He Zhang</b>	Survival senescence and associations between lifespan and life history traits in Common Terns

11:02	<b>Olli Loukola</b>	Do flycatchers copy and reject behaviour of tits with high and low clutch size?
11:18	<b>Lorenzo Serra</b>	Feather colour patterns and visual expression of the badge in the Rock Sparrow
11:34	<b>Edward Kluen</b>	Association between DRD4 gene polymorphism and escape behaviour in blue tits
11:50	<b>Chiara Morosinotto</b>	Plasticity in incubation behaviour under experimentally increased nest predation risk

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12:20—14:00 *Lunch*

14:00—14:40 **Posters**

14:40—16:30 **Symposia & Parallel Orals**

Aula Magna Symposium 3

### **Lifelong individual development as an important component of life history**

Conveners: Peter H. Becker, Kalev Rattiste

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14:40 Introduction

14:45	<b>Kalev Rattiste</b>	Changes in average reproductive success with age: a result of survival selection and/or age-related changes of competence and reproductive effort?
15:10	<b>Peter H. Becker</b>	Individual improvements during the lifespan of Common Terns in relation to fitness
15:35	<b>Jon Brommer</b>	Evolutionary insights from longitudinal data on reproduction
15:51	<b>Sandra Bouwhuis</b>	Individual variation in rates of senescence: natal origin effects and disposable soma in a wild bird population
16:07	Simon Verhulst	Do telomeres link rearing conditions, life style and life history?
16:23	General Discussion	

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Room: Raven (264) Symposium 8

## **Dispersal meets Biogeography — How dispersal affects range dynamic processes**

Conveners: Jan Engler, Maria Delgado, Debora Arlt

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14:40	<b>Erik Matthysen</b>	Birds on the move: can we infer dispersal at larger scales from local movement data?
15:15	<b>Debora Arlt</b>	Sex-biased dispersal and breeding site availability
15:30	<b>Blandine Doligez</b>	Dispersal heritability in a patchy population: accounting for imperfect individual detection and implications for individual and population processes
15:45	<b>Timothy Coppack</b>	Natal dispersal in a nutshell
16:00	<b>Jan Engler</b>	Range expansion and the neglected role of long distance dispersal in a migrating songbird
16:15	<b>General Discussion</b>	

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Room: Goldeneye (363) Symposium 2

## **Tracking small long-distance migrants throughout their annual cycle**

Conveners: Anders P. Tøttrup, Raymond Klaassen

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14:40	<b>Introduction</b>	
14:41	<b>Kevin C. Fraser</b>	Tracking migratory songbirds using geolocators: what are the ecological questions that can be addressed and future challenges?
15:03	<b>Heiko Schmaljohann</b>	Tracking longest songbird migration suggests a selection pressure towards a spatiotemporally similar migration strategy
15:25	<b>Adam Fudickar</b>	Annual movement ecology of a partial migrant songbird
15:40	<b>Mikkel Willemoes Kristensen</b>	Comparing two different migration strategies of trans-Saharan passerine migrants
15:55	<b>Anders P. Tøttrup</b>	Relating environmental conditions during non-breeding season to breeding performance and phenology in a long-distance migratory songbird using geocator data
16:10	<b>Raymond Klaassen</b>	Tacking passerine birds using geolocators, a new chapter in the research of bird migration?
16:25	<b>General Discussion</b>	

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Room: Martin (353) Oral session

## Hormones and Behaviour

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14:40	Götz Eichhorn	Energetic benefits of crèching behaviour in king penguin chicks
14:56	Manuelle Cottin	Corticosterone, foraging behaviour and reproductive success in Adélie penguins
15:12	Anne-Mathilde Thierry	Effect of stress hormone and severe weather conditions on the incubation behaviour of Adélie penguins ( <i>Pygoscelis adeliae</i> )
15:28	Liesbeth De Neve	Corticosterone levels in host and cuckoo nestlings. Is brood parasitism a physiological stressor?
15:44	Juliane Riechert	Age-specific change of prolactin and corticosterone levels in the Common Tern
16:00	Thomas Mueller	Stress associated with habitat quality and group living in ravens
16:16	Kim Geraldine Mortega	Seasonal changes in testosterone and its effects on singing behaviour and territorial aggression in the Black redstart ( <i>Phoenicurus ochruros</i> )

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Room: Snipe (258) Oral session

## Timing

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14:40	Andrea Kölzsch	How arctic-breeding geese time their spring migration
14:56	Alfonso Marzal	The sooner in Africa, the better in Europe. Linking malaria, moult speed and reproductive success in a migratory bird
15:12	Gergely Hegyi	Timing of food availability constrains developmental plasticity in a migratory passerine
15:28	Mihaela Ilieva	Gradual change in the migratory passage of willow warbler ( <i>Phylloscopus trochilus</i> ) populations through the eastern part of the Balkan Peninsula revealed by genetic markers
15:44	William Velmala	The importance of arrival time to breeding performance in a long-distance migrant bird
16:00	Francisco Pulido	Within- and among-population differences in the annual cycle of three Iberian Blackcap ( <i>Sylvia atricapilla</i> ) populations differing in migratory behaviour
16:16	Nicolas Strebel	Estimating unbiased avian spring arrival dates using an adapted site-occupancy model

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Room: Whimbrel (355) Oral session

## Monitoring

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16:46	<b>Bart Nolet</b>	From functional and aggregative response to stopover site use in migratory swans
14:40	<b>Marina Selivanova</b>	Wetland bird populations in the south of Western Siberia, Russia
14:56	<b>Sophie Monsarrat</b>	Food predictability and prospection behaviour of Griffon vultures: first results from GPS telemetry
15:12	<b>Mārcis Tīrums</b>	The phenology of spring arrival of birds in Latvia from 1830 to 2010
15:28	<b>Petr Vorisek</b>	European population trends of common birds: how can we improve the value?
15:44	<b>Chris Hewson</b>	The role of Africa in declines of Afro-Palaeartic migrants breeding in the UK
16:00	<b>Adriaan Dokter</b>	Monitoring flight activity and foraging of shorebirds in the western Wadden Sea by continuous radar and camera observations

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16:30—17:00 *Tea break*

17:00—18:00 **Plenary lecture** Aula Magna

**William Sutherland**

How can we be more effective in conserving birds?

18:00—18:30 **Closing ceremony** Aula Magna



# Abstracts

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Sorted alphabetically by the Presenting Author





## **DISPERSAL, CONNECTIVITY AND VIABILITY OF FOREST BIRD POPULATIONS IN A FRAGMENTED CLOUDFOREST IN THE TAITA HILLS, SE KENYA**

Presented by **Job Aben\***

Job Aben, Erik Matthysen

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Fragmentation of natural habitats, and its consequences, is recognized as one of the most important threats to biodiversity. The cloudforests of the Taita Hills are an example of a highly fragmented Afrotropical forest ecosystem embedded in a human-dominated landscape. The majority of the bird species confined to these forests have been shown to be negatively affected by its fragmentation. Among these species are the endemic Taita thrush, and Taita apalis, which consequently are listed as Critical. Interpatch movements can mitigate the negative effects of habitat fragmentation on the viability of populations. However, in the study area, the landscape consists predominantly of small-scale agricultural land suspected to impede interpopulation movements of forest birds. In a first step to quantify landscape connectivity for forest birds, we translocated 25 individuals of two forest dependent species (Cabanis's greenbul and White-starred robin) into the matrix, and subsequently collected high resolution information on habitat use and movement behaviour of homing individuals using continuous radio tracking. Movement paths superimposed on high resolution landcover maps were used to determine relative use of recognized landcover classes. This knowledge is currently being implemented in connectivity models using a novel application of the "least-cost" approach, to provide us with reliable estimates of current landscape connectivity for the two species. Ultimately, this project aims to model viability of the threatened forest bird populations for different reforestation scenarios and to translate these findings into practical recommendations for landscape restoration in the Taita Hills.

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## DAILY ROUTINES OF WINTERING BLACKCAPS (*SYLVIA ATRICAPILLA*) IN EASTERN SPAIN

Presented by **Jose I. Aguirre**

Michelangelo Morganti, Álvaro Ramírez, Jasper Van Heusden, José I. Aguirre, Mateja Bulaic, Francisco Pulido

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The behaviour and dynamics in the wintering quarters is a poorly explored aspect of the life-cycle of migratory birds. This part of the life-cycle, however, is of crucial importance for the survival of migrants and for their condition at the beginning of spring migration. Blackcaps winter in large numbers in eastern Spain. How these birds behave during this period is poorly understood. The aim of this study was, therefore, to describe, for the first time, the daily routines of wintering birds with a “resident strategy”, which live in a small area, in which food availability is virtually unlimited. Between April 2010 and February 2011, we captured and marked 506 blackcaps, giving each individual a unique colour coded ring. During the study period, we recaptured 13 (2.56%) and re-sighted 44 birds (8.69%); we also recorded the winter presence of 4 birds captured in the area during the breeding season (6.25%). We finally combined field observations and recapture data with individual tracks collected in a telemetry study on 10 birds. Telemetry results show that blackcaps have strict daily routines, involving a systematic exploration of the same feeding and roosting sites day after day. This knowledge combined with the information gained from recaptures/re-sightings of individuals at the same site after months suggests that wintering birds, once they have settled in the area, tend to repeat the same routines during the whole winter. Sporadic observation of territorial behaviour and the observation of a female monopolizing an artificial feeder, further suggest that these routines are to some extent plastic and can be adjusted to new environmental circumstances. This individual-based approach to the study of wintering behaviour in a partially migratory breeding population, which every winter has to cope with the presence of a high number of migrants invading their territories, will allow us to elucidate the role of winter dynamics in the evolution of partial migration.

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## FARMLAND USE AND HUMAN SOUND AFFECT THE HORMONAL RESPONSE TO AN ACUTE STRESSOR IN BARN OWLS

Presented by **Bettina Almasi**

Bettina Almasi<sup>1</sup>, Paul Béziers<sup>1</sup>, Alexandre Roulin<sup>2</sup>, Lukas Jenni<sup>1</sup>

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Modern human lifestyle has changed environmental conditions dramatically and confronts animals with many novel and potentially stressful anthropogenic perturbations, such as high input agriculture, the expansion of urban areas and the permanent presence of humans. Animals can react to a potentially stressful situation with the activation of the hypothalamic-pituitary-adrenal (HPA) axis, leading to a rise in corticosterone. The acute short-term secretion of corticosterone is considered beneficial and helps an animal to redirect energy and behaviour to cope with a critical situation. However long-term activation of the HPA-axis can impair e.g. reproduction and immune functions. In this study we investigated whether the cultures cultivated around nest-boxes and human presence affect baseline corticosterone levels of barn owl (*Tyto alba*) nestlings and their ability to react to an acute stressor. The adrenocortical response to an acute stressor was higher in barn owl nestlings living in habitats with high input agriculture than in more extensively cultivated habitats. Also the distance to the next inhabited house had an effect on the stress response, i.e. the closer the inhabited house was from the nest-box the higher was the response to an acute stressor, whereas baseline corticosterone was not affected. In a next step we tested experimentally whether barn owls react to the sound of humans. We exposed the nestlings to human voices and music during three days for four hours each day. Baseline and stress-induced corticosterone increased during the three days, showing that the nestlings react strongly to the sound of humans around their nest-box. All these results together suggest that anthropogenic factors can modulate strongly the HPA-axis at the level of baseline and stress-induced corticosterone concentrations.

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## **ECOLOGICAL CORRELATES OF COLONY SIZE IN AUDOUIN'S GULL (*LARUS AUDOUINII*) DURING THE BREEDING SEASON IN SARDINIA**

Presented by **Barbara Amadesi**

Barbara Amadesi, Nicola Baccetti, Marco Zenatello

*Italian National Institute for Environmental Protection and Research*

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Density-dependent factors affect the population dynamics of seabirds population growth, and food availability during the breeding season is a key factor in the regulation of population size. Colony size and spatial distribution of breeding seabirds can reflect local food availability and are influenced by the size of neighboring colonies, whose members can compete for food in overlapping foraging ranges. Audouin's gull (*Larus audouinii*) is an endemic seabird breeding in the Mediterranean region, Sardinia hosting the largest Italian breeding stock. There are some evidences of intra-specific competition in Audouin's gull, while the impact of sympatric and superabundant yellow-legged gull (*Larus cachinnans*) is less clear and may involve, beside competition, also kleptoparasitism and predation. We investigated the effect on size of 21 Audouin's gull colony sites occupied at least once over 12 breeding seasons (1997–2008) of the following parameters: distance to the nearest conspecific colony, number of Audouin's gulls breeding within the foraging range, yellow-legged gull density at the breeding site and within the foraging range. Foraging areas have been drawn as circular areas around colonies with different radii equal to three possible flight distances (30, 50 and 70 km), compatible with recorded instances. The response variable was modeled as a function of explanatory variables through zero-inflated negative binomial model using R software. The model predicts that colony size of *Larus audouinii* is negatively affected by both number of conspecifics and of yellow-legged gulls. Our results suggest that, under current conditions, the number of Audouin's gull nesting pairs is limited (i) by intra-specific competition for food around colonies, providing support for Ashmole's hypothesis that seabird populations are limited by food supplies during the breeding season, and (ii) by ecological interactions with sympatrically-breeding yellow-legged gulls.

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## INTER-INDIVIDUAL VARIATION IN TELOMERE LENGTH: CAUSES AND CONSEQUENCES IN A MIGRATORY BIRD SPECIES

Presented by **Frédéric Angelier**

Frédéric Angelier<sup>1</sup>, Carol Vleck<sup>2</sup>, Rebecca Holberton<sup>3</sup>, Christopher Tonra<sup>3</sup>,  
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In ecological studies, there is growing interest in telomeres because their length is thought to be a potential good proxy of the 'physiological age' and remaining lifespan of vertebrates. Telomeres are repeated DNA sequences located at the end of chromosomes and they are known to protect chromosome integrity. Interestingly, telomere length (TL) can vary in great extent between individuals, raising therefore the question of the causes and consequences of such variability. Although TL has been shown to vary with age and to be related to fitness components in birds, it remains unclear how environmental conditions can affect TL and its relationship to fitness. Here, we examined this question in a small migratory bird, the American redstart (*Setophaga ruticilla*). We showed for the first time that TL is (1) affected by age and habitat quality and (2) can concomitantly predict annual survival in redstarts (n=120). First, telomeres shorten with advancing age in all individuals. Importantly, this shortening is faster for individuals wintering in low-quality habitat (dry scrubs) than for individuals wintering in high quality habitats (mangroves), suggesting therefore that age and environmental conditions interact to determine telomere dynamics in wild birds. Second, birds with long telomeres survive better than birds with short telomeres. Again, this relationship is more pronounced for birds wintering in low quality habitats than for birds wintering in high quality habitats, demonstrating for the first time that TL predicts survival in a context-dependent manner. Although it remains unclear how long telomeres can mechanistically provide fitness benefits to wild vertebrates, we show here that both telomere dynamics and the relationship between TL and survival depends on a bird's environment. An environment of poor quality may act on both of these components by increasing the probability of an individual to be confronted to constraining and life-threatening events.

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## MOVEMENTS, HABITAT CHOICE AND BREEDING SUCCESS OF THE MARSH HARRIER (*CIRCUS AERUGINOSUS*) IN FRAGMENTED LANDSCAPES

Presented by **Anny Anselin**

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The Marsh Harrier (*Circus aeruginosus*) is a species of the Annex I of the EU Birds' Directive. It occurs in a range of open habitats, mainly wetlands. These are rare in the highly fragmented landscape of Flanders (Belgium). During the last decade, breeding numbers declined in its NW-European range. The causes can be multiple. Changes in marshland breeding habitat quality and land use in the feeding home ranges could cause local changes in breeding success that might lead to sink populations. Locally, the species started to shift to intensive farmland (cereal fields) as a nesting habitat. Little is known about the long-term effect of this behaviour on population demography. This year, we started a long-term research project, including populations from Belgium and The Netherlands at sites with different fragmentation levels. A first objective is to collect data on dispersal and home-ranges using wing tags and radio-tagging. A second aim is to compare breeding success in habitats of different sizes and habitat types. The data should give us insights into the magnitude of exchange of birds among populations and sites, and on habitat use, and answer questions as: how is the exchange between populations achieved, (2) are there differences between wetland and farmland birds, (3) do differences depend on the fragmentation level, (4) do birds (adults/offspring) that breed successfully in farmlands show habitat fidelity, (5) can this be linked to individual performance? This knowledge is important to evaluate the overall population status and to provide conservation policy advice. The poster presents an analysis of population trends and distribution in Flanders and the adjacent part of The Netherlands during the last 15 years, and the first results of the breeding season 2011.

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## **TERRITORIAL BEHAVIOUR AND TESTOSTERONE IN MALE BLACK REDSTARTS (*PHOENICURUS OCHRUIROS*): FROM PLASMA TO BRAIN**

Presented by **Beate Apfelbeck**

Beate Apfelbeck, Wolfgang Goymann

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Natural plasma testosterone levels in temperate zone male songbirds vary markedly between individuals even when sampled during the same breeding stage. Social interactions between males are thought to be one major factor influencing short and long-term fluctuations in testosterone levels within individuals. Furthermore, it is thought that territorial behaviour of temperate zone songbirds is regulated by testosterone, because seasonal testosterone profiles closely match the occurrence of territorial behaviour in males. These two components of the relationship between testosterone and territorial behaviour may involve different levels of testosterone (from baseline to elevated levels). Male black redstarts defend territories and sing during the breeding season and also in autumn, before they migrate south. But their testosterone levels are only elevated during the breeding season. Thus, black redstarts are an ideal study species to explore if and how tightly territorial behaviour is facilitated by testosterone across seasons and if testosterone levels are socially modulated. We addressed these questions in a series of experiments. Our data show that male black redstarts do not modulate testosterone levels during male-male interactions although they have the physiological capacity to do so. However, territorial behaviour may be still facilitated by testosterone during the breeding season and in autumn as experiments in which we blocked the action of testosterone on the brain show. We will also try to relate these results based on plasma testosterone levels with androgen and estrogen receptor densities in the brain.

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## **INTEGRATED DISTURBANCE ECOLOGY: FROM THE IMPACT OF OUTDOOR WINTER SPORTS ON ALPINE WILDLIFE TO THE CREATION OF WINTER PRESERVES**

Presented by **Raphael Arlettaz**

Raphaël Arlettaz<sup>1,2</sup>, Patrick Patthey<sup>1</sup>, Susanne Jenni-Eiermann<sup>2</sup> and Veronika Braunisch<sup>1,3</sup>

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The steady spread of tourism and leisure activities exerts huge impacts on biodiversity. Rapidly developing outdoor winter recreation such as free-riding is threatening wildlife of mountainous ecosystems, with traditional networks of nature reserves being insufficient for effectively mitigating disturbance effects. We studied the impact of outdoor winter sports on the black grouse, a threatened bird whose timberline habitat largely overlaps with snow sports in the Alps — the main winter tourist destination of Europe — with the idea to propose corrective measures. We could first quantify (wide-range comparative approach plus flushing experiments) the detrimental physiological (stress and energetics) and behavioural responses of black grouse subjected to anthropogenic disturbance in winter. Second, we modelled the winter habitat of three different «species» (black grouse, skiers — including snowboarders — and snowshoers) from aerial photographs: this enabled recognizing and predicting main areas of conflicts between black grouse and winter snow sports, especially free-ride activities. The resulting maps allowed setting priorities for delineating optimally located winter preserves in the SW Swiss Alps, where public steering measures will be implemented (forbidden access in winter). The methodology developed can be used for other wildlife exposed to anthropogenic disturbance in other areas where winter recreation represents a potential threat to biodiversity.

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## SEX-BIASED DISPERSAL AND BREEDING SITE AVAILABILITY

Presented by **Debora Arlt**

Debora Arlt

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Sex-biased dispersal is often explained by assuming that the resource-defending sex pays greater costs of moving from a familiar area. I hypothesize that sex-biased dispersal may also be caused by a sex bias in breeding site availability. In avian resource-defence mating systems, site availability is often more constrained for females: males can choose from all vacant sites, whereas females are restricted to sites defended by males. Using data on breeding dispersal of a migratory passerine, I show that average number of available breeding options and availability of the previous year's territory was greater for males than females. The female bias in site unavailability may explain the female bias in probability of breeding dispersal because there was no sex bias in dispersal among birds with their previous year's territory available. I suggest that sex biases in the availability of breeding options may be an important factor contributing to observed variation in sex-biased dispersal patterns. I further discuss the potential role of site availability for dispersal in general and spatial dynamics of populations.

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## **THE BREEDING PHENOLOGY, EGG AND CLUTCH SIZE AND REPRODUCTIVE OUTPUT OF THE WHITE-SPECTACLED BULBUL (*PYCNONOTUS XANTHOPYGOS*)**

Presented by **Aziz Aslan**

Aziz Aslan<sup>1</sup>, Ali Erdoğan<sup>2</sup>

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*2 Akdeniz University, Faculty of Science and Arts, Dept. of Biology, 07058, Antalya, Turkey*

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The phenology, egg and clutch size and reproductive output of the white-spectacled bulbul is unknown in the Mediterranean region of Turkey, although it is the most common species. The white-spectacled bulbul established territories from March to July, and the mean date of nest building was May 13. Laying took place between late March to August, and the mean date of first egg was May 21. The duration of the incubation and nestling period was  $10.94 \pm 0.19$  and  $13.04 \pm 0.17$  days, respectively, and clutch size averaged  $3.41 \pm 0.07$ . The hatching, fledging, and overall breeding success was 80.29%, 86.23%, and 69.23%, respectively.

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## COLOUR-RINGING OF LITTLE RINGED PLOVER (*CHARADRIUS DUBIUS*) STARTED IN ESTONIA

Presented by **Jaanus Aua**

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The Little Ringed Plover is a widespread breeder around the Baltic (up to 17 000 pairs) with numbers stable within the last decade. There has been relatively little research on the species in the area. The topics include studies on sexual dimorphism, ageing, sexual selection and breeding ecology. Despite the fact that thousands of individuals have been marked, mainly with metal rings, the migration routes and wintering grounds of the Baltic population of the Little Ringed Plover are not well known. In Estonia the species breeds mainly in anthropogenic habitats, like gravel and limestone quarries and in construction grounds. The national population reached its lowest level in the 1990s, increased in the 2000s, probably due to environmental changes associated with economic growth, and currently consists of ca. 2000 pairs. The Estonian Wader Study Group started a colour-ringing project on the Little Ringed Plover in 2010. The aims of the project is to collect data on the demography, breeding success, and nest site preferences of the Estonian population, examining breeding-site fidelity and natal philopatry, and preparing a study on the migration movements and wintering sites of this species. The Estonian birds are marked with a white ring with a black code (3 numbers and/or letters) on tarsus. 34 Little Ringed Plovers (8 adults and 26 chicks) were colour-ringed and additionally 36 chicks were marked with just a metal ring in 2010.

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## FOOD COMPOSITION OF THE URAL OWL (*STRIX URALENSIS* PALL.) IN LATVIA

Presented by **Andris Avotiņš jr.**

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Research was developed to establish Ural owl (*Strix uralensis* Pall.) food composition in Eastern Latvia and to identify possible differences between various nesting habitats, breeding females, territories and over the study period. We analyzed 51 food samples collected at nests of Ural owls in forests (Lubāna sample area — 36 samples) during the period of 1989—2010, and in agricultural landscapes (Mētriena and Pļaviņas sample areas — 15 samples), 2004—2010. Samples were compared using total of prey-object average biomass pooled in groups. In total, more than 1000 prey objects from at least 38 species were identified, about 2/3 of them were mammals (dominated by *Microtus* voles and European mole *Talpa europaea*), birds — 1/3 (dominated by birds larger than thrush size, but smaller birds were also found), others — amphibians and insects. In forest landscapes, Ural owl feeds significantly (Mann-Whitney U;  $p=0.05$ ) more on birds larger than thrush size than in agricultural landscapes. We found no statistically significant relationship between food of different females, territories and over the study period. We found that the Ural owl in Eastern Latvia is a generalist predator, feeding on the most accessible food items — objects with high abundance that are found more frequently, e.g. in years when moles are abundant. Birds larger than thrushes are rarely found. Such a relationship was found between mammals (mole and *Microtus* voles) and birds (thrush size and larger).

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## DO HIGH NUMBERS REALLY TRIGGER AUTUMN MOVEMENTS IN THE LONG-TAILED TIT? AN EXPERIMENTAL STUDY

Presented by **Olga Babushkina**

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The Long-tailed Tit (*Aegithalos c. caudatus*) in northern Europe shows irregular evasions of individuals in autumn and is generally considered as an irruptive migrant. It is suggested that large-scale movements in this species, as in other irregular migrants, depend on food availability or population density in the breeding areas. Our previous studies on the population of NW Russia (Babushkina, Bojarinova, in press) showed, however, that Long-tailed Tits have two periods of high locomotory activity in their annual cycle that are endogenously controlled and regulated by external photoperiod. In the present work, we investigated the possible role of high population density as a trigger of autumn movements. We recorded the dynamics of autumn locomotory activity in groups of Long-tailed Tits simulating different social environments. One group of 8 hand-raised birds was kept isolated from any contact with conspecifics after an age of 30 days (just after becoming independent) until the end of the experiment. Other birds (hand raised or trapped after fledging) were kept in a company of 23 individuals with the possibility to see and hear each other and free-living conspecifics. At the age of about 50 days all the birds from the isolated group and 8 birds from the company were subjected to locomotory activity registration. Two groups were recorded separately in different buildings, one still completely isolated and the other in contact with the rest of the company. All tested birds from both groups showed an increase in the locomotory activity compared to the initial summer level. The timing and level of activity and dynamics of fat reserves in two experimental groups will be discussed. This study was supported by Russian Foundation for Basic Research grant no. 09-04-01087a.

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## THE WINTERING POPULATION OF COMMON BUZZARD (*BUTEO BUTEO*) IN EASTERN MOLDAVIAN REGION (ROMANIA)

Presented by **Emanuel Baltag**

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As a fact, birds of prey are positioned at or near the end of food-chains, and at the top of food pyramids, so they are well known as suitable indicators for ecological completeness and environmental health. Monitoring their numbers is a basic tool for population trend studies and understanding the effect of environmental changes on biodiversity. During the winter season 2010—2011 (November—February) we made 15 line transects per month, each transect having 40 km length, where we attempted to count birds of prey species from the eastern part of the Moldavian Region. In order to estimate the density of wintering birds of prey, we recorded perpendicular distances of the birds from transect lines. Nine species of birds of prey were recorded, but an adequate number of observations to estimate density were collected only for the Common Buzzard (*Buteo buteo*). The transect covered 7 categories of habitats (artificial surfaces, agricultural areas, vineyards, fruit trees plantations, natural forests and artificial forests, pastures and herbaceous vegetation associations, wetlands and water bodies). We analyzed the birds' density based on these categories of habitats, and the highest range was found on agricultural areas (0.44—0.55 individuals/km<sup>2</sup>) while the lowest was seen on artificial surfaces (0.09—0.12 individuals/km<sup>2</sup>) and wetlands and water bodies (0.10—0.13 individuals/km<sup>2</sup>). The total density, for all seven categories of habitat for Common Buzzard was 0.34—0.43 individuals/km<sup>2</sup>. An important record which was made in these transect points was the Long-legged Buzzard (*Buteo rufinus*), which usually is a migratory breeding species in these regions, but was recorded for the first time in 2007 in the Moldavian Region.

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## HOW MUCH DO WE OVERESTIMATE FUTURE LOCAL EXTINCTION RATES WHEN RESTRICTING THE RANGE OF OCCURRENCE DATA IN CLIMATE SUITABILITY MODELS?

Presented by **Morgane Barbet-Massin**

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Climate suitability models are used to make projections of species' potential future distribution under climate change. When studying the species richness with such modelling methods, the extent of the study range is of particular importance, especially when the full range of occurrence is not considered for some species, often because of geographical or political limits. Here we examine biases induced by the use of range-restricted occurrence data on predicted changes in species richness and predicted extinction rates, at study area margins. We compared projections of future suitable climate space for 179 bird species breeding in Iberia and North Africa, using occurrence data from the full Western Palearctic (WP) species range and from the often-considered European-restricted range. Current and future suitable climatic spaces were modelled using an ensemble forecast technique applied to five general circulation models and three climate scenarios, with eight climatic variables and eight modelling techniques. The use of range-restricted compared to the full WP occurrence data of a species led to an underestimate of its suitable climatic space. The projected changes in species richness across the focus area (Iberia) varied considerably according to the occurrence data we used, with higher local extinction rates with European-restricted data (on average 38 vs 12% for WP data). Modelling results for species currently breeding only in North Africa revealed potential colonization of the Iberian Peninsula, which highlights the necessity to consider species outside the focus area if interested in forecasted changes in species richness. Therefore, the modelling of current and future species richness can lead to misleading conclusions when data from a restricted range of occurrence is used. Consequently, climate suitability models should use occurrence data from the complete distribution range of species, or at least within biogeographical areas.

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## THE TIMING OF PRIMARY MOULT IN THE CURLEW SANDPIPER VARIES WITH ENVIRONMENTAL VARIABLES

Presented by **Yahkat Barshep**

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The yearly onset of primary moult and growth pattern of individual primaries was examined in a population of Curlew Sandpipers (*Calidris ferruginea*) which migrate to Kenya, India, South Africa and Australia. Generally, moult started earliest at the northernmost latitudes and got progressively later farther south. In Kenya and India, the start of moult appeared to correspond with the onset of the rain season in these regions. In South Africa and Australia, the onset of moult was related to predation pressure and temperature on the Arctic breeding areas. There was little difference in the pattern of primary feather replacement within the species. Curlew Sandpipers were able to adjust the rate of moult by varying the number of feathers growing simultaneously and by varying the growth rate of individual primaries. This allowed populations at the southernmost limit of the non-breeding range to complete moult in time for spring migration and for populations at the northernmost limit in India to complete moult before the onset of the post-monsoon season. Because of its sensitivity on environmental variables, moult is a potential variable for measuring the impacts of climate change on avian life-history traits.

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## MATE CHOICE INFLUENCES DIFFERENTIAL INTROGRESSION IN A HYBRID ZONE

Presented by **Julia Barske**

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Hybrid zones are widely recognized as important sources of genetic variation, and conduits for the exchange of genes from one species to another. How and which traits move, or introgress, is an important area of study in evolutionary biology. A hybrid zone between two manakin (Pipridae) species, *Manacus candei* and *Manacus vitellinus*, exists in Bocas del Toro Province, in western Panama. The hybrid zone is unique in that the plumage genes of *Manacus vitellinus* introgress up to 50 km beyond the genetic center of the hybrid zone, into populations that are morphologically and genetically similar to *M. candei*. *M. vitellinus* and plumage introgressed males are more aggressive than *M. candei* males, lending support to the intrasexual selection hypothesis for plumage introgression. If *M. candei* females preferred males with *M. vitellinus* plumage traits, introgression of *M. vitellinus* plumage genes would be explained by both intra- and inter-sexual selection. *Manacus* spp. have a lek mating system; males perform elaborate, acrobatic courtship displays on small arenas on the forest floor, producing loud ‘wingsnaps’ and maximizing the visibility of their colored throat feathers. We have recently shown that display performance is associated with female preference in *M. vitellinus*, with females preferring males that perform certain moves faster. Thus, we hypothesized that female choice based on courtship display drives asymmetrical trait introgression. We studied whether display performance differs between the two species. Using high speed videography to film courtship displays of males of the two species, we compared them for those traits which in *M. vitellinus* are correlated to female preference. Contrary to our expectations, we found that *M. candei* males outperform *M. vitellinus* males. We propose that *vitellinus*-like plumage is preferred by females, but only when it recombines with the *candei* morphometric background, and hence, the superior display ability of *M. candei*.

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## OPTIMAL ANNUAL ROUTINES OF AVIAN LIFE

Presented by **Zoltan Barta**

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An annual routine of a bird specifies the timing of its major life history events (e.g. breeding, moult) over the annual cycle. In a uniform environment timing is not a problem, because every time of the year is the same. In contrast, if the environment is seasonal then the timing of actions becomes crucial. An optimal annual routine gives the timing which maximises fitness in a seasonal environment. Finding this optimal routine is far from being a trivial problem. First, past behaviour may constrain the currently available actions. Second, present behaviour determines a bird's future state which, in turn, influences what actions can be performed in the future. Third, actions, like breeding and moult, can be mutually exclusive, i.e. they cannot be performed at the same time. Fourth, many life history events require lengthy physiological preparation, which must be taken into account. Therefore we need a self-consistent, holistic approach where trade-offs are mediated through state variables. The technique of optimal annual routines developed by A.I. Houston and J.M. McNamara fulfils these conditions. This approach is able to include physiologically mediated life history trade-offs and tackle effects that carry over from one time of year to another. Furthermore, it can deal with intergeneration effects. Here, I give a short introduction to the technique and present case studies that demonstrate its capabilities. Specifically, I discuss the following questions: How does the environment influence moult strategies, and what determine the sequence of moult? What influences the relative timing of moult and migration? How can latitudinal differences explain the geographical trends found in clutch size from the Equator to the Poles? Finally, I investigate the effect of year-to-year environmental stochasticity on the timing of actions when performing a behaviour requires lengthy physiological preparations.

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## POSITIVE ASSORTATIVE MATING FOR MELANIN-BASED TRAIT IN TREE SPARROW (*PASSER MONTANUS*)

Presented by **Michaela Bartikova**

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Nonrandom mating with respect to some phenotypic traits, which is supposed to be a part of active mate choice, is called assortative mating. Females of high quality in socially monogamous species are expected to mate with high-quality males. We studied assortative mating for different morphological traits in a wild population of tree sparrows in two different populations in Lower Austria and south-western Slovakia during years 2001—2011. Most studies on assortative mating in birds are limited to highly sexually dimorphic species mainly in size. However our model species is considered to be sexually monomorphic in morphological traits, in contrast with this assumption we found significant sexual size dimorphism for tarsus, wing and tail length and males were on average also heavier than females. Tree sparrows mated assortatively by tarsus length and throat patch characteristics (length, width) — the strongest assortative mating occurred for tarsus length and throat badge length and remained significant after controlling for other morphological traits, suggesting that it was not an artifact of assortative mating for body size. Males with long throat patch mated with females with long throat patch and this trait in males was also positively correlated with their condition, which indicates that this trait could be a sexually selected trait by both sexes. The throat patch is a melanin-based trait expressed in both sexes in tree sparrow. Both parents participate in caring for the young, so there should be mutual mate choice, because males and females should both benefit from choosing a good parent. As far as we know there are no published studies on this topic in our studied species and also evolution of female ornaments is poorly understood. In our future study we would also like to investigate signal function of male and female breast patch for parental care and its relation to breeding success.

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## EFFECT OF ISOLATION FROM FORESTS ON BIRD DIVERSITY OF HEDGEROWS

Presented by **Peter Batáry**

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Hedgerows and forest edges play a major role in providing nesting sites, food resources and shelter for birds in agricultural landscapes of Western Europe. In our study we investigated the response of farmland vs. woodland birds to different degrees of isolation of hedges from forest and to vegetation structure. We studied six forest edges, six hedges connected to forests and six isolated hedges. Species richness and abundance of farmland birds were higher in hedges than in forest edges, species richness and abundance of woodland birds were lower in hedges than in the forest edges. Species richness and abundance of both groups did not differ between connected and isolated hedges. Width of hedges and edges positively affected the species richness and abundance of woodland birds. Furthermore, bird community composition differed between habitat types (hedge vs. forest edge) and between hedge isolation levels (hedges connected to forest vs. isolated hedges). Hence, both connected and isolated hedges harboured different communities, i.e. they benefitted different species. Based on our results we emphasize the importance of hedges in conserving farmland birds and encourage policy makers to support hedge creation and maintenance with landscape-wide management strategies supporting a diverse hedgerow structure. Both connected and isolated hedges play an important role as they harbour different bird communities. Broad hedges can serve as alternative habitats for woodland birds at least as corridors and stepping stones. Therefore, hedge and forest edge width, which plays an important role for the whole bird community, should be also considered by policy makers.

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## PURPORTED OR REAL INVASIVENESS OF NON-NATIVE BIRDS IN CENTRAL EUROPE

Presented by **Hans-Günther Bauer**

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Introduced or escaped non-native species rank among the most important threats to biodiversity. The occurrence of neozoans has increased dramatically in recent decades, particularly in the industrialised world. But whereas introduced species may wreak havoc in island ecosystems, evidence of similarly negative effects on a continental level is limited, and often restricted to plant species, fast-spreading invertebrates, and some predatory higher vertebrates. In continental European birds we notice a marked contrast between the drastically increasing number of allochthonous bird species recorded and the few data (or even proof) of direct impacts on populations or communities of native species. We discuss the current state of knowledge with regard to invasive bird species in Central Europe, address the lack of adequate research into the ecology of avian neozoa, and call for scientifically accepted threshold levels with which to assess the species' impact or "invasiveness". Finally, we propose a system of three categories under which different neozoan bird species should be subsumed in order to concentrate conservation efforts. We suggest to focus measures to those cases where action is adamant and elimination of real invasives necessary, and ignore others where efforts are (as yet) unnecessary or even contra-productive in terms of financial and work input, limited feasibility, and negative public relations.

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## CIRCULATING CORTICOSTERONE IN GREAT TITS: UNDERSTANDING THE INDIVIDUAL

Presented by **Alexander Baugh**

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The avian stress response has been studied intensively for several decades, and yet the basis for what is often extraordinary variation in natural hormone levels remains largely unanswered. Within a species, variation in circulating glucocorticoid levels might arise from a complex set of determinants, including intrinsic (e.g., genetic background) and extrinsic factors (e.g., proximate environmental circumstances). By estimating within- and between-individual variation in corticosterone (CORT) levels we might better understand the sources of hormonal variability and consistency. Intrinsic factors, (e.g., neophobia) however, are often correlated with other behavioral traits within individuals. By examining how such suites of correlated behavioral traits map on to hormonal variation we aim to better understand the sources of phenotypic diversity. To do so we examine individual variation in plasma corticosterone (CORT) levels in adult great tits (*Parus major*), focusing on the time course of the stress response and the nature of the stressor. We explore the shape of the stress response in wild birds and captive birds bi-directionally selected for consistent individual differences in behavior (i.e., behavioral profiles, personalities). The results demonstrate that the relationship between behavioral profiles and CORT levels is more complex than previously thought. For example, we show that birds from the two selection lines differ in their peak CORT levels, but that the direction of the effect depends markedly on the type of stressor applied. Further, in wild birds, our results suggest that individual differences in CORT during the negative feedback phase of the stress response (but not peak CORT) are linked to differences in exploratory tendencies. Together these studies provide insight into the causes of hormonal variability and emphasize the need to estimate more than just baseline and peak hormone levels.

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## ENERGETICS OF BREEDING IN AN ARCTIC SEABIRD: THE BLACK-LEGGED KITTIWAKE (*RISSA TRIDACTYLA*)

Presented by **Claus Bech**

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Birds are often energetically challenged during the breeding period and have to allocate the available resources in such a way that their own body functions are maintained as the same time as the chicks are provided with the necessary energy to sustain growth and development. In harsh climatic environments and in areas where food is patchy, an optimal resource allocation is especially important. The black-legged kittiwake (*Rissa tridactyla*) is a medium-sized marine gull, which has a circumpolar distribution with its northernmost breeding areas in the high Arctic. In this talk, I will summarize studies from Spitsbergen, Norway, on the energetics of breeding in these high-Arctic kittiwakes. Immediately after hatching of the chicks, breeding adult kittiwakes experiences a decrease in body mass, basal metabolic rate (BMR) and daily energy expenditure (DEE). It thus seems that the first part of the chick-rearing period is a period of negative energy balance for the adult birds. This is probably caused by time constraints, since one of the adults needs to attend the nest at all times. When chicks becomes thermally independence (about 15 days old), both adults will provide food for the chicks, and the adult DEE will hence increase during the remainder of the chick-rearing period in parallel with the increasing energy demand of the chicks. The BMR, however, is kept at a low level until the end of the chick rearing period. This causes the factorial metabolic scope (DEE/BMR) to increase from 2.5 to 3.9 from the incubation period to the end of the chick-rearing period. Several years of measurements of DEE during the late chick-rearing during provide surprisingly similar results, despite yearly variations in both food abundance and breeding success. This suggests that there is an intrinsic energetic ceiling in these high-Arctic breeding kittiwakes.

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## INDIVIDUAL IMPROVEMENTS DURING THE LIFESPAN OF COMMON TERNS IN RELATION TO FITNESS

Presented by **Peter H. Becker**

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Age-dependent change characterises the life of short- and long-lived birds. In my talk, I address lifelong developments in the Common Tern (*Sterna hirundo*) and their consequences for individuals and the population. Based on the long-term, individual-based and integrated population study at the colony site “Banter See”, Germany, I show that age-dependent change at the population level comprises many traits of behaviour, timing, physiology, body condition and reproduction. Individual improvements were found to be the major mechanism of this change whose effects are further enhanced by selection. Thus, old individuals represent an important part of the population, as they are shaped by ontogeny and selection and contribute most to the next generation. The fitness benefits of breeding attempts late in life are only marginally narrowed by senescence. In conclusion, lifelong ontogeny *per se* turns out to be a significant life history characteristic affecting fitness and demography.

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## EXPERIENCE WITH THE HACKING METHOD FOR SUPPORT OF THE LESSER SPOTTED EAGLE (*AQUILA POMARINA*) POPULATION IN GERMANY

Presented by **Uģis Bergmanis**

Bernd-U. Meyburg, Uģis Bergmanis, Torsten Langgemach, Kai Graszynski, Arno Hinz, Ingo Börner, Paul Sömmer, Christiane Meyburg

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The Lesser Spotted Eagle belongs to the group of species with obligatory Cainism which means that, although two chicks usually hatch, both seldom fledge from the eyrie. The breeding population in Germany, on the western fringe of the breeding range, is in decline. A great deal of effort has been made to stabilize the population through habitat protection in the breeding areas. In addition, since 2004, nestling management has been implemented as a conservation measure. The method involves the removal from the nest of the second chick (Abel) shortly after hatching and rearing it in captivity. Shortly before fledging the anonymously reared young eagle is put back into a nest with a young eagle of about the same age. This procedure is now commonly described as ‘fostering’. Between 2004—2006, five additional young eagles successfully fledged in this way. The first Abel fledged with human assistance in 2004 was identified by its colour ring in the following year in the breeding area. In order to increase the number of annually fledged young eagles, from 2007 onwards, Abels from Latvia were also introduced. From 2009 onwards the management was further optimized using the hacking method. Here, the young eagles are not returned into eyries in the wild but are prepared for release in a so-called hacking station. Between 2004—2008, 26 Abels were fledged using the fostering method. In 2009 and 2010 a total of 32 additional second-born young were fledged using the hacking method. All young eagles are ringed and many of them fitted with satellite transmitters. The hacking method is in general more advantageous than the fostering method. When food is in short supply this reduces the risk that the first-born in the eyrie is negatively affected. As hacking eagles are always well fed, their physical condition on departure to their winter quarters in Africa is better than that of either unmanaged or fostered young eagles.

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## MODELLING BIRD SPECIES DISTRIBUTIONS IN FLOODPLAINS — A TEST OF TOPOGRAPHICAL INDEXES AS PROXIES OF FLOODING SUSCEPTIBILITY

Presented by **Aurelien Besnard**

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Floodplain wetland biodiversity is increasingly threatened by anthropogenic and climatic changes. In areas still subjected to regular floods, low intensity agriculture and hay meadows are often maintained. In general, grassland habitat species are declining in several parts of Europe. In order to protect efficiently these species, it is necessary to understand the ecological factors that determine their distribution. Species distribution modeling techniques are particularly adapted to tackle this issue. However, a major problem is to find relevant proxies of the hydrological regime in floodplains. Topographic wetness indices may be valuable to this respect because they often require nothing more than a digital elevation model (DEM). We modelled the breeding ecological niche of 4 grassland passerines the whinchat (*Saxicola rubetra*), the yellow wagtail (*Motacila flava*), the reed bunting (*Emberiza schoeniclus*), and the corn bunting (*Emberiza calandra*) in the Loire river valley (France). We used two approaches to test the informative value of topographic indices for species distribution models. We used Maxent for presence-only data and GLMs for abundance data from transects. We also modelled community richness. Based on our data, we discuss the interest and efficiency but also the limits of topographical wetness indices for modelling the distribution of wetland species.

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## INDIVIDUAL WEIGHT DIFFERENCES OF VARIOUS DUCK SPECIES IN LATVIA 1993—2010

Presented by **Jānis Bētiņš**

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Since 1993, we conducted hunters-bag survey on seven sites in Latvia: Lake Engure, Lake Kaņieris, Lake Babīte, Lake Liepāja, Nagļi fishponds, ponds in Saldus district and ponds in Tukuma district. Our aim was to obtain information about locally breeding and moulting duck populations. Thus our observations were focused on the first weeks of hunting in August when local populations are mostly hunted. In total, we obtained 9051 weight measurements of 10 species: *Anas platyrhynchos*, *Anas crecca*, *Anas querquedula*, *Anas clypeata*, *Anas penelope*, *Anas strepera*, *Aythya fuligula*, *Aythya ferina*, *Aythya marila*, *Bucephala clangula*. We analyzed the data sorted by age, sex and geographical location as well as annual and seasonal fluctuations. Significant differences were revealed between eastern (Nagļi) and western (Engure) parts of Latvia (e.g. *Anas platyrhynchos* males in 2007 were significantly heavier — on average 103 g,  $p < 0.00002$ , t-test). We discuss possible explanations of such differences — feeding conditions, water level at the lake, inheritance and variance between populations.

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## TIMING AND BREEDING SUCCESS OF EUROPEAN HONEY-BUZZARDS IN THE PAST CENTURY

Presented by **Rob Bijlsma**

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The European Honey-buzzard (*Pernis apivorus*) is a long-distance migrant wintering in tropical Africa. The annual cycle is seriously time-constrained. Birds arrive on breeding grounds between 8 and 14 May. Egg laying starts on average on 26 May, incubation lasts 29–32 days, nestling period takes 37–42 days and post-fledging varies between 5 and 25 days. Honey-buzzards are present on the breeding grounds for 130 days, of which 115 days are needed to complete the breeding cycle. Average May temperature in The Netherlands has risen by 1.5°C between 1971 and 2009. Emergence dates of wasp queens in spring are positively correlated with May temperature, and have advanced by a month between the mid-1970s and late 2000s. Spring arrival of Honey-buzzards has only slightly advanced in recent decades. Onset of laying did advance with seven days between 1973 and 2010, and is positively correlated with May temperature. Wasp abundance in 1974–2010 varied with a factor of 45 between years. Reproduction of Honey-buzzards is affected by wasp abundance, especially during years with few wasps (brood failure, pairs refrain from breeding) or with high abundance (high breeding success). In the 1970s and 1980s, wasp scarcity was countered by extensive predation on squabs of Woodpigeons (*Columba palumbus*). Woodpigeon populations crashed in the 1980s, and years with few social wasps are now characterised by poor breeding success. The past century showed a strong advancement of wasp cycles, and a moderate advancement of egg laying in Honey-buzzards (but not in spring arrival). Whether this apparent mismatch is responsible for the decline, as recorded in The Netherlands and in much of Europe, is not certain. The increase of intra-guild predation, mainly by food-stressed Goshawks (*Accipiter gentilis*), and widespread destruction of winter habitat in tropical Africa may have an overriding influence on survival and reproduction.

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## BREEDING SUCCESS OF FOREST-DWELLING BIRDS OF PREY IN NATURAL VS. ARTIFICIAL NESTS

Presented by **Heidi Björklund**

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Changes in forest environment affect the populations of forest-dwelling birds of prey by altering the quantity and quality of their breeding habitat. Forests may become less suitable for birds of prey due to habitat loss, too small forest patches for their territories or lack of stout trees that can support the big branch nests of hawks and eagles. Raptor enthusiasts have helped birds of prey by constructing artificial branch nests to replace a fallen nest or to attract birds of prey to breed in forests without suitable nest trees. However, it has been uninvestigated how artificial nests actually help the birds of prey. Common birds of prey have been monitored for 28 years in Finland, North Europe. As a part of the study, volunteer bird of prey ringers and enthusiasts have gathered nest card data on common bird of prey nests with information on breeding success. All known nests of Osprey (*Pandion haliaetus*) have been monitored for 39 years and those of White-tailed eagle (*Haliaeetus albicilla*) for 31 years in Finland. We examine the breeding success of three middle-sized hawks Northern Goshawk (*Accipiter gentilis*), Common Buzzard (*Buteo buteo*) and Honey Buzzard (*Pernis apivorus*) as well as two big raptors Osprey and White-tailed eagle in natural and artificial branch nests to find, if there are differences in breeding output. This information could improve the protection of birds of prey.

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## **THE PRESENT STATUS OF THE AVIFAUNA OF THE CITY OF LVIV (UKRAINE) AND ITS CHANGES**

Presented by **Andriy Bokotey**

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The urban environment is very dynamic; in this case bird communities are very changeable over time. The avifauna in the city of Lviv was recorded in an area of 66.7 km<sup>2</sup> during breeding and wintering seasons between 2004 and 2007. A total of 85 bird species were recorded, 74 locally breeding species (population density is 443.0 pairs/km<sup>2</sup>) and 48 wintering species (density 1142.4 individuals/km<sup>2</sup>). Surveys have been carried out in different built-up areas and green areas. 49 breeding species (592.2 pairs/km<sup>2</sup>) and 40 wintering species (1939.4 individuals/km<sup>2</sup>) were recorded in areas with blocks of flats; 38 breeding species (621.0 pairs/km<sup>2</sup>) and 30 wintering species (1533.9 individuals/km<sup>2</sup>) were recorded in the central part of the city; 57 breeding species (405.1 pairs/km<sup>2</sup>) and 43 wintering species (1242.1 individuals/km<sup>2</sup>) were recorded in areas with small houses; 44 breeding species (237.2 pairs/km<sup>2</sup>) and 30 wintering species (721.3 individuals/km<sup>2</sup>) were recorded in industrial areas; 65 breeding species (371.9 pairs/km<sup>2</sup>) and 38 wintering species (741.7 individuals/km<sup>2</sup>) were recorded in parks, forests, and grave yards. Changes in species composition have occurred since 1993. 8 species have disappeared in the city, 17 species show declines, 37 species have increased by numbers, and 7 new species have appeared. Appearance of an urban population of Woodpigeons was the most noticeable phenomenon. In the 90's no breeding event was recorded for this species, but in 2007 almost 140 breeding pairs of the Woodpigeon were counted. The results of this survey will be applied to conservation management in the city of Lviv.

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## **EARLY BREEDING OF THE TAWNY OWL (*STRIX ALUCO*) IN ANTHROPOGENIC HABITATS IN EASTERN ROMANIA**

Presented by **Lucian-Eugen Bolboacă**

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The Tawny Owl is a common species in forests across Romania and also often breeds in anthropogenic habitats especially in town parks and gardens. The species has been recorded nesting in the city of Iași, situated in eastern Romania. On the 15th of February 2009, we recorded an adult Tawny Owl along with four fledglings in Copou Park. This is an interesting observation considering the fact that in central and south-eastern Europe and Romania the breeding season of the species usually starts in March. Considering that the age of the chicks was above 32—37 days when they fledged, and the 28—30 days incubation interval, we calculated that the date of egg-laying was around the end of November 2008. This behaviour could enable double brooding, since there would be enough time for a second brood. From our knowledge, this is the first record of premature breeding in the Tawny Owl in central and eastern Europe. We consider this observation to be very important because it provides new information regarding the reproductive behaviour of the Tawny Owl in Central and Eastern Europe.

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## COMBINING GPS AND ACCELEROMETER DATA TO STUDY BIRD BEHAVIOUR

Presented by **Willem Bouten**

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The benefits of satellite telemetry and GPS tracking have been shown in numerous studies for a wide variety of avian species, enabling us to follow birds throughout their annual routine, sometimes for several years, even when travelling thousands of kilometres from their site of capture. Bio-logging sensors, such as accelerometers have been used to study behaviour of wild animals, especially marine mammals. The GPS-tracking system of the University of Amsterdam includes a tri-axial accelerometer and thus combines the strengths of these devices. Behaviours such as sitting, standing, floating, preening, foraging, flapping flight and gliding flight can be distinguished. We present characteristic accelerometer patterns for different behaviours of various birds and discuss the potentials and limitations of automated classification based on accelerometer data and independent observations. We pay attention to variations of patterns within the behaviour of an individual, differences between individuals within a species, and variation between species. We show the added value of combining information on the whereabouts (GPS) and behaviour (accelerometer), through examples from studies with lesser black backed gulls (*Larus fuscus*), oystercatchers (*Haematopus ostralegus*) and white storks (*Ciconia ciconia*). The combination of high resolution GPS tracking and acceleration measurements clearly provides new opportunities for avian research, enabling us to adapt a more quantitative ecological approach, linking movement, environment, and behaviour.

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## INDIVIDUAL VARIATION IN RATES OF SENESCENCE: NATAL ORIGIN EFFECTS AND DISPOSABLE SOMA IN A WILD BIRD POPULATION

Presented by **Sandra Bouwhuis**

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Longitudinal studies have recently demonstrated senescent declines in reproductive performance and/or survival probability with age to be almost ubiquitous in nature. Little is known, however, about the extent to which rates of senescence vary between individuals, and about causes or consequences of such variation. Quantifying these links in natural populations is important for understanding the constraints and adaptive processes underlying the evolution of senescence. Here, we analyse breeding data from 1029 female great tits (*Parus major*) to quantify the effect of natal conditions and early-life reproduction on rates of reproductive senescence, reproductive lifespan and lifetime reproductive success. While for locally-born females we find no evidence that natal conditions influence rates of reproductive senescence, we show that immigrant females suffer from faster rates of senescence than locally-born females, and that this difference contributes to immigrants having a lower lifetime reproductive success. Additionally, and independently, we find rates of reproductive senescence to increase with rates of early-life reproduction, as predicted by the disposable soma hypothesis. Despite accelerated senescence late in life, high early-life reproduction is, however, positively associated with lifetime reproductive success across individuals. Female immigrant status and early-life reproduction do not relate to reproductive lifespan. We thus show that both immigration into our population, and high levels of early-life reproduction, are associated with reduced late-life reproductive performance in female great tits, but that fitness can be increased by high levels of early-life reproduction at the expense of accelerated reproductive senescence. These results suggest disposable soma to be a likely mechanism underlying senescence in these birds, and encourage further study of the genetic basis (i.e. antagonistic pleiotropy) of such an early versus late-life trade-off.

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## MID-SEASON HABITAT SHIFTS IN FARMLAND BIRDS: IMPLICATIONS FOR RESEARCH AND CONSERVATION

Presented by **Mattia Brambilla**

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Within bird conservation science, a poorly investigated topic is the intra-seasonal variation of ecological needs and distribution of multi-brooded species. Changes in ecological conditions taking place during the breeding season could affect habitat selection. Species occurring along an altitudinal gradient and/or occupying habitats undergoing large modifications during the season, as farmland species in hilly/mountain areas, might be especially involved. We focused on species breeding in agricultural landscapes in southern Europe, which host important populations of species of conservation concern and, due to mild climatic conditions, allow several breeding attempts for a number of species. We combined analyses of habitat selection (adopting regression or presence-only models according to available data) and intra-seasonal variation in local abundance, considering them as a function of habitat type, period and elevation, for corncrake, woodlark, skylark, cirl and corn bunting. Significant within-season changes in habitat association, mean elevation and/or local abundance were found for all species, with a widespread (but not universal) shift toward higher elevation from early to late season and a concurrent switch from cultivated habitats to less intensively managed habitats. Simulations showed that both monitoring and conservation plans based on ecological requirements of a single brood may be insufficient for detecting trends and for conservation, respectively. Fine-grained habitat mosaics (as e.g., the ones created by traditional farming in the Apennines) allow higher habitat suitability over the whole breeding season. Mid-season habitat changes, with consequent distribution shifts, may be widespread among multi-brooded species and could have major implications for their conservation, especially in farmlands with altitudinal gradients, and thus should become a focus of researches, particularly in southern Europe.

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## MULTI-SPECIES COLONIES OF LARIDAE ON THE TERRITORY OF ABANDONED COAL MINES IN THE TULA REGION (CENTRAL REGION OF EUROPEAN RUSSIA)

Presented by **Oksana Brigadirova**

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The research was carried out between 2004 and 2010. The Tula region is characterized by the lack of natural wetlands, only 0.4% of the territory. The proportion of artificial wetlands is 0.5%. One of the largest anthropogenic wetlands of the Tula region is located in its East. Here, the large-scale extraction of brown coal in the past (Moscow coal basin) led to the formation of the characteristic relief, with a total area of 35 km<sup>2</sup>, including numerous waste heaps and small anthropogenic bogs and lakes. The observations of Laridae colonies were carried in 23 water bodies, 9 of them held gull and tern colonies. During the breeding period, 4 species of gulls (*Larus ridibundus*, *Larus canus*, *Larus argentatus*, *Larus cachinnans*) and 3 species of terns (*Chlidonias leucopterus*, *Chlidonias niger*, *Sterna hirundo*) were recorded. The total of adult Laridae individuals on the nesting was above 900, and bird numbers have remained stable over the last years. The dominant species among the Laridae is *Larus argentatus* (46%), which was observed on all anthropogenic lakes occupied by gulls. At the same time, it's the only reliable *Larus argentatus* breeding site in the Tula region. *Larus ridibundus* and *Larus canus* are rather numerous (23% and 13%, respectively). In 2008, *Larus cachinnans* was noted here for the first time. In 2009, about 20 individuals of this species were registered. The presence of *Chlidonias leucopterus* and *Chlidonias niger* in multi-species colonies was insignificant (1–2%). *Sterna hirundo* was most numerous among terns (12% of the total number of Laridae). Nesting was also observed in multi-species colonies, but most of the birds nested in isolated colonies (50 pairs). Thus, anthropogenic bogs and lakes have considerable avifaunistic value in view of the lack of natural wetlands. They are the only places in the Tula region where Laridae colonies of such high species diversity are registered.

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## **EVOLUTIONARY INSIGHTS FROM LONGITUDINAL DATA ON REPRODUCTION**

Presented by **Jon Brommer**

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Birds typically breed during multiple years. Individual-based studies hence collect repeated records on the reproduction of individuals during different environmental conditions and at different ages. Combined with pedigree information and set within the powerful statistical framework of random regression, this type of longitudinal records can be used to explore various evolutionary and ecological scenarios. Here I focus on (1) whether there is a genetic basis in the response of individuals to environmental conditions (genotype-environment interactions) and (2) whether there is a genetic basis in how the performance of individuals change over ages (genotype-age interactions).

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## WHY DO MIGRATING BLACK STORKS (*CICONIA NIGRA*) USE TWO FLYWAYS?

Presented by **Paul Brossault**

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It is known that the two western and eastern populations of the Black Stork (*Ciconia nigra*) breeding in Europe follow two distinct migratory ways to reach the African continent: Gibraltar and Bosphorus. Sixteen Black Storks were tracked by satellite during their autumnal and spring migrations in order to identify their major stopover sites. Storks were followed between breeding sites in Europe and wintering sites in West Africa from 1998 through 2006. The data obtained during the migration permit to describe movement patterns, speed, connections between stopovers in Europe and Africa. Among the 29 stopover sites identified, 6 were considered important. The longest distance that a stork could travel without stopover was 2433 km (defined here as “accessible distance”). Our results show that birds start spring migration from Africa, travel a distance equal to the “accessible distance” to Spain, stay for one stopover and go directly to the breeding areas. This “accessible distance” travelled once during each migration could explain the migratory divide of Black Stork populations. This study highlights the importance of stopover locations for the flyways of the Black Storks.

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## HOW DOES DIETARY CALCIUM AVAILABILITY INFLUENCE EGG-SHELL PIGMENTATION AND EGG STRUCTURAL PARAMETERS OF GREAT TITS (*PARUS MAJOR*)?

Presented by **Kaat Brulez**

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Many small passerine species have diets that are low in calcium. Therefore, during egg production female birds shift diet to include food items rich in calcium (e.g., mollusc shell, woodlice, millipedes). Recent work has focused on deposition of protoporphyrin that constitutes egg-shell pigmentation in many small passerines. Owing to its shock-absorbing properties, the structural-function hypothesis predicts that protoporphyrin is deposited onto the eggshells to provide extra strength when dietary calcium is scarce. We tested whether egg parameters of Great Tits breeding in a naturally medium-to-low soil-calcium woodland (Chaddesley Woods NNR, Worcs., UK) were sensitive to calcium availability by providing calcium supplements (chicken egg-shell fragments and oyster-shell grit) prior to and during egg-laying. Supplemented females produced egg-shells that were significantly thicker and heavier than those of unsupplemented (control) birds. Pigmented spots produced by control females were found in areas of the egg-shell that were thinner but this was not the case in Ca-supplemented females. This indicated that spotting on eggs laid by supplemented females, may be superficially deposited and, thus, might have a functional significance beyond structural strengthening. Other studies have found that larger eggs produce larger hatchlings that have higher fledging success and recruitment rates. With less potential for dietary calcium limitation during egg-laying, Ca-supplemented Great Tit females may be able to produce larger eggs with thicker and heavier egg-shells that, ultimately, could increase fledging success and benefit fitness of breeding birds.

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## RAPTOR ASSEMBLAGE SHAPING PREY DISTRIBUTIONS

Presented by **Daniel Burgas**

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Top-predators have the potential to affect prey populations through different mechanisms. Prey species will most likely react directly (predation) or indirectly (spatial displacement) to predator presence, while non-prey species may benefit from the predator (protection against meso-predators). Thus, top predators could significantly affect distribution and abundance of prey and other species both at local and at large scales. However, while most effort hitherto has been devoted to studying single predator species, less attention has been paid to the study of how potential interactions between different top-predators could affect prey distributions. I present the theory and rationale behind this system and provide an example relating the northern goshawk (*Accipiter gentilis*) and the Ural owl (*Strix uralensis*) and their effects on the vulnerable Siberian flying squirrel (*Pteromys volans*). I discuss the implications these interactions may have for conservation.

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## LONG-DISTANCE DISPERSAL TO THE NORTH AS AN ADAPTATION TO CLIMATE WARMING: AN EXPERIMENT IN PIED FLYCATCHERS

Presented by **Claudia Burger**

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One consequence of climate change is a shift in the timing of the annual cycle of many organisms which can lead to mismatches between cycles of predators and prey. Arrival and breeding dates of many migratory bird species have advanced less than the timing of their food peak. Consequently, birds breed too late to profit from the short food peak in spring, and hence they decline in numbers. One major way to overcome this mistiming is to move to more northern breeding areas where spring starts later. This could be advantageous for the individual and may also introduce new genes on which selection can act, but there may also be high costs involved. Studies comparing the performance of philopatric birds with that of long-distance dispersers are rare because of the difficulties to track birds. Using a new aviary set-up, we successfully translocated Dutch pied flycatchers (*Ficedula hypoleuca*) to a northern breeding site in Sweden. We were able to retain ten Dutch females for breeding under natural conditions in the new location. Despite an unusually cold spring in 2010, Dutch females started egg-laying significantly earlier than Swedish control females. Fledgling weights did not differ significantly between translocated and control groups, although flying insect prey increased strongly later in the season. Swedish birds fed more caterpillars to their young than Dutch birds, when controlling for date, which might indicate that familiarity with breeding habitat is important. This is the first study to experimentally investigate fitness consequences of long-distance dispersal in a free-ranging, migratory passerine. Especially in a warm spring, long-distance dispersal to the north might indeed be a beneficial strategy and could speed up adaptation to climate change.

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## INTRASPECIFIC METABOLIC SCALING IN PASSERINE BIRDS: DOES IT MAKE BIOLOGICAL SENSE?

Presented by **Andrey Bushuev**

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The relationship between metabolic rate (MR) and body mass (M) is expressed by the allometric equation  $MR=a \cdot M^b$ , where  $a$  is the allometric coefficient and  $b$  is the scaling exponent (the slope in a log-log plot). Debates about variation in the scaling of metabolic rate with body mass have been going on for more than half a century, although it has been widely accepted that the scaling exponent is  $3/4$  (“ $3/4$ -power law” or Kleiber’s law). Most studies of allometry in metabolic rates have been done on an interspecific level, because large body mass range is required for reliable regression analysis. Intraspecific metabolic scaling is usually reported for animals with long-term growth (such as invertebrates of different taxa, fishes, reptiles). Birds as a class are the most unstudied group of vertebrates with respect to intraspecific scaling. Using our long-term data we overcame the problem of narrow body mass range by means of large sample sizes. We studied the relationship between body mass and whole-organism nighttime resting metabolic rate in two separated Pied Flycatcher (*Ficedula hypoleuca*) populations and one Great Tit (*Parus major*) population. All estimates were highly significant. The scaling exponent was close to unity ( $b=1.11$ ,  $SE=0.08$ ,  $n=1035$  in Moscow Region, 1992–2010;  $b=0.95$ ,  $SE=0.14$ ,  $n=348$  in Tomsk Region, 2008–2009) in adult Pied Flycatchers, close to  $2/3$  ( $b=0.67$ ,  $SE=0.04$ ,  $n=953$  in Moscow Region, 2000–2005) in 13–15 day old Pied Flycatcher chicks, and between  $2/3$  and  $3/4$  ( $b=0.71$ ,  $SE=0.04$ ,  $n=792$  in Moscow Region, 1992–2000) in adult Great Tits. The result is in contrast with estimates for other species: all studies in nestlings found the scaling exponent to be close to unity. Different intrinsic and extrinsic factors (sex, age, moult, Drost’s colour type, period, season, ambient temperature) were taken into account. Ecological consequences of different scaling exponents in the studied species are discussed.

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## **DO THE PASSERINES CROSS THE SAHARA USING THE SHORTEST WAY TO THE SOUTH, OR NOT?**

Presented by **Przemyslaw Busse**

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Crossing the big barriers on migration from Europe to sub-saharan Africa — the Mediterranean and the Sahara belt — needs a lot of energy and time for flight. It may be expected that especially passerine migrants optimize their flight routes to the length of the journey and the time spent in flight. Thus, after crossing the Mediterranean Sea, birds should take the shortest way to the savanna south of the Sahara, where resting and refuelling is possible, by flying directly to the South. However, orientation cage tests (altogether several thousand of tests in “Busse’s cage”), performed at several Egyptian and the Middle Eastern ringing sites of the SEEN (SE European Bird Migration Network) showed surprising results with strong activity along the NE—SW axis in autumn and the SW—NE axis in spring. This means that birds migrating along this route must cover much longer distances to cross the Sahara than expected. Several species appear to follow this strange migration strategy. A few ringing recoveries seem to confirm this possibility.

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## POPULATION GENETIC STRUCTURE OF WOODPIGEON (*COLUMBA PALUMBUS*) IN EUROPE

Presented by **Dalius Butkauskas**

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The population genetic structure of the Woodpigeon (*Columba palumbus*) in Europe was studied by analyzing the distribution of different D-loop haplotypes among bird samples collected in various breeding and wintering sites of the species (in Russia, Belarus, Lithuania, Sweden, Hungary, France, Spain, and Portugal). Totally 89 different haplotypes ascertained as belonging to 5 haplo-groups were identified after examination of partial D-loop sequences, consisting of 359 bp mtDNR fragments derived from 360 samples. Significant differences were found between Woodpigeon samples collected in different regions of Europe and the hypothesis of panmictic European populations of the species was rejected. Based on frequencies of distribution of haplogroups and occurrence of some rare haplotypes only in certain geographical regions it was determined that specific population genetic structure of sedentary populations of Woodpigeons (of birds breeding in the Balearic Islands, etc.) is different from that of migratory populations of the Baltic region origin using the Eastern Atlantic flyway (birds breeding in NW Russia, Belarus, Lithuania, Sweden and wintering mainly in the Pyrenean Peninsula). A distinct population genetic structure is characteristic also of Woodpigeons breeding in Hungary and using the Mediterranean flyway.

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## **PARENTAL EXPERIENCE AND LOCAL FOOD AVAILABILITY AS DRIVERS OF PARENTAL CARE IN GOSHAWKS**

Presented by **Patrik Byholm**

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In many long-lived species, there are well-documented effects of age and previous breeding experience on patterns of reproductive output: typically experienced individuals outperform naive ones. However, the mechanisms explaining these patterns are not well understood. By analyzing videos filmed at nests of the northern goshawk (*Accipiter gentilis*), an avian top-predator of the boreal forest ecosystem, I investigated state dependency in feeding behaviours and sibling aggression, in particular in relation to parental breeding experience and nest-specific food availability. In general, mothers' involvement in active beak-to-beak feeding increased with increasing food availability, but mothers with previous local breeding experience always fed their young at a higher rate than inexperienced ones. As soon as young had learned to eat from delivered prey themselves, fights for access to food — apparently primarily driven by hunger — were more common in broods of inexperienced mothers than of experienced ones. In the end, sibling rivalry boosted inherent brood asymmetries between brood members more strongly among naive breeders than among experienced ones. Since such asymmetries have consequences not only for offspring size and body condition but also for offspring survival and life-history decisions, parental commitment to beak-to-beak feeding is likely to be an important, although hitherto overlooked, mechanism causing experience-related differences in reproductive performance among birds.

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## LIMITATIONS OF THE UPLANDS AS REFUGES FOR DECLINING, FORMERLY WIDESPREAD SPECIES: A CASE STUDY OF WHINCHATS (*SAXICOLA RUBETRA*) IN SCOTLAND

Presented by **John Calladine**

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Decades of agricultural intensification has led to major declines of many formerly widespread and often common birds. Less intensively managed upland and marginal upland areas have provided an increasingly important “refuge” for a broad range of those declining species. The Whinchat is an example of a species that has declined or disappeared from extensive areas of lowland Europe. In Britain for example, the population is estimated to have declined by 57% from 1995—2008 and the majority are now in marginal upland and upland areas. A study of the habitat features and physical attributes of territories occupied by breeding Whinchats in a Scottish study area demonstrated a marked influence of both altitude and aspect within a favoured habitat of sparse shrubs and developing ground vegetation. The likelihood of an area being occupied by breeding Whinchats was inversely related to altitude and areas with south and east facing aspects were favoured. For areas with south and east facing aspects, the probability of a site being occupied by Whinchats exceeded 80% below 300 m above sea level and declined linearly to less than 20% above 500 m. For areas with north and west facing aspects, the probability of occupancy at 300 m was 40% and close to zero at 500 m. Although the uplands currently host the majority of the remaining population of Whinchats in Britain, environmental conditions appear to limit their abundance and breeding success in these more exposed areas. These limitations should be considered when targeting conservation management if viable populations of such declining species are to be retained within the uplands.

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## OLD VERSUS NEW WORLD: ADAPTIVE SIGNIFICANCE OF NEST DEFENCE IN TWO BROOD PARASITISM SYSTEMS

Presented by **Daniela Campobello**

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Adaptiveness of behavioural plasticity in defensive behaviour has been assumed implicitly when animals react specifically to a particular threat. Learned enemy recognition, therefore, has often been considered synonymous with increased fitness. Some hosts of avian brood parasites can discriminate in such a way that allows them to adjust their response to the risk posed by the species approaching their nest. Their defence may be learned either individually or socially. However, quantification of fitness advantages gained by adopting specific defensive strategies and their contextual adjustments are scarce in the literature. We determined whether nest defence and its flexibility enhanced nest survival of hosts in two parasitic systems, an older system involving the common cuckoo (*Cuculus canorus*) and its host, the reed warbler (*Acrocephalus scirpaceus*), and a more recent one, with the brown-headed cowbird (*Molothrus ater*) and its host, the yellow warbler (*Dendroica petechia*). Starting in 2002, we tested individual versus social learning and recorded defensive responses by these warblers to taxidermic mounts of the parasite presented at their nest. Reed warblers uttered rasp calls more frequently to cuckoos than to other threatening species and the most vocal individuals during the first cuckoo encounter also tended to escape parasitism. Nest survival in the face of parasitism also was predicted by changes in the number of rasp calls following a threatening experience. Yellow warblers also responded to cowbirds with specific defences but none was associated with higher or lower nest survival when parasitism was considered but aggressive or distraction displays were associated with an increased survival of nests under the treat of nest predation. In both yellow warblers and reed warblers, enhanced intensities of some defensive responses were associated with increased nest survival, and these strategies spread most commonly throughout the populations.

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## **THE IMPACT OF SKI-RUNS ON ALPINE BIRD COMMUNITIES: A LANDSCAPE APPROACH**

Presented by **Enrico Caprio**

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Treeless mountainous areas at high altitudes are important habitats for the conservation of wildlife, but they are affected and increasingly threatened by the construction and enlargement of ski-runs. To assess the extent of this threat, we compared bird diversity and community composition in circular plots centred on ski-runs of recent construction, grassland habitats adjacent to ski-runs and natural grassland habitats far from the ski-runs. We modeled bird community indices with GLMs at a landscape level including topographic variables as covariates. Generalized linear models at a landscape level showed that community indices were best modeled by combinations of factors including altitude, exposition and a few landscape metrics. The edge of ski-runs, in particular, negatively affected bird communities and the distribution of three grassland species (water pipit, wheatear, and black redstart). Using these models, we predict that more sympathetic management through grassland restoration may benefit alpine birds, but only a small increase in ski-run extent could have significant negative impacts. Retaining the avifauna around ski-resorts is likely to involve developing new, environmentally friendly ways of constructing runs, such as only removing rocks and/or leveling the roughest ground surfaces, to preserve as much soil and natural vegetation as possible. Restoration of ski-runs should promote the recovery and maintenance of local vegetation to enhance invertebrate and bird assemblages, whilst not compromising the safety of the ski-runs.

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## **DECLINING WINTER POPULATION OF SCAUP: TRENDS AND A CRY FOR HELP!**

Presented by **Anja Cervencł**

Anja Cervencł

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The European winter population of Scaup (*Aythya marila*) underwent a large decline in the 1990's of more than 50% and it is now considered to be endangered at European level. The reasons for this dramatic decline are not sufficiently known, but some of the main threats to the European Scaup population appear to be at the wintering grounds. Degradation of winter habitats, drowning in fish nets, pollution and disturbance are considered to have negative effects on the birds. This contribution aims at describing the trend and the distribution of Scaup in relation to habitat parameters in one of the most important wintering countries — The Netherlands. Furthermore, because of the European wintering population decline we are interested in producing a population status report that collates all available data from all European wintering countries of this species. The main objective is to instigate and then promote collaboration between institutes to produce this Scaup status report and hence provide future management recommendations for important over-wintering areas.

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## **STRESS RESPONSE VARIATION WITHIN AND BETWEEN SPECIES: THE INFLUENCE OF THE BROOD VALUE**

Presented by **Olivier Chastel**

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In vertebrates, stressors such as starvation or predator attacks stimulate the rapid elevation of circulating glucocorticoid hormones (e.g., corticosterone in birds). Such an acute hormonal response to stress is also known to be highly variable among individuals and between species but the source of such variation is often difficult to explain. In this talk, I will present correlative, experimental, as well as comparative evidences showing that individual features, such as age, breeding experience, quality, and species life-history traits, can explain a significant part of the large variance observed in the acute stress response. I will then discuss these results in an evolutionary framework and test if the observed within-individual and between-species variance in the stress response support the hypothesis that individuals and species actively modulate their stress response with respect to the value of current reproduction (“the brood value hypothesis”). I will then broaden the discussion on other potential sources of variation for the stress response such as contaminants (heavy metals and many persistent organic pollutants). Contaminants are known to interfere with many endocrine functions (e.g., thyroids hormones), but little is known about the potential effects of environmental pollution on the baseline and stress-induced corticosterone levels in birds.

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## COMPARATIVE DIET OF THE WHITE STORK (*CICONIA CICONIA*) AT THREE ALGERIAN LOCALITIES (TEBESSA, OUM BOUAGHI, AND KHENCHELA)

Presented by **Linda Cheriak**

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This study on the composition of the diet of the White Stork has two objectives: (1) to describe the diversity of food items of this species at various study sites, (2) to compare food composition among 3 selected sites. The study sites belong to the arid semi bioclimatic zone; they are located at the East of Algeria with a vegetation cover specific to each site. The methodology of work consisted of analyzing 90 regurgitated pellets, isolating the undigested components and comparing them with complete specimens identified and confirmed by specialists. The results confirmed that storks are insectivorous as in many other areas of the world. Insects accounted for 99.35%, 98.2% and 95.63% in Constantine, Khenchela and Tébessa, respectively. Birds are consumed in Khenchela (24 preys) and Tébessa (41 preys) whereas Arachnids are found in Constantine (14 preys). The other categories are only rarely consumed. Six orders of insect prey are found in the food of the bird in the 3 sites, Coleoptera are consumed accounting for 70.29%, 65.13% and 76.89% of the total of the insects consumed in Constantine, Khenchela and Tébessa; Dermaptera (17.5%) were at second position in Constantine and Tébessa (12.01%), while Orthoptera followed Coleoptera in Khenchela with 28.13%. Scarabéidae and Ténébrionidae alone represent the families which were most consumed at the 3 study sites, accounting for 62.58%, 66.88% and 70.67% of all Coleoptera. Cétonidae (15.23%) and Elateridae (13.78%) occupy the second position at Constantine, Carabidae at Khenchela (12.7%) and Tébessa (15.03%). The other families are less often consumed.

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## **NOT ALL SONGBIRDS CALIBRATE THEIR MAGNETIC COMPASS FROM TWILIGHT CUES: A TELEMETRY STUDY**

Presented by **Nikita Chernetsov**

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Migratory birds have a redundant orientation system, using sun, stars and the geomagnetic field as the sources of compass information. Numerous orientation cage experiments aimed to identify how bird migrants integrate information from different orientation cues provided controversial results. Some authors concluded that before migration, magnetic compass is calibrated from celestial cues, and during the migratory period, geomagnetic information takes precedence and is used as the primary cue. It has been also suggested that the view of the entire sky, including the area near the horizon, is crucial for using celestial cues and that birds that are given this possibility always calibrate their magnetic compass from celestial cues. Published data from naturally migrating birds (two species of North American thrushes) suggest that songbirds daily calibrate geomagnetic information from twilight cues. Here we report that free-flying European migrants, song thrushes, released after pre-exposure to a horizontally rotated magnetic field, demonstrated simple domination of either magnetic or stellar compass. We suggest that different songbird species may have different hierarchies of orientation cues.

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## **GREAT TITS' BREEDING AND THE NESTLING FOOD AVAILABILITY IN A PRIMEVAL FOREST: IS SYNCHRONISATION IMPORTANT?**

Presented by **Marta Cholewa**

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Knowledge of the nestling food composition is crucial for understanding the links between food resources and birds' breeding seasons, both at the ultimate (adaptation of breeding seasons) and proximate (effects of mis-mismatch between food availability and nestlings' requirements) levels. In 1950, D. Lack postulated that "the breeding season of each species of bird is adapted by natural selection so that it coincides with the season of the year when there is abundant food for its young" and suggested that "the breeding season of tits is adapted to the caterpillar season". Since then, the importance of synchronisation between offspring appearance and food availability is often described in general but information on the nestling diet is less frequently provided. Only after proving that some food type plays an essential role in rearing young, it is justifiable to look for possible adjustments of the species' breeding season to temporal variation in the availability of this food resource, to find out whether and to what extent synchronisation with its accessibility is critical for successful reproduction. To answer the question of whether Great Tits (*Parus major*) synchronise the period of maximum food demand of young with the caterpillar peak in a primeval conditions (Białowieża National Park, E Poland) and whether this influences the birds' breeding success, we studied the composition of nestling food and estimated the peaks of caterpillar availability during every breeding season in the study area. It showed that folivorous caterpillars were indeed a common food source for tits nestlings although the foodpeaks were very low in the forest during these years. Mistiming was costly only for birds breeding too early, the birds breeding past the caterpillar peak did equally well as the ones being synchronised.

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## IMPACT OF SOCIAL RELATIONSHIP ON THE STRUCTURE OF NESTS OF THE YELLOW-LEGGED GULL (*LARUS CACHINNANS*)

Presented by **Irina Chukhareva**

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Interconnections overpatching of the structure of Yellow-legged Gull nest materials and their nest-building activity in monospecies colonies were studied during 2007—2009 under the direction of S.P. Kharitonov at the Bird Ringing Centre of Russia. The nests in the 3 Yellow-legged-Gull colonies were mapped by means of GPS and a tape-line. The use of nest material was compared with the access to substrate vegetation. The minimal distance to the nest, which contained specific plant component, and to the nest, which did not contain this specific plant component, was calculated for each nest component. Generally in monospecies colonies, which were built in 2007—2009 (N=196 nests) on the islets in the reservoir near the city of Miass, the nests were located under birch, pine and willow. Gulls generally use materials which are located near the nests. This makes the nests less perceptible on the substrate. The m distance (L1) between the nests, which contained different nest material components with substrate, was less, than the middle distance (L2) between the nests, which contained identical nest material components with substrate (in 2007, N1=N2=28, L1=5.5 m, L2=44.6 m, Z=2.49, p=0.012; in 2008, N1=N2=11, L1=2.32 m, L2=10.2 m, Z=3.05, p=0.0023; in 2009, N1=N2=24, L1=6.65 m, L2=18.6 m, Z=3.26, p=0.0011). The difference in plant use, which belonged to the closest yellow-legged gulls nests within one substrate, revealed that aggression of dominant individuals prevented subordinate individuals to gather nest material on certain nest sectors. The subordinate individuals were forced to collect nest material beyond the nest sector. Dead chicks were found in some subordinate nests on the islets with random nests and in one central nest of the most numerous nest group on the single islet.

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## INITIAL RESEARCH RESULTS ON TICK MIGRATION VIA MIGRATORY BIRDS

Presented by **Olaf Ciebiera**

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Our initial research results indicate a natural expansion of ticks to Poland that use migratory birds as hosts. During spring 2010, 42 birds migrating through Poland (including the species *Erithacus rubecula*, *Turdus philomelos*, *Turdus merula*, *Phylloscopus collybita*, *Phoenicurus phoenicurus*, *Troglodytes troglodytes*, *Luscinia luscinia*, *Fringilla coelebs*, *Prunella modularis*, and *Sylvia atricapilla*) were examined for the presence of ticks. Birds were captured on the bird ringing station on the Polish coast (Kopań) as part of the programme “Akcja Bałtycka”. Examined birds were considered either migrants on their way to the East and North of Europe or residents (*Erithacus rubecula*, *Fringilla coelebs*, *Prunella modularis*, *Turdus merula*, *Turdus philomelos*, *Troglodytes troglodytes*). Some of them may have had set off from Africa (*Sylvia atricapilla*, *Luscinia luscinia*, *Phoenicurus phoenicurus*, *Phylloscopus collybita*). 80 ticks of the genus *Ixodes* [*I. ricinus* (79), *I. frontalis* (1)] were found in two developmental stages (larvae, nymphs). The average infection rate was 1.9 ticks per bird. The highest number of ticks was observed on species such as *Luscinia luscinia*, *Erithacus rubecula*, and *Turdus merula*. Ticks attached themselves to different body parts the host bird: gape (18.8% of all cases), crown (18.0%), top of the beak (5.0%), and parts of the eye (2.0%). The nymph stadium dominated with 78.8% of all ticks, whereas larvae made up 21.2%. Ticks using migratory birds as hosts have the potential to spread over long distances. Moreover, they may transmit tick diseases — a further subject of our research.

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## A RAPID EFFECT OF HANDLING ON COUNTS OF WHITE BLOOD CELLS IN A WINTERING PASSERINE BIRD: A MORE PRACTICAL MEASURE OF STRESS?

Presented by **Dina Cīrule**

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Measuring circulating glucocorticoids is a widely used method to assess stress in animals. However, hormones must be sampled within the first few minutes of capture, which makes it difficult to discriminate between hormone baseline levels and the levels caused by environmental stress. The use of white blood cell counts made from blood smears represents an alternate method for measuring physiological stress. Since the increase in glucocorticoid hormones causes characteristic long-lasting changes in the leukocyte numbers, we tested whether stress related handling of male great tits (*Parus major*) may cause rapid changes in their leukocyte profile. We found that handling stress significantly increased heterophil counts already between 30 and 60 min after capture, while lymphocyte and eosinophil counts significantly declined between 60 and 120 min after capture. The increase in heterophil counts and reduction in lymphocyte counts caused an increase of heterophil and lymphocyte ratio (H/L) between 60 and 120 min after capture. Overall these results indicate that leukocyte profiles in wintering male great tits may change more rapidly than previously thought, reflecting the condition of acute stress of individual birds.

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## **MALE MANAKINS DO NOT ADAPT THEIR COURTSHIP DISPLAY TO SPATIAL ALTERATION OF THEIR COURT**

Presented by **Francesca Coccon**

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Male Golden-collared manakins (*Manacus vitellinus*) of Panamanian rainforest perform complex and elaborate courtship displays. Over a seven-month long breeding season, the males aggregate in leks where each individual clears a small 'court' on the forest floor and spends several hours per day performing the displays. The main courtship display is composed of acrobatic jumps between saplings delimiting the arena and loud mechanical sounds produced by the wings. These "wingsnaps" are probably not learned since they can be induced in juvenile males and females by treatments with testosterone. We hypothesized that males learn the choreography of their display, rehearsing the moves of the courtship dance until they are executed with amazing precision and speed. We investigated whether males are able to modify their choreography if the spatial conformation of the court is manipulated. We recorded the behaviour of several males before and after altering their arenas by placing a small branch against the most important sapling, the one used by them for mating. Compared to pre-treatment levels, males did not change their overall displaying activity after the spatial alteration. Males, however, did change the structure of the display performing routines that were longer, i.e., with a higher number of jump-snaps and, more importantly, missed the 'grunt' element at the end of the display, which invites females to copulate. These results show that male Golden-collared manakins cannot adapt immediately to a manipulation of the courtship arena, providing evidence in support the hypothesis that males learn the choreography of the display.

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## NATAL DISPERSAL IN A NUTSHELL

Presented by **Timothy Coppack**

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The distance covered between place of birth and place of first reproduction is a key trajectory in the life of birds. Yet, the factors controlling individual dispersal decisions are largely unknown and the genetical consequences are hard to pin down. The major problem in the analyses of dispersal is that most study areas are limited by observational capacities (or by nest-box availability) rather than by natural habitat boundaries. Here, we circumvent this problem by looking at natal dispersal patterns within a resident population of blackbirds (*Turdus merula*) inhabiting the small and remote island of Heligoland (North Sea). We accurately quantified natal dispersal distances within the island by individually marking offspring hatched over four successive seasons. Natal dispersal distances on the island were influenced strongly by habitat characteristics, but did not depend on sex. However, the tendency to settle in densely populated habitat patches was higher in males than in females. Our study brings the importance of spatial scale and population structure as determinants of natal dispersal decisions to the foreground. Female-biased natal dispersal, which is otherwise the norm in birds, is overridden when space is scarce and the physical hurdles to evasion are high. We discuss the population genetic consequences of restricted natal dispersal on islands and the relevance for understanding mainland populations in increasingly fragmented landscapes. Supported by Deutsche Forschungsgemeinschaft (DFG: BA 816/17-1)

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## FEATHERS AND EXCREMENTS AS MEASURES OF HEAVY METAL POLLUTION OF GREAT TIT NESTLINGS AND ADULTS

Presented by **Rute Alexandra Costa**

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The use of passerine species as bioindicators of metal pollution has increased over the past years, especially when considering the need for non-invasive procedures, such as collecting feathers and excrements. In 2009, calcium and metal concentrations (As, Ca, Cd, Cu, Hg, Ni, Pb, Se, and Zn) were determined in feathers and excrements of nestling great tits (*Parus major*) and in the feathers of adult female great tits in industrial (MU) and rural (MQ) sites in maritime pine forests on the west coast of Portugal. The aim of this study was to compare the levels calcium and metals detected in both study areas, while looking for differences between sampling method (feather vs. excrement) and age (nestling vs. adult). Although metal concentrations differ between sample types (excrement vs. feather), they indicate similar tendencies in both study areas. There was a significantly higher concentration of mercury in the industrial area MU and a significantly higher concentration of arsenic in the rural area MQ in both sample types. Metal levels in adult female had quite different results compared to nestlings, with only significantly higher levels of nickel in MU. Since metal levels showed a consistent pattern in feathers and excrements of nestling great tits, we may say that they present a good method for evaluation of these elements in polluted areas. Also, being non-invasive methods, they do not disturb the sampled population.

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## CORTICOSTERONE, FORAGING BEHAVIOUR AND REPRODUCTIVE SUCCESS IN ADÉLIE PENGUINS

Presented by **Manuelle Cottin**

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During high energy expenditure periods such as the breeding season, the amount of energy that organisms can allocate to self-maintenance and reproduction largely depends on their foraging strategies. The stress hormone, corticosterone (CORT), is known to influence foraging-related activities and breeding success. In this study, we investigated the effects of CORT manipulation in free-living male Adélie penguins (*Pygoscelis adeliae*) during the guard stage. For this purpose, at the beginning of the chicks-rearing period, male Adélie penguins were implanted with CORT pellets and equipped with time-depth recorders. At the end of the treatment, blood samples were collected for isotope analysis. CORT-implanted males spent on average 19% more time on the nest than controls. However, foraging trip duration was similar between both groups. Dive duration, time spent at the lowest point of dives, and number of undulations per dive were significantly higher in CORT-implanted birds than in controls. However, CORT-birds performed overall less dives (ca. 4400) than controls (ca. 6250) and spent more long periods (>3h) without diving. In addition, similarity of isotopic signatures suggests that both groups had foraged at the same location and had ingested the same prey. Finally, the treatment induced a decrease in breeding success, the mortality of treated bird chicks being about 30% higher than controls. Our results indicate that CORT treatment would have resulted in redirecting bird behaviour from costly activity (i.e., reproduction) to a behaviour promoting the preservation of energy reserves. Interestingly, CORT administration had opposite effects at different scales, apparently decreasing the diving effort at the scale of the trip while simultaneously increasing it at the scale of a dive. This duality opens new pathways to explore the involvement of CORT in foraging decisions and its role in mediating the conflict between parental care and self-maintenance.

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## MASS VARIATION AS A LIFE HISTORY TRAIT IN TROPICAL BIRDS

Presented by **Daniel Cox**

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Birds vary in life history traits, showing trade-offs such as low clutch size with increased survival when they are more K selected as a consequence of more stable foraging environments. Mass variation is potentially linked to these life history traits because it arises from a trade-off between predation and starvation risk and this is usually also a function of the quality of the foraging environment. Populations may either gain mass (Interrupted Foraging; IF) or lose mass (Mass-Dependent Predation Risk; MDPR) in response to an increase in predation risk; if predation pressure remains constant, an improvement in foraging conditions will result in a shift from MDPR to IF. Therefore those species which show greatest mass gain should be associated with more favourable foraging environments and so show higher survival and/or lower clutch size. We tested the relationships between adult survival and clutch size with degree of seasonal and yearly mass variation in 27 species of small birds using data collected over a 9 year period in a tropical savannah region in West Africa. We showed that there was a strong positive relationship between seasonal mass variation and adult survival that is little affected by clutch size, and reconfirm the widely established negative relationship between survival and clutch size. Our results suggest that low mass variation is associated with r selection, so linking mass variation to environmental quality.

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## WIND FARMS AND MIGRATING RAPTORS OF THE ADRIATIC FLYWAY — NEED FOR URGENT ACTION

Presented by **Antica Čulina**

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The Adriatic flyway has recently been recognised as an important migration route for many raptor species. The Dinaric Alps in Croatia form the lowest and narrowest segment of the European part of Alpine belt. As such, they potentially present the most important passage area for many migratory raptors. In addition, karstic fields are abundant in the area, providing suitable stop-over sites. However, the real importance of the region has not been emphasised yet and numbers of birds using the passage are not known. Croatia, as an EU candidate country, has taken the obligation to increase the proportion of renewable energy resources (EU Directive 2001/77/EC). Among other RES, this includes the increase in numbers of wind farms, from several that currently exist to more than 130 until 2020. The vast majority of them will be situated along the Croatian coast. As such, they pose a threat to migrating raptors. Main concerns about the possible impact of these wind farms come from three main sources. First, the species using the passage as well as their numbers are not sufficiently well known. Secondly, environmental impact assessment studies usually do not include the migration period and, if anything, only concentrate on breeding species. Lastly, when considering the impact of one wind farm, the cumulative impact of several adjacent wind farms is not considered. Raptor species we are aware of to use this area during migration are: Marsh Harrier, Montagu's Harrier, Common Buzzard, Honey Buzzard, Red-footed Falcon, Hobby, and Saker. Thus, large proportions of the central and northern European populations of these species are assumed to migrate through the area. Detailed consideration and account of the importance of the area for migratory raptors, as well as changes in environmental impact assessment methods are needed. Special care should be taken for species listed on the 2010 IUCN Red List as NT (Red-Footed Falcon) and VU (Saker).

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## HOW PAINTED REDSTART (*MYIOBORUS PICTUS*) MALES REACT TO MORE AND LESS AGGRESSIVE SONG

Presented by **Jakub Paweł Cygan**

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Several features of song may serve as an information of males' status and quality. Despite a relatively small syllable repertoire (ca. 30), Painted Redstart (*Myioborus pictus*) males sing in a very variable way — create numerous song types and switch between them, specially when engaged in territorial disputes. Males most probably use song (presenting large repertoires) as signal of their aggressiveness, which possibly reflects their quality. To describe song repertoires, 15 paired Painted Restart males were recorded in 2005 and 2006 (in pre-laying period) near the Southwestern Research Station, Arizona. A few days later, to check males' reactions, two kinds of randomly chosen five-minutes-playbacks were presented to them. One playback imitated aggressive behaviour, i.e., a large song repertoire (15 song types changed every second song), and the second non-aggressive, i.e., a small song repertoire (6 song types changed every fifth song). In both trials song frequency was the same, i.e., 6 songs per minute, typical for unpaired male's song. Males which had sung more diverse songs before the experiment, reacted more strongly to aggressive playback stimuli; they approached the speaker earlier, and closer, sung more songs with larger syllable repertoire than males which had sung less diverse songs. Those "shy" ones reacted more intensively only to the low song repertoire stimulus. The results suggest that only males with larger repertoires ("higher quality") are prone to interact with rivals singing in a more aggressive way.

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## DIVERSITY AND STRUCTURE OF THE BIRD COMMUNITY OVERWINTERING IN THE BIALOWIEZA FOREST, POLAND — PRELIMINARY RESULTS

Presented by **Dorota Czeszczewik**

Marcin Wiśniewski, Wiesław Walankiewicz, Dorota Czeszczewik

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Birds can serve as useful model organisms to study effects of forest management at the community level. We studied the relationship between wintering bird communities and habitat characteristics of lowland primeval and managed oak—lime—hornbeam and spruce—pine stands of the Białowieża Forest, NE Poland. Birds were censused by point counts in randomly selected plots of 50 m radius in autumn—winter season 2010—2011. Tree stands characteristics were measured as well. In total, 36 bird species were recorded. The highest number of species (24) was recorded in deciduous primeval stands while the lowest in managed coniferous stands (17). The highest density of birds was recorded in autumn and it decreased with the lapse of winter. The base of the community was formed by passerines in all habitats (65—84% in primeval stands and over 90% in managed stands). There was a difference between habitats in the rate of woodpeckers: six species occurred in primeval stands and only four in managed stands were recorded. In primeval coniferous stands the density of woodpeckers was on average nine-fold higher than in managed coniferous stands while only two fold higher in deciduous stands, respectively. The amount of dead wood was much higher in primeval stands than in managed ones. Dead wood is the crucial element of the habitat which diversifies these habitats and affects bird community composition. At the landscape meso-scale, more dead trees should be restored in managed forests.

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## **INTEGRATING, ARCHIVING, AND SHARING BIOLOGGING DATA FROM WILD BIRDS IN MOVEBANK**

Presented by **Sarah Davidson**

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Biologging technology has allowed a new generation of research that integrates data on animal movement, physiology, and health to address new scientific questions. However, these massive and complicated data sets present new data management challenges to biologists analyzing their own data, or seeking to collaborate with other researchers. Here we present Movebank ([www.movebank.org](http://www.movebank.org)), a project that allows researchers to manage, archive, view, analyze, and share animal tracking and biologged data. Movebank presently archives over 5 million data points from approximately 13 000 individually tracked animals, representing 262 species and 278 studies. Researchers control access to their data, keeping them private, or sharing them with colleagues, data managers, or the public. We will show summary maps of the many thousands of tracks of migrating birds collected through recent Movebank workshops, and also show a more detailed example of the integration of biologging data (location, heart rate, body temperature, and acceleration) with globally available weather data for a group of mallards (*Anas platyrhynchos*).

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## AVIAN EGG SHELL PIGMENTATION: TESTING A NEW HYPOTHESIS

Presented by **Greet De Coster**

Greet De Coster, Liesbeth De Neve, Luc Lens

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Many passerine bird species lay eggs that are speckled with dark protoporphyrin pigment spots. Several functions have been associated with egg pigmentation, such as strengthening of the eggshell, reduction of eggshell permeability, and identification of own eggs in species subjected to brood parasitism. These factors can account for interspecific differences in egg pigmentation and also for intraspecific differences among females and clutches. Still, they cannot convincingly explain the variation between the eggs within a single clutch. Here, we propose a new hypothesis to explain (intra-clutch) variation in protoporphyrin pigment spots. We present several arguments that support our prediction that egg pigmentation partially reflects female parasite load. Furthermore, we show the results of an experiment in a free-living population of great tits (*Parus major*) that was designed to test our hypothesis. In particular, we infested great tit nests with their most common ectoparasite, the hen flea (*Ceratophyllus gallinae*), prior to egg-laying and compared egg pigmentation patterns between eggs of infested and uninfested clutches. As expected, egg pigmentation was significantly affected by female parasite load. Parasite effects also varied with the order of egg laying and with the time of breeding. These findings are discussed from an evolutionary-ecological perspective.

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## CORTICOSTERONE LEVELS IN HOST AND CUCKOO NESTLINGS. IS BROOD PARASITISM A PHYSIOLOGICAL STRESSOR?

Presented by **Liesbeth De Neve**

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Brood parasitism is known to severely reduce the reproductive success of host species due to ejection of host eggs/nestlings or, in non-evictor species, because of the optimal strategy of parasite chicks to monopolize parental care provided by foster parents. In non-evictor species, the presence of a brood parasitic chick could be assumed as an important stressor for host nestlings. However, so far, no one had explored whether chicks sharing the nest with a brood parasite would suffer from higher stress levels than non-parasitized ones. Here, we explore this hypothesis analyzing corticosterone (Cort) levels, the most used tool for assessing the response of individuals to ecological stressors in evolutionary biology, in the non-evictor great spotted cuckoo (*Clamator glandarius*) and two of its main hosts, the magpie (*Pica pica*) and the carrion crow (*Corvus corone*). We first investigated if Cort levels varied in relation to brood composition by experimentally creating 3-nestling broods of only cuckoo chicks, only host chicks (magpie or carrion crow), or one cuckoo and two host chicks together. Furthermore, we explored variation in Cort levels during the early, mid and late nestling period in the parasite and host species. We found an effect of brood parasitism on magpie nestlings that showed higher Cort levels when raised together with a cuckoo chick than when raised in only magpie broods. Interestingly, we did not find such an effect in the larger carrion crow host nestlings (a host in which the cost of parasitism is lower) or in the cuckoo nestlings. These results indicate a potential physiological cost of brood parasitism for some host species, but no extra cost for cuckoo nestlings sharing the nest with host nestlings. In addition, we found that cuckoo nestlings showed higher Cort levels compared to host nestlings, independently of brood composition or nestling developmental stage.

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## FLYING INTO THE PIGEON'S BRAIN

Presented by **Giacomo Dell'Omo**

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Homing pigeons are able to use the position of the sun, the earth magnetic field and olfaction for navigating from remote unfamiliar locations. In the familiar range they can rely on visual cues. Several brain regions are involved in the spatial orientation as it has been shown by brain lesions and early genes expression. However, there is no information about when and where brain activation takes place during the pigeon's homewards journey. We equipped pigeons with very small GPS and micro EEG/neuronal activity dataloggers ("Neurologgers") to simultaneously record electric brain activity during the homing flight. We released the birds single or in group, from land and sea, with one eye closed, near or far from peculiar landmarks to provide a variety of situations amenable to changes in EEG. Changes in EEG power were not unidirectional at different frequencies and several frequency bands in the EEG spectrum were determined, based on this directionality. The modulation of visual input associated with the landscape caused the most prominent changes in the high-frequencies. Recording neuronal activity from the caudo-medial mesopallium (CMM), an auditory area, also revealed that neurons responded when pigeon were approaching the home loft. GPS was also used in combination with other instruments (coils, accelerometers, cameras) to provide a better understanding of bird's behaviour during flight. The potential of application of the GPS with other technologies is discussed also for other bird species. Supported by Swiss National Science Foundation.

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## RESOURCES, CONDITIONS AND INTERACTIONS INFLUENCING WHITE STORK (*CICONIA CICONIA*) FECUNDITY

Presented by **Damijan Denac**

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Weather affects breeding success of the White Stork, but so far the effect has not been studied in the context of different food resources or habitat quality. My aim was to determine whether the impact of weather conditions on breeding success is dependent on habitat quality. Weather effect on reproduction was analyzed in two populations that differed significantly in the areas of the pairs' potential feeding habitats. Field work was carried out between 1999—2004. Population size of populations with rich food resources was 15—28 pairs, and of populations with poor food resources 101—126 pairs. Univariate correlations and multiple regression methods were used to find effects of weather. Average temperature and rainfall in April, May and June were used as weather variables. Rainfall in May explained best the variability of breeding success, but only in the population with poor food resources. In the population with rich food resources, weather did not account for reproduction variability. Furthermore, the effect of intraspecific exploitation competition on the White Stork's breeding success was investigated, but in population with poor food resources only. Pairs were classified in density groups according to the number of neighboring breeding pairs within their home range. The surface of potential feeding habitats was used as a food resource indicator and analyzed for all nests within the home range and compared among density groups. Breeding success was density dependent. Pairs breeding alone and pairs with one neighbour within the home range most frequently reared three chicks, pairs with two neighbours reared two, but pairs with three or four neighbours most frequently failed to raise a single chick. Regarding the use of organism-weighted densities expressed as the number of conspecific neighbours breeding within a pair's home range and foraging biology of the species, intraspecific exploitation competition was a possible cause for density dependent breeding success.

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## DO ALTITUDE SPECIFIC VISIBILITIES INFLUENCE THE FLIGHT HEIGHT OF SOARING RAPTORS MIGRATING OVER WATER?

Presented by **Mark Desholm**

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Raptors making use of thermals for climbing during migration are notoriously known to gather at coastal hot-spots before crossing water bodies. Once over water, no new thermals are generated and the soaring raptors are faced with the options of either changing height for lift (i.e., gliding) or active flapping flight in order to reach the distant coast safely. In recent years, a growing number of marine wind power plants have been constructed and the migrating raptors are now faced with a potential and novel collision risk. It has been shown, recently, that the initial flight altitude influences the collision risk at marine wind plants. Thus, in order to manage the collision risk for these bird species it is of paramount importance to understand the initial altitude choice of raptors crossing bodies of water. In this study, I hypothesize that raptors are constrained altitude-wise by flight visibility (i.e., visibility at the altitude of flying) since they prefer to have land sight on the other side of the water before initiating the crossing flight. Aerial observations of flight visibility were conducted from a small sports airplane at two Danish migration hot-spots and radar and range finder were used to sample the initial migration altitudes. I demonstrate how flight visibility (i.e., whether the distant coast could be seen), in general, is constrained altitude-wise either upwards by cloud-cover or downwards by haze or fog. The teaser of this abstract is whether the raptors then chose initial flight altitudes in accordance with the actual flight visibilities and how this influenced the collision risk at one existing and one planned marine wind power plant.

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## **SPANISH SPARROW (*PASSER HISPANIOLENSIS*) IN N-E BULGARIA: MORPHOMETRICS AND CAPTURING PERIODS**

Presented by **Dimitar Dimitrov**

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The Spanish sparrow (*Passer hispaniolensis*) has expanded to the north Balkan Peninsula in the last 50 years. The population in Bulgaria continues to increase and the species has become common in many parts of the country. Data on biometrics, moult and migration patterns of this expanding population are scarce. We analysed the ringing data of a Spanish sparrow breeding colony, as well as of birds caught during migration at Kalimok station, N-E Bulgaria (41°00'N 26°26'E). The birds were caught in the period 1997—2010 with mist-nets situated close to the colony and in reedbeds nearby. From every bird the following measurements were taken: length of the 8th primary feather, wing length, tail length, and body mass. Data on sex, age, and moult were recorded for every individual. The average wing length was 78.8 mm (N=339; SD=2.4) for males and 76.7 mm (N=139; SD=2.0) for females. The length of the 8th primary feather was on average 57.8 mm (N=339; SD=2.0) in males and 56.1 mm (N=138; SD=1.8) in females. The earliest capture in spring was on March 7 and the latest on October 30 in autumn. The peak periods with large numbers of birds captured were between end of April and the second third of May in spring, and from middle of August to the second third of September in autumn. Eight birds were recaptured over the years — 6 after 1 year, 1 after 3 years, and 1 after 4 years. Adults started their complete moult in middle of July and completed it in the first decade of September. Juvenile birds moulted completely between the end of July and the middle of September.

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## MONITORING FLIGHT ACTIVITY AND FORAGING OF SHOREBIRDS IN THE WESTERN WADDEN SEA BY CONTINUOUS RADAR AND CAMERA OBSERVATIONS

Presented by **Adriaan Dokter**

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Foraging conditions for shorebirds in intertidal systems vary greatly over time. Tidal, diurnal, lunar and seasonal cycles have very different characteristic time scales, but all influence food availability and spatio-temporal foraging patterns. To reveal the relative impact of these different environmental rhythms on the spatio-temporal use of intertidal flats by shorebirds, we installed two continuous monitoring systems at the Balgzand intertidal area in the Dutch western Wadden Sea, both covering timescales of minutes up to a full season: (1) a newly developed track-while-scan bird radar was used to study shorebird flights between high-tide roosts and foraging grounds (2) a stand-alone camera made continuous observations of foragers near a local mussel and cockle bed. Bird movements and foraging was monitored continuously during both night and day from February to December 2010. The long continuous observations period allowed us to study the precise timing and number of bird flights and foragers in relation to the diurnal, tidal and seasonal cycle. As expected, tidal dynamics was the main driver of shorebird flight activity. Flight activity peaked around incoming and outgoing tide, closely following spring and neap tide patterns. Surprisingly, a depression in flight activity is found at dusk, during the transition to nocturnal foraging strategies, while an increase in flight activity is found at dawn. Focussing on the Eurasian Oystercatcher, we will discuss foraging activity during a full lunar cycle in both a late winter and a late summer situation, in order to reveal the relative importance of night-time versus day-time foraging across the season.

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## DISPERSAL HERITABILITY IN A PATCHY POPULATION: ACCOUNTING FOR IMPERFECT INDIVIDUAL DETECTION AND IMPLICATIONS FOR INDIVIDUAL AND POPULATION PROCESSES

Presented by **Blandine Doligez**

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Understanding the factors affecting the evolution of dispersal, such as its proximate mechanisms, appears crucial to understand the impact of dispersal on many evolutionary processes in the wild at both individual and population scales. In particular, many models on the evolution of dispersal assume that individual differences in dispersal are genetically determined, while empirical studies often consider dispersal as a plastic, condition-dependent trait with low heritability. There is however growing evidence from within-family similarities in dispersal behaviour suggesting a heritable component of dispersal in different avian species. Obtaining unbiased estimates of dispersal heritability in natural populations is therefore fundamental to understand the evolution of dispersal strategies and their population consequences. I show that dispersal propensity, i.e. the probability to disperse between breeding habitat patches, is significantly heritable in a patchy population of the collared flycatcher (*Ficedula albicollis*) (a hole-nesting migratory passerine), as estimated by quantitative genetic models (within-family resemblance and “animal models”). The effect of parental dispersal status is additional to that of local habitat quality, which confirms previous results about context-dependent between-patch dispersal in this population on top of a partly genetic determination of variation in dispersal. However, these approaches do not account for imperfect individual detection in the wild. To which extent ignoring individual detection probability may bias heritability estimates remains unknown. I investigate this issue using a capture-recapture approach to account for individual detection probability and its heterogeneity depending in particular on individual dispersal status and previous history. I discuss the different estimates quantifying the genetic basis of dispersal and their implications for dispersal processes at the individual and population levels.

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## **RELATIONSHIPS BETWEEN GREATER SPOTTED EAGLE (*AQUILA CLANGA*) AND EAGLE-OWL (*BUBO BUBO*) AT PRIPYAT POLESIE (SOUTHERN BELARUS)**

Presented by **Valery Dombrovski**

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A considerable part of the Belarus populations of the Greater Spotted Eagle (GSE) (about 100 pairs) and the Eagle-owl (EO) (about 300 pairs) are located in Pripyat Polesie. According to publications, EO exerts negative influence on GSE due to direct predation. The presence of competition between these species for feeding resources and nesting sites was also supposed. Study of GSE and EO relationship (comparative analyses of diet in different habitat types, width and the degree of food niches overlapping, foraging capacity of hunting areas, foraging selectivity and breeding success of GSE in dependence of the distance from the nearest EO nest) was carried out during 2005—2010 at Pripyat Polesie. Food niches of GSE and EO significantly overlap at Pripyat Polesie (Morisita index  $CH=0,85$ ), so the occurrence of trophic competition between these species was concluded. Both species are characterized by polyphagy, the basis of their diet consists of small mammals (40—60%) and birds (36% in both species). Both species demonstrated significant selectivity with respects to the Water Vole (*Arvicola terrestris*), Voles (*Microtus spec.*), Anseriformes and Gruiformes, as well as the preference of larger prey of up to 1 kg. The most essential dietary differences between GSE and EO consist in the regular use of reptiles (especially snakes) and insects by GSE, which are extremely rare in the diet of the EO. There was higher occurrence of Owls in the diet of the EO than in GSE. The predation of EO on GSE was never recorded at Pripyat Polesie. Breeding success in GSE pairs within a 500 m radius from active EO nests (65 breeding attempts) showed no difference with pairs without such neighbourhood (216 breeding attempts). Thus, there is no antagonism between EO and GSE at Pripyat Polesie despite the similarity of diet and habitat preference.

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## **ARTIFICIAL LIGHTS AND TIMING OF REPRODUCTION IN EUROPEAN BLACKBIRDS (*TURDUS MERULA*)**

Presented by **Davide Michelangelo Dominoni**

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Across much of the world, urban areas are growing faster than any other land cover type. Animals which have successfully settled in these man-made ecosystems have to cope with novel environmental conditions compared to their forest conspecifics. One of the most apparent urban-specific environmental factors is artificial light at night. While there is no doubt that photoperiod i.e. the light fraction of a 24 h day is one of the driving forces regulating life cycles of plants and animals, nothing is known about the effects of this so called 'light pollution' in urban environments on the behaviour, physiology, and brain functions of animals. Previous studies, however, support the idea of a stimulatory effect by artificial night light. Urban birds exposed to higher light irradiance initiated their morning chorus earlier than birds living in rural areas. Even changes in the seasonal organization of annual events such as reproduction in urban populations have been tried to explain by increased night light irradiance. To elucidate the significance of artificial night light for the organization of seasonal and daily activities, we set up a common garden experiment where we kept two mixed groups of urban and rural European blackbirds (*Turdus merula*) in two different rooms with different amount of nocturnal light intensity. We measure the response of the reproductive system, the daily and nocturnal locomotor activity and the amount and time of song activity. In our contribution we will report on the results of this experiment and will eventually discuss the ecological and evolutionary importance.

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## ROOSTING BEHAVIOUR OF THE HOUSE SPARROW (*PASSER DOMESTICUS*) IN AN URBAN AREA

Presented by **Beata Dulisz**

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Observations of House Sparrow roosts were made in the autumn-winter season (15 November—15 April) in 2009/2010 in the city of Olsztyn (NE Poland). 20 controls in the morning (one hour before sunrise to take-off of the birds), and 20 controls in the evening (two hour before sunset to one hour after darkness) were carried out. The size of sparrow flocks fluctuated from 36 to 124 sparrows, and with the progress of the autumn-winter season, this number gradually decreased. Birds which were roosting in the roost and dispersing in the morning from the roost, were mostly moving alone or in flocks of 2—5 sparrows. Sparrows stopped arriving at the roost before sunset and in the period when day-length and temperatures were minimal. Most birds arrived just before sunset. The total time of roosting was about 60 minutes and was prolonged towards the end of the winter season. In the morning, birds departed after sunrise and the maximum flight intensity was within 30 minutes, but during the period of the shortest and the coldest days, birds stayed longer in the roost. The total duration of roost clearance was significantly shorter than settling at the roost. During arrival at the roost and before leaving the roost, sparrows showed physical and vocal activity, which was lower in the morning before leaving the roost. At low temperatures, the number of birds in the roost was reduced.

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## GPS, ACCELEROMETRY AND FLIGHT ENERGETICS: A STUDY CASE WITH VULTURES

Presented by **Olivier Duriez**

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Studying flight behaviour and energetics in free-ranging animals has always been a technical challenge. Measurements from the ground or in wind tunnels are indeed not suitable for studying flight dynamics in large raptors. Here, we present the results of detailed measurement of the flight behaviour of 5 vultures of 3 closely-related species (Eurasian griffon vulture *Gyps fulvus*, Rüppell's vulture *G. ruppelli*, and Himalayan vulture *G. himalayensis*), trained for aerial shows but practicing soaring flight in natural conditions, using the topography of the site, i.e., a natural canyon (le Rocher des Aigles, Rocamadour, France). We used miniature, ultra-precise GPS loggers (Gipsy 1, recording position, altitude and speed at a frequency of 4Hz), coupled with 3D accelerometers (recording at 100 Hz) to analyze in detail the flight behaviour of freely-flying vultures. We also measured heart rate (HR) calculated from electro-cardiograms recording for 2 of these 5 birds, as a proxy for energy expenditures. This is, to the best of our knowledge, the first measurement of HR in freely-soaring raptors. In spring and summer 2010, birds performed 2 to 5 flights per day, i.e. experiencing the same aerological conditions and thus allowing for direct comparisons of the influence of species-specific wingspan and body mass on the flight abilities of the different species. The preliminary results demonstrated that these birds fly as efficiently as birds in the wild, reaching altitude of >1500 m above ground in <15 min. HR increased at take-off and landing up to ca. 300 bpm, but was very low during the rest of the flight, almost at the level of field resting HR, i.e. when the bird was sitting on its perch. HR was highly correlated to Overall Body Dynamic Acceleration (OBDA) suggesting the possibility to use reliably accelerometer data as an index of effort.

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## ADULT SURVIVAL OF THE AQUATIC WARBLERS (*ACROCEPHALUS PALUDICOLA*) BREEDING IN THE BIEBRZA MARSHES, N-E POLAND

Presented by **Andrzej Dyrzcz**

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Adult survival is one of key demographic parameters in management of avian populations. Yet, annual survival of the globally threatened Aquatic Warbler long remained a mystery, impairing our ability to model species' demography. We estimated survival of Aquatic Warblers breeding in the Biebrza marshes, a rather stable and abundant population forming the core of the Polish range of the species. In 1987—1995 we ringed 279 breeders (149 males and 130 females) from a local population at Grobla Honczarowska. We analyzed these data with a range of capture-recapture models using MARK 5.1 software and an information-theoretic approach to find the most parsimonious model. The most supported model (with lowest AICc) assumed constant survival, equal for both sexes, and probability of re-encounter dependent on the year in males, and constant for females. With this model, average annual survival was estimated at 0.62 (95% CI: 0.519—0.706). Re-encounter probability was constant at 0.137 for females and varied between 0.87 and 0.13 (with a clear decreasing trend during 9 years of the study) for males. However, this model was not clearly superior to the second-ranked one that allows survival to differ slightly between sexes (delta AICc=2.11, model weights 0.52 and 0.18, respectively). Also the third-ranked model (annual and sex-related variation in re-encounter) has a comparable support (delta AICc=2.86, weight 0.13). Here, survival was estimated at 0.63 (0.530—0.727) for both sexes. Further analyses of our Aquatic Warbler results should aim at finding a refined model that will have a better support in the data.

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## CENSUS OF THE WINTERING COMMON BUZZARDS (*BUTEO BUTEO*) IN BULGARIA FOR THE PERIOD 2006—2008

Presented by **Sylvia Dyulgerova**

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Being on the top of the food pyramids, birds of prey are good indicators of environmental "health", and monitoring their numbers is a basic tool for understanding the effects of environmental changes on biodiversity. Many raptors are easier to monitor during winter, as they have greater densities on the wintering grounds than in their breeding areas. However, studies on the ecology of their populations in winter are considerably less numerous compared to the breeding period. The Common Buzzard (*Buteo buteo*) is the most abundant wintering raptor in south-eastern Europe, but still the data about its numbers in this region are based on estimations rather than on empirical data. The aim of the study was to investigate the density, numbers and habitat use of the species during the winter in Bulgaria. We made national counts of birds of prey in the lowlands of Bulgaria in the winters of 2006—2008. The study design was based on the combined method between the roadside survey and the point count technique. No sampling bias was found in relation the attraction or avoidance of birds of prey from the roads. Density estimation was made using the distance sampling method. The number of wintering raptors was calculated on the basis of the land cover under 650 m a.s.l. (CORINE Land Cover 2000). The habitat preferences of studied species were tested using G-test. Density and numbers of the wintering Common Buzzards were consistent in 2006 and 2007 and slightly higher in 2008. The species was more abundant in southern than in northern Bulgaria and was concentrated in areas with predominance of arable lands while uncultivated (abandoned) areas were avoided. The presented results contribute to the knowledge about the ecology of wintering Common Buzzards and could help in species conservation related to sustainable agricultural land management.

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## PRELIMINARY DATA OF BLACK STORK MONITORING IN BELARUS

Presented by **Maryna Dzmitranok**

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Monitoring of the Black Stork in Belarus started in 2006. The basic monitoring plot for counting Black Storks is located in the southern part of the country in Zakaznik Middle Pripyat (Stolin district). Monitoring counts are carried out visually with a telescope from 20th of April onwards. Flying and displaying territorial pairs are mapped. This monitoring site is dislocated from the Pripyat river floodplain. The forest contains mostly old black alder flooded woods with oak and hornbeam islands. The forest is surrounded with natural river floodplain meadows with a great number of small lakes and marshes; on the other side it is surrounded by melioration systems with pastures and agricultural fields criss-crossed with a high number of canals. It is an optimal habitat for breeding Storks in Belarus. The density of Black Storks in this area is the highest for the whole country. During 2006—2010, the density of territorial pairs was 22 on 150 km<sup>2</sup> of the forest area, and this level remained stable. However, the number of displaying territorial pairs is higher than that of found nests. According to our preliminary data, the nesting success of the species in the Palessie region is low. Only 33% of the nests used by Black Storks were with chicks in 2009—2010. Logging of the old forest plots and disturbance during the nesting period (duck hunting in the forest) have been pointed out as unfavourable factors for the Black Stork.

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## **THE PRESENT STATUS OF THE BREEDING POPULATION OF THE BLACK STORK (*CICONIA NIGRA*) IN UKRAINE**

Presented by **Natalie Dzyubenko**

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The Black Stork, listed in the Red Book of Ukraine, has an unfavourable conservation status in Europe, according to the Berne, Bonn and Washington Conventions. However, the exact quantity of this species in Ukraine was unknown until the early 21st century. Intensive forestry activities are the most severe threats to the Black Stork in Ukraine, followed by the depletion of feeding resources as result of drainage melioration. Another negative influence is the lack of suitable nesting trees. Considerable rejuvenation of forests is a result of intensive forestry activities. The Western Ukrainian Ornithological Society, under financial support of the trust “Ciconia”, has conducted an inventory of the population of the Black Stork in Ukraine in 2005—2010. Over 60 000 km<sup>2</sup> of forest were investigated, which is above 75% of the total forest area of Ukraine. 576 nests and 276 nesting areas of the Black Stork have been found. Breeding density in different regions ranges from 1.1 to 2 breeding pairs per 100 km<sup>2</sup> forest area. Assuming that the density of nesting Black Storks in unstudied areas is the same as in already studied areas, the overall number of the Ukrainian population of the Black Stork might be close to 1000 nesting pairs. Based on our research, we provide strong evidence for increasing numbers of Black Storks in Ukraine. We suppose that this is a result of only a few factors. First of all, it may be a consequence of successful adaptation of this species to anthropogenic changes of forest ecosystems. Another reason for increasing numbers of Black Storks could be the success of conservation efforts.

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## UNDERSTANDING AND PREDICTING AVIAN INVASIONS: INDIVIDUAL VARIATION VERSUS SPECIES-SPECIFIC TRAITS

Presented by **Pim Edelaar**

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For reasons of both fundamental and applied interest, many studies have tried to derive characteristics that make invasive species different from non-invaders. For birds, there is now good evidence that the number of introduced individuals has an important effect, and that additional factors promoting invasiveness are the similarity between native and introduced range, the width of habitat use (generalist ecology) and relative brain size (innovation of behaviour). However, the species-specific (mean) characteristics as displayed in the native range may not provide a good description of the actual group of individuals trying to establish a population in a novel range. For invasive birds in Spain we have established that captive breeding has a major effect on invasiveness. Taking into account their numbers present in cages (as determined from their abundance on bird markets), wild-caught species were far more likely to establish invasive populations than were captive-bred species. A good example is the Canary: although by far the most common bird species in captivity (and frequently seen as an escape), there are no records of breeding in the wild. Follow-up studies show that this is most likely linked to the loss of adaptive behaviour in captive-bred birds: e.g., they show no or very weak responses to a model of a predator, and therefore presumably have a low survival rate after introduction into the wild. Hence, whether a bird is wild-caught or captive-born is a strong predictor of invasiveness that is not species-specific but operates at the individual level. Clearly, this aspect should be taken into account when discussing or preventing the risk of novel invasions. We are currently also investigating the possibility that processes during the invasion steps prior to establishment (uptake, transport, introduction) could have selective effects on individual variation, and thus could change and potentially increase the invasiveness of species under certain conditions.

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## LAND USE AND CLIMATE CHANGE AS DETERMINANTS OF WHITE STORK REPRODUCTION

Presented by **Ute Eggers**

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Survival and fitness of organisms strongly depend on environmental conditions. In case of a changing environment, organisms may have to adapt, relocate, or go extinct. If the environment changes too fast for organisms to adapt, serious population declines can result from this. Knowledge on the impacts of environmental changes on species and systems is pivotal for effective nature management and conservation in order to prevent species declines or even extinction. In our study, we use land-use and climatic parameters as predictors for the breeding success of the White Stork (*Ciconia ciconia*). We analyse the potential relationships between these environmental factors using spatial statistics and advanced predictive regression techniques. Our investigation area is Brandenburg, the federal state with the highest number of White Storks in Germany (around 30% of the German population). Climate projections predict increasing aridity and rainfall variability in this already dry region. In addition, already around 50% of the federal state area is used for agriculture and current or upcoming amendments of EU-Directives give reason to even expect an increase of this percentage. Therefore, long-time climate data series and land use data based on remote sensing (e.g., CORINE Land Cover) are used as predictors in our analysis. Heart of the study is a long-time data series for over 50 years on White Stork reproductive success, e.g., the number of fledglings and the percentage of non breeding pairs of the population. The expected changes in climate and land use require a thoughtful monitoring of the resulting consequences for nature. Thanks to the comprehensive data base, we believe that this study presents an excellent basis for evaluation of the present and future state of this White Stork population.

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## ENERGETIC BENEFITS OF CRÈCHING BEHAVIOUR IN KING PENGUIN CHICKS

Presented by **Götz Eichhorn**

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During their long growth period of nearly one year, king penguin (*Aptenodytes patagonicus*) chicks are challenged by severe food shortage during the austral winter, a harsh climate and predation risk from giant petrels. Utilization of large fat reserves stored in preparation to the winter fast, a protein-sparing metabolism and reduction in body temperature allow chicks to physiologically adjust to these nutritional and environmental constraints. In the present paper we investigate behavioural means by which penguin chicks might enhance their chance of survival. A prominent behavioural phenomenon represents the aggregation of chicks into crèches. Previous work showed that crèches protect chicks from adult aggression, predation and adverse weather. However, the energetic benefits of crèching behaviour for king penguins are unknown. Therefore, we simultaneously recorded behaviour, heart rate (HR, an index of energy expenditure) and body temperatures of free-living chicks in their colony on Possession Island (Crozet Archipelago) and relate these to crèching position. Weather conditions and air temperature on the back of penguins were monitored simultaneously to investigate differences in microclimate inside and outside crèches. We show that crèching behaviour allows a different and more energy conserving time budget. However, expected benefits from an ameliorated air temperature insides crèches appear negligible, which is due to the loose aggregations of crèches compared to huddles as formed, for instance, by emperor penguins. We hypothesize that an indirect energetic benefit of crèches might be realized through improved sleeping conditions facilitating heterothermia and thereby allowing additional energy savings.

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## DO SMALL HOLE NESTING PASSERINES DETECT CUES LEFT BY A PREDATOR?

Presented by **Anna Ekner**

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There are a lot of studies about relationships between prey and predators. However most have focused on the influence of lethal predators on their prey. We suggested that non-lethal effects may also be very important for a complete understanding of prey-predator interactions. Among many influencing factors, predation is important because it affects survival probability, especially in winter, which is a critical period for many passerines living in temperate zones. Apart from killing prey, predators may also have an indirect influence on the choice of nocturnal resting sites. Therefore, small passerines should detect and avoid places where a predator has operated previously. We tested this prediction using data on wintering small passerines, mainly on Great Tits. The study was performed during the winter season of 2005/2006 in western Poland. In the experiment, we put fur and mangled feathers in half of 100 randomly selected nest boxes. Boxes were checked every ten days, from January–March. The birds showed a significantly stronger preference towards “clean” nest boxes (without predator traces). It seems that non-lethal predator influence winter dispersion of birds and wintering passerines may recognise nest boxes where predation has previously occurred through visual cues.

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## RANGE EXPANSION AND THE NEGLECTED ROLE OF LONG DISTANCE DISPERSAL IN A MIGRATING SONGBIRD

Presented by **Jan Engler**

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The mechanisms underlying range expansion in birds are various and still the subject of scientific debate. Dispersal propensity, competitive capacity, and population genetics and dynamics, among other factors, were considered as the intrinsic driving forces facilitating range expansion. However, ecologists are just beginning to understand the exact interplay between each factor in this complex mechanism. The functional roles of short and long distance dispersal in range expansion depend on the dispersal propensity of a given species. Migrating species, in particular, often show a high vagility, i.e., a high capacity or tendency for the individuals to move to a distant place. In consequence, their natal dispersal ability could also be higher than in resident species, making them more adapted for range expansions. Since 2008, we investigated the recent range expansion of the Melodious warbler (*Hippolais polyglotta*). An accompanying colour ring program reveals a high philopatry in adult males. However, nothing is known about the natal dispersal of young birds. We compared the genetic structure of three populations located along a gradient on edge of the north-eastern range in south-western Germany using microsatellite loci. The three populations were of different ages and were sampled in 2001/02 and 2008—10. During this time span, the range edge moved further to the north-east, where new populations were founded and the young existing populations became more densely inhabited. Additionally, we compared these populations to other populations located across the whole European range to find possible source areas from which new populations were founded. The analysis of the genetic population structure with rapidly mutating loci like microsatellites should shed light on the general patterns of dispersal propensity and, more precisely, the role of long distance dispersal as an intrinsic driving force on the rapid range expansion of the Melodious warbler in Central Europe.

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## USING BIOLOGGERS TO TEST PREDICTIONS FROM A DISTRIBUTION MODEL ON THE CARRYING CAPACITY FOR OYSTERCATCHERS WINTERING IN THE WADDEN SEA

Presented by **Bruno Ens**

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The university of Amsterdam (UvA) developed a solar-powered bilogger registering both position (via GPS) and behaviour (via accelerometer) at a high frequency and small enough to attach to Oystercatchers (*Haematopus ostralegus*); see abstract Bouten et al. This allowed us to test predictions from a distribution model on the carrying capacity for wintering Oystercatchers of intertidal mudflat areas, like the Wadden Sea. Here, the birds are subject to many human activities like shellfish fishery, recreational disturbance, military training exercises and soil subsidence due to gas extraction, as well as more indirect impacts like climate change and the spreading of introduced species like the Pacific oyster (*Crassostrea gigas*). To quantify the cumulative effect of these impacts on the carrying capacity for Oystercatchers, we developed a distribution model called WEBTICS (Wader Energy Balance Tidal Cycle Simulator). The model was calibrated with data from the Wadden Sea and the Oosterschelde. Historical data on weather, tides, shellfish stocks and emersion time from another estuary in Zeeland Delta in the Netherlands, the Westerschelde, sufficed to correctly predict the number of Oystercatchers wintering there. It is clear that the calculated carrying capacity primarily depends on the shellfish stocks high in the intertidal zone, i.e. with a long emersion time. To further validate the model, we tracked 40 Oystercatchers with the loggers developed by the UvA from June 2010 throughout the winter. We aim to present results on: (1) A test of the model prediction that Oystercatchers increase time spent on feeding per 24 hours as feeding conditions deteriorate throughout the winter. (2) A test of the model prediction that shellfish beds with a long emersion time are more heavily used compared to shellfish beds with a short emersion time. (3) Individual variation in time spent foraging and usage of different shellfish beds.

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## EFFECT OF WINTER FOOD SHORTAGE ON THE MUSCULAR DEVELOPMENT IN KING PENGUIN CHICKS (*APTENODYTES PATAGONICUS*)

Presented by **Aude Erbrech**

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In birds, the period between birth and the acquisition of independence is generally characterized by a rapid and continuous growth, and by a steady parental food supply. Nevertheless, when the rearing period is long, parental food provisioning may fluctuate seasonally in relation to environmental changes and food shortage may affect the chick energetics. However, under such circumstances little is known on how the conflict between maturation of tissues associated to growth and the energy saving processes allowing coping with restricted feeding is managed. We investigate this question in chicks of the king penguin (*Aptenodytes patagonicus*), a semi-altricial seabird. This bird has a long rearing period ashore (about one year) and the chick's statural growth is almost completely stopped during winter when parental food provisioning is drastically reduced. Our aim was to estimate the impact of this three month food shortage on the development of the muscles of the pectoral and pelvic girdles. Water, protein content, fibre type characteristics and myosin heavy chain content were determined in muscles of chicks suffering various degrees of food deprivation in comparison to chicks fed regularly before winter. Our prediction was that because used for pedestrian locomotion ashore pelvic muscles should be less affected by food restriction than pectoral muscles that would be used for swimming only several months later, at departure to sea.

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## WHAT HYPOTHESES EXPLAIN REVERSED SEXUAL DIMORPHISM IN SKUAS BEST?

Presented by **Jan Esefeld**

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Several phylogenetically not closely related bird taxa including Stercorariidae show a reversed sexual dimorphism in body size. Until today, none of the many proposed hypotheses that aim to explain the evolution of this phenomenon is widely accepted to account for Skuas. In this ongoing study conducted during the southern summer seasons 2009/10 and 2010/11 on King George Island, South Shetland Islands, Antarctica, it was examined to what extent breeding pairs of the two occurring species polar skua (*Catharacta maccormicki*) and brown skua (*Catharacta antarctica lonnbergi*), as well as hybrid pairs involving both species, express sexual roles. Nests were visited regularly checking for presence, aggression and egg incubation of individual partners. Furthermore, GPS-loggers and observations were used to determine individual time for foraging, incubation and in-territory residence. Observations were additionally used to search for differences in courtship behaviour, chick feeding quantity, as well as territory defense. Depending on the type of differences found in sexual roles it will be possible to test certain reversed sexual dimorphism hypotheses for skuas. As different pairs show different magnitudes of sexual dimorphism, results will also be tested for correlation with this trait. Any correlation would strongly indicate a direct causal link to sexual dimorphism.

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## A CLEAR THREAT — PREVENTING BIRDS FROM HITTING WINDOWS

Presented by **Wolfgang Fiedler**

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Bird collisions with glass panels on buildings, bus shelters, noise barriers and other structures are estimated to range among the top causes of death for birds in urban and suburban areas. Since the first, largely naive solutions, such as raptor silhouettes stuck on windows, a lot of effort has been invested in developing optimal patterns of stripes, grids and other signatures to make glass panels visible for birds. A number of experimental setups has been developed to test the strike prevention rates of various glass signatures, e.g., flight tunnels based on a two-way choice/decision experiment (glass with vs. without signature). Currently the highest success rates (strike prevention rates) are achieved by glass signatures that are visible for both, humans and birds. For optical/aesthetical reasons, architects and building owners often have reservations against applying these methods. An alternative approach uses the differences in the spectrum of visible light for birds and humans, deploying signatures in the UV sector that is still visible by most bird species. While the basic suitability of this approach has been shown, these glass types do not yet reach the same efficiency as the methods using signatures in the full spectrum of visible light. The performance of the UV signed glass seems to depend strongly on the type of signature, the position of the UV layer in the glass and other factors like sun position, overcast and amount of light behind the glass panel. In addition, situations where glass panels present mirror images of bushes, trees or open space to birds may not be fully comparable to those situations where glass simply represents an invisible barrier to flying birds. Besides all technical approaches concerning the glass itself, structural building solutions (like exposition and size of the glass panel, avoidance of “looking through” situations, etc.) as well as planting strategies can help to reduce glass strikes - including the abandonment of glass in highly sensitive areas.

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## **TRACKING MIGRATORY SONGBIRDS USING GEOLOCATORS: WHAT ARE THE ECOLOGICAL QUESTIONS THAT CAN BE ADDRESSED AND FUTURE CHALLENGES?**

Presented by **Kevin C. Fraser**

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In recent years, geolocators have been miniaturized enough to allow, for the first time, start-to-finish migration tracking of small (<50 g) birds. Using geocator data for two species of Neotropical migratory songbirds, purple martins and wood thrushes, we illustrate how this technology allows us to test questions about (1) seasonal carry-over effects, (2) geographic and sex/age variation in migration ecology, (3) individual plasticity and (4) migratory connectivity. We have shown that late breeding in wood thrushes delays the onset of feather moult but in turn this does not delay arrival on the winter territory. By deploying geolocators on breeding purple martins in Texas and Pennsylvania, 2000 km apart, we have shown a consistent pattern of rapid (>400 km/d) initial migration to the Yucatan Peninsula in Mexico, followed by prolonged stopovers in Central America before continuing migration to Brazil. Tracking individuals in successive years reveals much plasticity; one female wood thrush tracked 3 years in a row showed extremes in routes taken (cross-Gulf of Mexico vs. circum-Gulf) and timing (early vs. late spring arrival and fall departure). Finally, wood thrushes exhibit relatively high connectivity between breeding and wintering populations whereas purple martins breeding 2000 km apart use a similar, large, wintering region in Brazil. Logistical challenges (pilot testing geocator design, ground truthing, retrieval rate, habitat shading, and latitude “blackout” during spring/fall equinox) vary among species and affect accuracy of locations. For hypothesis-testing an unavoidable constraint is that geolocators can only provide data on surviving birds.

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## PHENOLOGY OF AUTUMN MIGRATION OF SOME PASSERINE SPECIES AT TWO SITES IN LATVIA, 1970—2010

Presented by **Inga Freiberga**

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Possible changes in timing of migration are widely discussed in view of climate change. To test whether we can observe any changes in timing of autumn migration, we analyzed capture dates at Pape, Latvia (56°09'N 21°03'E) for the period 1970—2010 and at Lejasciems, Latvia (57°16'N; 26°34'E) for the period 1989—2010. Birds were captured by Heligoland traps (Pape) and mist nets (Lejasciems) annually between August and November. We used median captures dates for each species to represent migration timing in respective year. Data on four species were analyzed in detail: *Erithacus rubecula*, *Parus major*, *Regulus regulus*, and *Turdus merula*. We tested whether all these species are showing tendencies towards delayed autumn migration over the study period, as may be expected for these short distance migrants that winter in Western Europe. All species, except *Erithacus rubecula*, showed a delay in autumn migration. *Erithacus rubecula* showed no significant trend during this period. The two locations probably are used by birds of different breeding populations, thus explaining differences observed between study sites.

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## DOES BY-CATCH POSE A THREAT TO SEABIRDS IN THE IONIAN SEA (EASTERN MEDITERRANEAN)? A QUANTITATIVE RESEARCH OF LOCAL FISHERIES

Presented by **Jakob Fric**

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It is apparent from numerous studies worldwide that incidental catches (by-catch) of seabirds in fishing gear potentially pose a considerable risk to populations. Nevertheless, systematic data on by-catch rates of seabirds are patchy and need to be updated in the European marine areas according to the Directorate-General for Marine Affairs and Fisheries of the European Commission. The present study which was carried out in the framework of the LIFE07/NAT/GR/000285 project, constitutes the first attempt for the evaluation of the by-catch rates in the Ionian Sea and, more specifically, in the Prefecture of Zakynthos Island. Data were obtained by distributing a specific questionnaire of closed and open-ended questions to the local fishermen in collaboration with the Prefecture's Fishery Department. A total of 150 professional fishermen (corresponding to the 90% of the total piscatorial fleet of the Island) responded to our personal interview surveys, during July—December 2010. The collected information indicates that primarily commercial longline and, to a lesser extent, gillnet fishery gear cause incidental catches mostly of Cory's Shearwaters, followed by Yellow-legged Gulls, Mediterranean Shags, and Audouin's Gulls. More specifically, 947 birds were estimated to be killed annually, of which 626 (66.1%) were Cory's Shearwaters, corresponding to 3—4% of the local breeding population. The temporal analysis of the incidental bird mortality pointed out that seabirds were more susceptible to trapping in fishery gear set around sunrise during spring and summer months, whereas spatial analysis of by-catch data indicated variation in the number of seabirds caught in different fishery areas. Our results stress the need for a European Plan of Action which will aim to mitigate the negative impacts of fishery gear on seabirds.

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## **ANNUAL MOVEMENT ECOLOGY OF A PARTIAL MIGRANT SONGBIRD**

Presented by **Adam Fudickar**

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Although the co-occurrence of migratory and sedentary individuals within a single breeding population, partial migration, is common among songbirds, little is known about the movement ecology of individuals within these populations. For instance, it is still not clear if individuals have a strict lifetime movement strategy or if they are able to change strategies from year to year. Additionally, the commonly used method of winter re-sighting for identifying migrants within partial migrant songbird populations runs the risk of overestimating the migratory fraction of the population due to regional winter dispersal. For two years we tracked European blackbirds (*Turdus merula*) from a partial migrant population in southern Germany throughout their annual cycle using a combination of light-logging geolocators and radio telemetry. Our results provide the first annual tracks for partial migrant songbirds and highlight the potential for using geolocation technology for tracking medium distance migrants and identifying migrants within partial migrant populations.

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## **INTERACTIONS BETWEEN FOREST MANAGEMENT, DEER BROWSING AND HABITAT QUALITY FOR BIRDS IN HISTORICALLY FRAGMENTED BRITISH WOODLANDS**

Presented by **Rob Fuller**

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Processes affecting forest bird populations in intensively managed cultural landscapes are very different to those in landscapes with more extensive forest cover. Fragmentation models developed in pristine landscapes will not necessarily help predict species responses to habitat restoration and creation in landscapes with sustained anthropogenic disturbance. Furthermore, in cultural landscapes, conservation attention often focuses on early successional species and ones with low area sensitivity. Human exploitation of western European woodland has created a huge range of habitat types. Recent extensive work shows that forest management has large effects on abundance of many bird species, both through tree composition and habitat structures. Large changes in extent and management of British forest are proposed for climate change adaptation and ecosystem service delivery. While broad predictions can be made of how these changes may affect resource availability for birds, understanding of how forest management affects habitat quality remains weak for many species. Native and non-native deer are increasingly impacting on woodland causing simplification of understory structures. These impacts vary according to forest management system but habitat quality is generally reduced for birds dependent on young-growth and low dense vegetation, especially several long-distance migrants. Mitigation management includes fencing, reducing deer densities at a landscape scale, and manipulating forest management. Some of these approaches are effective at local scales but the real challenge is to reduce browsing impacts at large scales, especially as woodland extent is already low in most British landscapes.

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## PREDICTING WHITE STORK DISTRIBUTION IN WESTERN FRANCE BASED ON ECOLOGICAL NICHE MODELLING

Presented by **Hélène Gadenne**

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Predictive habitat models are increasingly being used for predicting species distribution and studying the consequences of human activities on species conservation and management. Within the current global change scenario, wetlands are one of the main affected ecosystems. Long-term studies are necessary to track changes in species distribution. In the present study, we focused on a wading bird, the White Stork (*Ciconia ciconia*) in France. This model species is especially interesting since populations decreased to quasi-extinction in 70s, but increased considerably after 80s in several areas such as in Charente-Maritime (western France). Here, the presence and absence of nests along waterways and marshes has been surveyed since the first breeding attempt in 1978. To understand temporal changes in breeding distribution, we developed habitat models based on presence/absence of nests of white storks. We compared the breeding habitat in 2000 and 2006 based on the presence of 102 and 179 nests, respectively. Similarly, we randomly generated 1000 absence points within the study area. For each point (presence and absence), we extracted information on 15 environmental variables describing habitat structure based on a GIS. For instance, we reclassified Corine Land Cover classes and we extracted fine-scale information from the topographical database of the study area. The same procedure was repeated for 4 buffer distances around each presence/absence point. We developed Generalized Linear Mixed Model including a spatial autocorrelation term to select the most important variables affecting breeding probability. We hypothesized that white stork breeding probability would be higher in areas with higher grassland and pasture availability within marshes and waterways, while decreasing in crops. Finally, we used the best habitat model to project the most likely breeding habitats under different scenarios of habitat availability.

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## LONG-TERM MONITORING OF BIRD DIVERSITY AND NUMBERS IN FOREST MICROFRAGMENTS ALONG THE HIGHER DON RIVER, RUSSIA

Presented by **Vladimir Galushin**

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Summer bird distribution was regularly mapped in 1992—2009 within three tiny woods along the west bank of the Don river in the Lipetsk region. Bird diversity in the larger grove (2.0 ha) consisted of 39 species (14—22 annually); in smaller ones (0.9 and 0.7 ha), 16 (8—11) and 18 (6—13) species were found. Their density was 12.9 pairs/ha (10.7—16.0), 22.8 (16.8—29.0) and 16.9 (12.9—25.7) pairs; from year to year it changed in 20—25% only. For the majority of species, population trends in each grove showed neither significant increases nor decreases during almost 20 years, except the Ortolan Bunting (*Emberiza hortulana*) which was almost entirely absent in 1998 and very rare in following years. All microfragments were most suitable for stable nuclei of 10—15 bird species, while other 20—30 species comprised variable parts of bird populations therein. Permanent inhabitants of the microfragments were the Tree Pipit (*Anthus trivialis*), Yellowhammer (*E. citrinella*), Whinchat (*Saxicola rubetra*), Red-backed Shrike (*Lanius collurio*), Chaffinch (*Fringilla coelebs*), Goldfinch (*Carduelis carduelis*), Whitethroat (*Sylvia communis*) and, most surprisingly, Buzzard (*Buteo buteo*). The latter was from time to time replaced by the Black Kite (*Milvus migrans*) in the studied groves. Nesting raptors in such tiny woods were adaptively tolerant to harmless local people: farmers, shepherds, passersby. At the same time, they seemed to be most secretive towards researchers with binoculars. Buzzards and kites always left their nests silently and flew away unnoticed in contrast to raptors in the large forest. Due to their high bird density, forest microfragments are important bird habitats within ecological corridors amidst agricultural landscape in Eastern Europe.

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## **BREEDING BIOLOGY OF WHITE-BREASTED MESITES (*MESITORNIS VARIEGATA*) IN KIRINDY FOREST**

Presented by **Anna Gamero**

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White-breasted mesites are terrestrial birds endemic to the dry deciduous forests of West Madagascar. They live in highly cohesive social units of 2 to 5 individuals. Because of their social organization, they have been considered to be cooperative breeders, but their breeding biology is not well known. We studied a breeding population in Kirindy Forest between 2009 and 2011 in order to determine their social organization (group size, stability and home range size), and breeding system by quantifying individual investment during nest building, incubation and chick care by combining spatial data, behavioural observations of habituated groups and video-recording of active nests. Overlapping home ranges varied from 6 to 14 ha and were stable between seasons. Cooperative breeding was not observed since groups split in general before breeding started. Incubation and chick care were shared by both members of the breeding pair. Thus, it is unlikely that white-breasted mesites breed cooperatively and their groups may therefore form for other reasons.

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## **INCORPORATION OF SPATIAL INFORMATION IN CAPTURE-RECAPTURE MODELING: COMPARING MOVEMENT PATTERNS OF ADULTS AND JUVENILES**

Presented by **Beth Gardner**

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Many studies of avian populations and monitoring programmes collect capture-recapture data. However, the spatial information collected in such studies is often ignored and little attention has been paid to the spatial modeling of demographic rates. Here, we demonstrate a spatial capture-recapture analysis using Bayesian inference to estimate movement and demographic parameters for a suite of avian species. We apply this model to a mark-recapture study conducted in Brazil. Encounter histories for individuals were determined from captures events at a series of mist-nests placed in 20 transects at sites representing two habitat types: secondary and primary forest. We examined the movement patterns of multiple species and age classes (adults versus juveniles) and made comparisons across forest type. Using the auxiliary spatial information collected in such studies provides the ability to better understand movement and detection, improve estimates of demographic rates, and thus to better understand the importance of habitat relationships and management decisions.

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## **TERRITORY CHOICE OF THE WOOD WARBLER (*PHYLLOSCOPUS SIBILATRIX*) IN RELATION TO HABITAT STRUCTURE AND RODENT DENSITY**

Presented by **Michael Gerber**

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Conservation of threatened species requires knowledge of the main factors leading to population declines. Habitat loss and fragmentation have been proposed as important drivers of population declines in many bird species. In ground-nesting passerines, such as the wood warbler, increasing numbers of generalist predators have been suggested to cause high nest loss rates affecting population trends. Over the past decades, wood warblers have shown negative population trends in many countries in western Europe, while populations in eastern Europe have fluctuated but overall remained stable. Aside from increased nest predation, changes in forestry practices, leading to habitats unsuitable for the wood warbler, and increasing disturbances due to recreational activities have been implicated in the negative population trends. In 2010, we examined territory choice of wood warblers in 12 study areas in northern Switzerland by comparing habitat structure and rodent density in real territories and nearby control areas. Territories of wood warblers had higher tree numbers and denser herb layers than adjacent control areas. In addition, rodent density was lower in territories than controls. We found no difference between territories and controls with respect to variables related to disturbance or public information. Our study sheds new light on territory choice of the wood warbler in western Europe and suggests that current forestry practices may have adverse effects on this species. Our results are consistent with the hypothesis that wood warblers avoid high rodent densities to reduce indirect predation risk. Future studies need to address temporal changes in habitat composition to elucidate the role of forestry-related changes of habitat structure for population changes of wood warblers.

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## **CLIMATE CHANGE AND THE GOLDFINCH (*CARDUELIS CARDUELIS*) BREEDING POPULATION TREND IN EASTERN SPAIN**

Presented by **José Antonio Gil-Delgado**

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Among bird species, advances of laying dates have been widely reported in relation to climate change, mainly in northern areas. Nevertheless, some regions were warmer than others and it is important to examine changes in the reproductive traits of populations of other areas. Moreover, the ultimate consequences in the population trends have not been expounded at length. Among multi-brooded species in northern Europe, climate change has led an increase in the duration of the breeding season. Thus, in years when the breeding season starts early, the number of breeding attempts per pair could increase and result in a higher number of clutches and fledglings that are finally incorporated in the population. We present the population trend of Goldfinch (*Carduelis carduelis*) and also the onset of the breeding season in relation to the increased temperatures in an orange plantation plot of the Mediterranean Region (Sagunto, eastern Spain) during 21 years. We used both the mean laying dates of first clutches and the first laying dates. From 1975 to 1984 the Goldfinch did not breed every season and the breeding pairs ranged between 0 and 5 pairs. Since 1985 the population has fluctuated until reach a maximum of 27 breeding pairs in 2006. Since then the number of breeding pairs has decreased. The onset of the breeding season of the Goldfinch did not show any trend, neither the mean temperatures of three periods prior to breed despite a general increase of 2°C in the study area. First clutches were better related to the temperature increase than the average first laying dates. The no advance of the breeding season as a response to a global warming in the study area could affect the final population because of less number of clutches are laid and therefore less fledglings are produced.

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## IS THERE PARENT-OFFSPRING VOCAL RECOGNITION IN THE STONE CURLEW (*BURHINUS OEDICNEMUS*)?

Presented by **Dimitri Giunchi**

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Parent-offspring vocal recognition in the stone curlew was investigated by collecting data on the population breeding in the Taro River Regional Park (Parma, Italy) during 2009–2010. Given the nocturnal habits of the species, this population seems to be a particularly good candidate for this kind of investigation since in the study area breeding territories are usually densely packed, thus increasing the likelihood of chicks swapping. Vocalizations were recorded by putting chicks in a small arena and recordings were then spectrographically analysed. Two main call types were identified: (1) a brief strangled sound (S-call) with a broadband spectrogram, uttered when parents and chicks were at close quarter; (2) a chirping sound (C-call) with a complex structure, used for long distance vocal contact with adults. Seven chicks were also recorded two times, ca. nine days apart, and the similarity indexes calculated between the two C-call spectrograms belonging to the same chick were compared to those calculated on 19 non relatives chicks. The similarity within chicks turned out to be higher than between chicks, even though we recorded a great intra-individual variability, which could be a serious obstacle for parent-offspring vocal recognition. We also performed playback experiments to test if chicks vocal individuality was used by parents to recognize their offspring. After removing the chick(s) from breeding territories, we broadcasted in random sequence the calls of the pair's own chick and the calls of the chick from an unrelated brood of similar age. We found that the likelihood for parents to approach the loudspeakers was the same in both conditions. These results suggest that in the stone curlew parents are unable to recognize their chicks using vocal cues. Further experiments are needed to test whether the chicks are able to recognize their parents' voice.

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## **FORECASTING BIRD POPULATION CHANGES IN RESPONSE TO GLOBAL WARMING USING HIGH RESOLUTION MODELS — LESSONS LEARNT FROM GERMANY**

Presented by **Thomas Gottschalk**

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Hitherto, models on bird distribution change due to climate warming were generally conducted at relatively coarse resolutions, often using a 50 km grid and thereby ignoring local differences in habitat use and topography. Here, I present challenges and achievements related to forecasting bird population changes at a high spatial resolution (25x25 m) and across a national scale (357 000 km<sup>2</sup>). We used data of the German Common Breeding Bird Survey (approx. 300 000 breeding bird records), a high resolution land-use map and climate data from regional climate simulations to forecast the populations of 45 common terrestrial bird species in Germany under expected climate change. Bird abundances were estimated from raw census data using Distance Sampling. Resource selection functions were devised using Generalized Linear Models, and were then applied to maps of the present state and to simulated maps of the IPCC climate scenario A2 for the year 2050. Data availability, harmonization of data from different sources, and large processing time of the high resolution maps proved the greatest technical hurdles of the project. Although results differed between species, land-use was generally more important than climate in shaping species distributions. The talk evaluates whether modeling at fine spatial resolution is worth the effort and discusses options for future work.

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## **DISTRIBUTION OF THE WHITE STORK (*CICONIA CICONIA*) IN BULGARIA: CHANGES IN THE RANGE FOR A 25-YEAR PERIOD**

Presented by **Dimitar Gradinarov**

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Bulgaria covers only 1% of the European Union territory, but holds a relatively large fraction of the European White Stork (*Ciconia ciconia*) breeding population (ca. 5%). While a small decrease in the south-eastern European population was reported for the 1990s, there was a slight increase of the number of breeding pairs in Bulgaria. So far, there has been no empirical research to investigate what factors influence the trends of the White Stork distribution on a national level. In this study, we aimed to investigate the shifts in the species distribution in Bulgaria for a period of 25 years and relate these changes in the species range with land cover characteristics. We compared past and present distribution of White Storks in Bulgaria, based on national counts of the species during 1979—1981 and 2004—2005. We analyzed the presence/absence of the White Stork for the studied periods on the basis of 1493 UTM grid cells (10x10 km). The species has never been present in 35% of the analyzed grid cells and it was persistent in half of the studied grid cells (52%). Expansion in the range was found in 8% and reduction in 5% of the grid cells. Comparison of land cover characteristics between the distribution categories was made on the basis of CORINE Land Cover (2000) and inferences for the sustainable land use were made with the aim to conserve the favorable status of the White Stork breeding population in the country.

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## THE EFFECT OF SKI-RUNS AS A BARRIER FOR THE COMMON UPLAND BIRDS: A CASE STUDY FROM THE PIRIN NATIONAL PARK, BULGARIA

Presented by **Mladen Gramatikov**

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Winter resorts represent an important factor for socio-economic progress of an area, especially in developing countries, and a strong economical interest in this domain exists. However, this anthropogenic activity inevitably results in habitat fragmentation which has been recognized as a major threat for biodiversity reduction worldwide. So far, the effects of forest fragmentation caused by the construction of ski facilities on biodiversity have been poorly studied. The aim of this study was to investigate the role of ski-runs as an isolation factor for common upland birds. As a model study area, we selected Bansko — the most famous winter resort in Bulgaria. A total of 30 study plots were systematically located along 7.5 km of ski-runs and additional 50 study plots were located into the surrounding forests. Birds were sampled using the point count method and each study plot was visited twice during the breeding season of 2009. Bird abundance in the forests was used for the estimation of the expected flying-over the ski-runs rate for each species. The width of the ski-runs did not affect the species composition and abundance of flying-over bird assemblages. We found that 14 species (n=34) fly over the ski-runs less often than expected and that two species were sensitive to the presence/absence of vegetation cover on the ski-runs. Recommendations for the maintenance of ski-runs were made with the aim to minimize their negative effects on the upland avifauna.

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## **AUTUMN MIGRATION OF LONG-EARED OWLS (*ASIO OTUS*) AT PAPE, LATVIA 1967—2010: VARIATION IN NUMBERS, AGE AND SEX RATIOS**

Presented by **Gaidis Grandāns**

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We analyzed annual captures of Long-eared Owls at Pape ornithological research centre (56°09'N; 21°03'E) during the period of autumn migration 1967—2010. In total 6253 Long-eared Owls were included in the analyses. Owl capture at Pape during autumn migration was conducted by Rybatschy type trap during the period of 1967—1992 and continued 1992—2010 with smaller (Helgoland-type) trap. Since 1988 owls were captured also by mist-nets in the meadows and dunes between the Lake Pape and the Baltic Sea. Number of migrating owls fluctuates with peaks on every 3<sup>rd</sup>—5<sup>th</sup> year, long term trend in numbers, however is not observed. Autumn migration of Long-eared Owls at Pape starts at the beginning of September and lasts until the end of November. Differences in timing of migration between young and adult birds were observed. Proportion of young birds were highest at the beginning of migration and gradually decreased to the end of migration season. Adult birds, especially adult males, migrated later. Young birds dominated during migration (77.5%), but their proportion on average was lower (61.8%) in years when migration intensity was at its minimum.

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## ASSESSING POPULATION DECLINES: THE VALUE OF A BAYESIAN APPROACH

Presented by **Jeremy Greenwood**

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In assessing the relative importance of recent declines in bird populations, the UK classifies them as raising No, Medium or High Alerts. The classification depends both on the magnitude of the declines and whether or not they are statistically significant. In addition to the philosophical indefensibility of statistical tests, this produces various undesirable possibilities, such as a species switching in a single year from No Alert to High Alert simply because its decline has been measured more precisely. Most importantly, a decline that is steep but uncertain is classed as No Alert (because it is not statistically significant) yet the very uncertainty that leads to lack of significance means that the decline could well be much steeper than its estimate suggests. The Pan-European Common Birds Monitoring Scheme uses a different system but it suffers from the same fundamental problems. Bayesian methods provide not just point estimates of rates of decline but also probability frequency distributions for those estimates. This allows more thoughtful interpretation of the results, such as examining the probability that a species has declined steeply even though the point estimate of its decline is not statistically significant. It gives us more insight into possible future scenarios, such as allowing us to estimate the probability of each species declining to disastrously low levels if current trends continue, which we cannot do simply from the point estimates of the recent rates of decline. Unlike point estimates of rates of decline, the probability distribution of the estimate provides us with the information we need to make soundly based decisions about priorities for the management of declining species.

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## BREEDING SUCCESS AND NEST PREDATION OF WOOD WARBLER (*PHYLLOSCOPUS SIBILATRIX*) IN NORTHERN SWITZERLAND

Presented by **Alexander Grendelmeier**

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For effective conservation measures it is inevitable to thoroughly understand the ecology of a species, and particularly what factors may limit its reproductive success. Currently, greatest threats for many bird species are habitat loss, degradation and fragmentation. With increasing habitat fragmentation, predation may gain increasing importance. Predation influences reproductive success, especially, of ground-nesting birds that are exposed to the entire predator community. Using trail cameras, we monitored 45 Wood Warbler nests in 12 study areas and 32 artificial nests (during 13 days of incubation) in 10 study areas, spanning Northern Switzerland. Nest success of Wood Warbler was 40.8% (n=49), resulting in 1.9 fledglings per breeding pair. Success of Wood Warbler nests and artificial nests during incubation was 84.1% (n=44) and 73.7% (n=32), respectively, but only 18.4% if rodent predation on artificial nests is included. Predators of real nests were *Vulpes vulpes* (n=9), *Martes martes* and *M. foina* (n=8), *Meles meles* (n=3), *Garrulus glandarius* (n=3) and 1 *Strix aluco*. Predators of artificial nests were rodents (n=25, predominantly *Apodemus* mice), *V.vulpes* (n=6), *Martens* (n=2), 1 *M. meles* and 1 *Sciurus vulgaris*. By using cues such as broken egg shells or depredated nests left intact, previous studies had suggested rodents might also depredate Wood Warbler nests. Based on our data, we cannot confirm this suspicion. We also warn to use afore mentioned cues to attributed predation to rodents. *Martens* as well as *G. glandarius* often left broken egg shells and only *V. vulpes* destroyed or deformed nests. *Apodemus* mice (n=3) and *S. vulgaris* (n=2) could even be observed sticking their head inside Wood Warbler nests, yet no predation occurred. Our results shed new light on nest predation of Wood Warbler and call for further studies regarding interactions between nest predation, fluctuating rodent abundances and environmental factors.

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## THE REPRODUCTIVE BENEFITS OF LIVESTOCK FARMING IN BARN SWALLOWS: QUALITY OF NEST SITE OR FORAGING HABITAT?

Presented by **Martin Grüebler**

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Livestock farms hold larger numbers of barn swallows (*Hirundo rustica*) with higher reproductive success than arable farms. As a consequence, barn swallow populations have been declining across Europe where mixed and livestock farming ceased and where agricultural intensification favoured arable farming. A positive association between livestock farming and barn swallow reproductive success is well documented, but the specific roles of micro- and macro-environment remain unclear. A positive effect of livestock on swallow breeding performance might be due to improved feeding conditions associated with dung around cattle farms (macro-habitat). Alternatively, barn swallows might profit from raised and more constant temperatures at the nest site in stables housing farm animals (micro-habitat). We analysed data from a study across Switzerland of over 1500 barn swallow breeding pairs at 280 farms to quantify the effects of livestock farming at the micro- and macro-habitat on the reproductive success of single- and double-brooded pairs. The presence of livestock in the building with the nest and large numbers of manure heaps around nest sites increased nestling survival in double-brooded but not in single-brooded pairs. The presence of livestock increased the annual output of double-brooded pairs by 0.8 chicks, and both factors of livestock farming combined increased the annual output by 1.6 chicks. Productivity of barn swallows depends on both, the characteristics of the micro- and the macro-habitat. Since changes in farming systems, grazing patterns, landscape heterogeneity and climate may have different effects on micro- and macro-habitats, they can affect productivity of declining bird species in a complex way.

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## THE EGYPTIAN GOOSE IN EUROPE: A NON-NATIVE POPULATION SPREADING IN AND FROM THE NETHERLANDS

Presented by **Abel Gyimesi**

Abel Gyimesi, Rob Lensink

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In this study, we summarize the current distribution and numbers of the Egyptian Goose in Northwest Europe, the reasons for its success and investigate the possible ecological, economical and social impacts of the species in Europe. Egyptian Goose escaped from parks in The Netherlands bred in the wild in 1967 for the first time. Since then, the species has colonized most of the suitable habitats in the country and spread further in Europe. The high breeding success of the species in The Netherlands can be attributed to the large amount of available feeding sites (grasslands) and suitable breeding habitats (presence of freshwater nearby grasslands with a few trees). Generally, severe winters negatively affect numbers, and a survival analysis revealed that dry summers negatively affect survival rates. The Dutch population exponentially increased since its establishment in the wild but the increase has slowed down in the last ten years. However, further growth is expected in the newly colonized areas and in populations in the surrounding countries, especially in Germany. Currently, the size of this introduced population in Northwest Europe is estimated to be at least 65 000 birds. The breeding population in The Netherlands was estimated at  $\pm 10\,000$  breeding pairs in 2009, while the total population at  $\pm 50\,000$  individuals in July 2009. Based on available figures, without culling since the nineties the total numbers would have increased up to 60 000 breeding pairs, i.e. 280 000 birds in July 2009. During moulting large aggregations can be formed, which may cause considerable damage to crop producers. Due to their aggressive behaviour, Egyptian Geese might be avoided by other species forcing them into suboptimal feeding and breeding habitats.

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## MIGRATORY CONNECTIVITY IN NIGHTINGALE POPULATIONS DIFFERING IN MIGRATION ROUTES

Presented by **Steffen Hahn**

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Geographically separated breeding populations of Palaearctic-African migrants are not necessarily separated during the non-breeding period in Africa. However, if development of populations differs while the environmental conditions in the breeding areas were similar, we may argue for the conditions in ‘wintering’ areas affecting population growth via strong migratory connectivity. Up to now, population specific African non-breeding areas of almost all Palaearctic passerines are not known, and therefore, the degree of migratory connectivity and its consequence for local populations is open for speculation. We studied the migratory connectivity of three populations of the Common Nightingale (*Luscinia megarhynchos*) breeding in Europe along a west-east gradient. They were selected to represent the three hypothetical migration routes of the western, central and eastern flyway across the Mediterranean and the Sahara desert. Spatial migration pattern and areas occupied during the non-breeding season were determined using light-sensed geolocation. Nightingales showed a moderate/high degree of migratory connectivity: birds of the north-western population (from France) overwintered in west-Africa; their wintering area overlapped slightly with those from southern-central population (from Italy). However, eastern European birds (Bulgaria) spend the non-breeding season isolated in central Africa. Autumn migration mainly followed the main flyways (via Iberia-Atlas, via Apennine-Tunisia, via Greece-Libya). We conclude that birds of different population should experience different environmental conditions when wintering from west to central Africa, but for members of the same population conditions should be more similar.

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## MODELLING TRANSIENT SPATIO-TEMPORAL POPULATION RECOVERY DYNAMICS OF COMMON BUZZARDS AND GOSHAWKS IN DUTCH LIMBURG

Presented by **Caspar Hallmann**

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Understanding the key demographic processes governing population recovery and spatial range expansion is vital if we are to successfully manage or control spatially structured and invading populations. This is particularly true for species living in fragmented habitats. Inspired by the successful range expansion and population recovery of Common buzzards (*Buteo buteo*) and Eurasian Goshawks (*Accipiter gentilis*) we investigate how demographic traits contribute to population growth and range expansion in the Netherlands (1970—current). We derive habitat suitability based integro-difference models to project spatio-temporal range expansion of the two species in South East Netherlands. Therefore, long term ring recovery and nesting record datasets are used to derive estimates of natal dispersal, survival and reproduction. These estimates are used to parameterise the integro-difference model. In addition, habitat suitability estimates are incorporated to evaluate effects of habitat heterogeneity/fragmentation on the species' population recovery. In general, a good agreement between model predicted distribution and actual census data exists. As asymptotic population dynamics are less useful for conservation studies we focus on short term transient population dynamics. Moreover, we explore which demographic traits (1) have played a key role during the initial stages of recovery, (2) if and how they changed as populations advance, and (3) how they are affected by habitat heterogeneity. The use of spatial transient elasticity analysis provides a flexible way to address where and when demographic traits contribute to population growth and range expansion. In addition, we show how to use transient analysis of spatial models as a suitable additional tool for exploring invasion dynamics of species, as well as investigating potential management activities.

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## EGGSHELL STRUCTURE AND PIGMENTATION IN A HOLE-NESTING SONGBIRD

Presented by **Rita Hargitai**

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Avian egg-shell structure may have important consequences for embryonic growth and development, but relatively little is known about the factors responsible for variation in eggshell characteristics of wild birds. In this study, we explored potential causes of variation in egg-shell colour and structure (shell thickness and porosity) in the a hole-nesting songbird, the collared flycatcher (*Ficedula albicollis*). We analysed if egg-shell colour is affected by shell structure or pigment level, and whether female traits, laying date, local breeding density, and clutch size affect shell structure. We found that egg-shell blue-green and UV colours were unrelated to shell thickness, pore density and egg size. Eggs with higher concentration of biliverdin showed lower UV reflection and higher reflection in the blue-green part of the spectrum. We found that females in better nutritional condition, indicated by their higher mass controlled for tarsus length, laid eggs with thicker shells. It is possible that females in better condition have more time available for searching calcium-rich food, and thus could produce eggs with stronger shells. However, female physical characteristics had no significant relationships with shell porosity. In contrast to our expectation, shell thickness and pore density were unrelated to local breeding density and laying date, though very late and repeat clutches were not sampled in our study. However, we found that eggs in larger clutches had lower pore density than eggs in smaller clutches, which may be expected if the rate of water loss and nest humidity are to remain constant in clutches of different egg numbers.

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## **EFFECTIVENESS OF A NEW TYPE OF WIRE MARKINGS ON HIGH TENSION POWER LINES TO MITIGATE NOCTURNAL BIRD COLLISIONS**

Presented by **Jonne Hartman**

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The collision of birds with power lines is known as an important mortality factor. In the past decades several types of wire markers were developed to improve the visibility of wires and by that mitigate bird collisions, but so far, few studies have found significant reduction of collision victims for species that regularly fly at night. We studied the effectiveness of a new type of wire markers (moving black and white plastic markers). The two main goals of the study were: (1) to determine the effectiveness of these markers, specifically for bird species that pass the power line at night and (2) to determine if there is a difference in the number and behaviour of birds passing marked versus unmarked line sections, both during day and night. We performed regular collision victim searches during two winters (both before and after wire marking), under marked and unmarked stretches of a 150 kV power line (4 km) in a Dutch grassland polder. Using radar technology, we studied flight paths and height and frequency of passages of birds flying at night. We also monitored flight behaviour of birds passing the power line by day. The BACI set-up of the study enabled rigorous statistical testing of the results. The effects of the wire markers appeared to be species specific. In general the markers reduced the number of collision victims of birds passing the power line by day, by ca. 67%. Birds passing marked stretches by day, adapted their flight height at a larger distance from the power line and passed at a larger distance from the groundwire. At night, no statistical differences in flight altitude or frequency of passages were found between marked and unmarked sections. The most novel result, however, was that the wire markers were also highly effective for several night active bird species, e.g. wigeon (ca. 80% reduction of the number of collision victims). Apparently, the new type of wire markers also increase the visibility of the wires for birds that mostly fly at night.

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## **HORMONE-BEHAVIOR RELATIONSHIPS: FROM ECOLOGY TO EVOLUTIONARY PHYSIOLOGY**

Presented by **Michaela Hau**

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Past research has been invaluable in fostering our understanding of how hormones regulate avian behavior, and how behavior feeds back onto hormones. More recently, comparative studies have highlighted the existence of remarkable variation in hormone-behavior relationships, associated with variation in ecological and social conditions faced by populations and species. By reviewing work on tropical species, I will provide examples for such ecological variation in hormone-behavior relationships across species. I will then discuss the ecological factors that might account for such variation, focusing in particular on recent studies that have linked hormones with avian life histories. Finally, I will discuss recent microevolutionary studies that will be important for deepening our understanding of the evolution of hormone-behavior relationships and outline open questions in the field of evolutionary endocrinology.

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## CLIMATE WARMING AND WOODPECKERS' BREEDING IN A PRIMEVAL TEMPERATE FOREST: A 35 YEARS PERSPECTIVE

Presented by **Grzegorz Hebda**

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Several birds have advanced their breeding seasons in response to the recent climate warming, though this reaction has not been consistent across species. Spring (second half of April) temperatures have increased also in the Białowieża National Park (E Poland) during the last decades. We analyse here ca. 1000 breeding attempts of the two most numerous woodpecker species breeding there — *Dendrocopos major* and *Dendrocopos medius* — to check whether they responded to warming springs by advancing their breeding seasons in 1975—2010. *D. medius* is a year-round resident in the forest, while *D. major* is a partial migrant (irruptive), what could influence their mode of reaction. Responses of their breeding times to the short-term (year-to-year) variation in spring temperatures are discussed as well.

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## **PATTERNS OF BASELINE AND INDUCED IMMUNE FUNCTION OVER THE ENTIRE ANNUAL CYCLE IN A FREE-LIVING BIRD — CONSISTENCY AND FLEXIBILITY AT THE SAME TIME!**

Presented by **Arne Hegemann**

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A central hypothesis of ecological immunology is that immune defences are traded off against competing physiological and behavioural processes. During energetically demanding periods, birds are predicted to switch from expensive inflammatory responses to less costly immune responses. As a result, immune indices vary during the annual cycle. Immunological variation within and among particular annual cycle stages has been studied to an extent in birds, but variation in multiple immune indices over one or more entire annual cycles of free-living birds remains poorly understood. We quantified baseline and induced immune function in free-living Skylarks (*Alauda arvensis*) throughout the whole annual cycle. Because Skylarks undergo characteristic and predictable changes in the ecology (diet, social structure, time and energy budgets) during the annual cycle, we expected clear seasonal variation in immune function as a result of trade-offs. We found significant variation among annual cycle stages for an array of baseline immune patterns. However, the ability of birds to mount costly acute phase responses, which were quantified via changes in 14 physiological parameters, was constant among annual cycle stages. The seasonal variation in baseline immune patterns differed between years. All immune patterns found at the population-level were consistent within individuals, as revealed by an analysis of repeated measurements. Our data suggest that acute phase responses are sufficiently important to Skylarks that this species does not trade this response off against other life history demands. In contrast, baseline immune defences are adjusted seasonally, but this seasonal variation was inconsistent between years. Thus, immune modulation is apparently not tightly associated with other more predictable changes in this species' ecology. Instead, the environmental conditions that vary from year to year appear to shape these patterns.

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## **TIMING OF FOOD AVAILABILITY CONSTRAINS DEVELOPMENTAL PLASTICITY IN A MIGRATORY PASSERINE**

Presented by **Gergely Hegyi**

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Global warming may advance the timing of peak food availability for insectivorous birds, but breeding earlier in response to this may be constrained by migration. Developmental plasticity, on the other hand, may play an important role in the face of short-term, partly anthropogenic environmental fluctuations. We examined the implications of seasonal timing for developmental plasticity in a Central-European population of collared flycatchers, using 23 years of observational and three years of experimental data. The median hatching date of young was earlier in years of earlier food peaks, but the adjustment was incomplete and most of the population missed the food peak in the earliest years. In three years of different food timing, we imposed a temporary, experimental food shortage on the nestlings in a sample of broods. After removing the food limitation, the extent of compensatory growth differed among years. This year effect on compensation was largely explained by the distance of hatching dates from the yearly food peak. These results suggest that early food peaks may not only create permanently adverse conditions for migratory birds, but they may also constrain the plastic responses of individuals to temporary disturbances.

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## **RUDDY DUCK ERADICATION IN THE UK**

Presented by **Iain Henderson**

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The Ruddy Duck (*Oxyura jamaicensis*) is native to the Americas but became established in the UK in the 1960s following escapes and releases from captivity. During the 1970s and 1980s the population increased rapidly and spread throughout the UK, and at this time it was also seen with increasing frequency in mainland Europe. By 2001 it was estimated that the UK population was around 6000 birds. Hybridisation with the globally-threatened White-headed Duck (*Oxyura leucocephala*) was first recorded in Spain in 1991. By 1999 between 10 and 20 Ruddy Ducks were appearing annually in Spain and it had become widely accepted that hybridisation was the most significant threat to the survival of the White-headed Duck. Several years of research into different methods of controlling Ruddy Ducks in the UK led to the conclusion that shooting was the only effective way to rapidly reduce the population. In 2005 a programme aiming to protect the White-headed Duck by eradicating Ruddy Ducks from the UK began. Over 7000 have been culled on 126 sites across England, Scotland and Wales under this programme, and data suggest that by winter 2010/11 the UK population had been reduced by over 95%, with only around 150 birds remaining. Emphasis has also been placed on ensuring that good progress is made in other European countries which hold Ruddy Ducks, most notably France, the Netherlands and Belgium. In December 2010 it was agreed at the Standing Committee of the Bern Convention that all contracting parties should work towards the target of complete eradication of the Ruddy Duck in the wild in the western Palaearctic by 2015.

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## THE ROLE OF AFRICA IN DECLINES OF AFRO-PALAEARCTIC MIGRANTS BREEDING IN THE UK

Presented by **Chris Hewson**

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Populations of Afro-Palaeartic migrants are declining across Europe. Recent work has suggested that these declines may be due to climate change on the breeding grounds resulting in earlier peaks in resource availability that migrants are not able to track through earlier arrival and this has been supported by analysis of population trends. However, recent population-level work undertaken in the UK including analysis of trends from the CBC and BBS censuses found little support for this but instead found clear relationships between the timing of species' population declines and the bioclimatic wintering zone occupied in sub-Saharan Africa. Species that winter primarily in the Sahel zone declined strongly between the late 1960s and early 1980s (as a result of drought conditions in the Sahel at that time) whilst species wintering further south in the humid tropics of West Africa began to decline from the 1980s and most are currently declining strongly. Whilst it is possible that this relationship could arise through conditions in the humid tropics preventing these species from advancing their arrival date in order to track resource availability on the breeding grounds, it nonetheless places the focus for understanding the declines on the African winter quarters. Recent work in West Africa to examine the ecological causes of this relationship has involved large-scale surveys of migrants across a latitudinal transect designed to elucidate seasonal patterns of habitat occupancy and the possible effects of habitat degradation. The implications of initial results from this work for hypotheses explaining the decline of migrants will be discussed. Future work will specifically examine constraints on rates and timing of spring fattening as well as involving detailed autecological work on habitat use by key species and the use of tracking techniques to identify patterns migratory connectivity and the interactions between events and processes occurring at different seasons.

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## WINNING AND LOSING IN PUBLIC: AUDIENCE AS A CATALYST FOR ANDROGEN RESPONSIVENESS AND FUTURE SUCCESS?

Presented by **Katharina Hirschenhauser**

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In male vertebrates, testosterone regulates the seasonal development of secondary sexual characters, sexual behaviour and territoriality. On top of seasonal patterns, testosterone may increase in response to attacking partner or territorial challengers. In birds, meta-analyses of studies comparing testosterone of winners and losers had particularly low effect sizes. Post-conflict testosterone responses of Japanese quail (*Coturnix japonica*) could not be explained by conflict outcome alone. Mirror-elicited fighting behaviour was not accompanied by testosterone changes. Thus, at the intra-individual level, social context may explain when to engage a post-conflict testosterone response rather than winning or losing. Probably there are many intrinsic (and testosterone responsive) factors wrapped up in the term 'social context'. In a series of staged fights with Japanese quail we show that a socially complex experimental set-up may affect testosterone responsiveness. The presence of a familiar audience explained the observed testosterone responses to winning or losing rather than conflict outcome or relative fighting ability. Returning to the social group after having won or lost the staged fight changed the previously established social status in the group: 'losing in public' diminished the male's dominant status on a long-term, which did not occur after fights without audience. In contrast, returning winners remained dominant and more distinct when the group was informed (with audience). Manipulating testosterone in winners and losers of staged fights affected aggressiveness directly after fighting. However, on a long-term post-conflict testosterone was not sufficient to actually reverse neither winner nor loser effects. Hence, the staged fight tests in quail do not support the notion that testosterone is actually needed for future aggressiveness and success. (Funded by Alexander von Humboldt Foundation #OST/1132340)

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## THERMOREGULATORY ADAPTATIONS TO FASTING AND STARVATION IN BIRDS

Presented by **Esa Hohtola**

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As endothermic animals, birds spend a significant part of their energy for maintaining homeothermy, especially in cold environments. Their body temperatures and metabolic rates are typically higher than in mammals of similar body mass. Therefore, food shortage and starvation pose a true energetic challenge for maintaining homeothermy in birds. As most birds are small, their relative energy reserves are also limited, which exacerbates the effects of starvation. During food shortage, energy can be saved if the need for active thermogenesis can be reduced. Such a hypometabolic state can be achieved by increasing thermal insulation or by reducing body temperature in a regulated manner or by combining the two mechanisms. While some evidence of a more strict limitation of heat loss (thermal conductance) exists, more and more evidence for a capability to a regulated decrease of body temperature (rest-phase hypothermia, shallow torpor) during starvation is accumulating. The decline of body temperature in shallow torpor is typically 3–10°C. While deep torpor, triggered by starvation or even without energetic stress, has been recognized for a long time in some avian groups (e.g., in humming-birds and swifts), recent studies show that basically all avian groups can save energy by entering starvation-induced shallow torpor during the rest-phase of their daily cycle. So far such responses have been found in at least 11 avian orders. How starvation is translated to a neurohumoral thermoregulatory signal that results in a lower regulated body temperature is not known. Also, the energy savings ensuing from the relatively small decline in body temperature need further studies.

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## **INFLUENCE OF MODERATE STRESS ON IMMUNOCOMPETENCE AND RESISTANCE TO OXIDATIVE STRESS IN THE GREY PARTRIDGE (*PERDIX PERDIX*)**

Presented by **Benjamin Homberger**

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The drastic decline of the grey partridge across Europe has led to an increase of re-introduction attempts in many countries. However, successful re-establishments of grey partridge populations remain an exception and the knowledge about the key factors for success is still scarce. Survival in the wild critically depends on the physiological background of the animal such as immunocompetence. We aim to disentangle the influence of genetics, maternal effects and environmental impacts on the immunocompetence and stress physiology of grey partridges within a re-introduction project in Switzerland. Pairs of grey partridges originating from wild birds or from strains held in captivity for many generations and their offspring were assigned to experimental groups kept under moderately stressful or relaxed housing conditions. The treatments potentially cause alterations of immunocompetence and eventually influence survival of released birds in the wild. We characterized innate immunity (haemagglutination), acquired immunity (antibody production after vaccination) and susceptibility to oxidative stress of grey partridge chicks at an age of 45 days. We found effects of sex, genetic background and moderate stress on immunocompetence and susceptibility to oxidative stress. This will give hints on the best strains and housing conditions for improving re-introduction successes.

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## AVIAN IMMUNOECOLOGY — WHERE NEXT?

Presented by **Peeter Hõrak**

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Immune defences belong to the most complicated and resource-demanding organismal functions. Detection and destruction of parasites and pathogens involves construction of sophisticated recognition and memory pathways, release of harmful substances and increased metabolism. All those impose costs, which eventually lead to physiological trade-offs in allocation of resources between immunity and other components of fitness. A nascent discipline — immunoecology — proposes that such trade-offs have major impact on the evolution of physiological and life-history strategies. Viewing immune function in the context of ecology and adaptation and asking how immune defences have evolved and are being used and optimized in different environments, ecological settings and lineages, immunoecological approach in avian biology has been flourishing during the past 20 years. However, avian immunoecology is still far from maturity. The progress has been particularly hampered by the assumption, inherent to many studies, that immune function can be considered as an easily quantifiable entity and that ‘immunocompetence’ is an ubiquitous commodity (the stronger the response, the better). The knowledge of avian ecologists is particularly scant as regards to understanding how standard assays of immune function relate to resistance to real parasites and how to assess immunopathology, including oxidative damages. Major advancement of the discipline will probably rely on insights that stronger immune responses do not necessarily maximize fitness or correlate with parasite resistance, and that cross-regulation exists between different components of the immune system. Another imperative is appreciation of the importance of proper down-regulation and termination of immune responses and possible benefits associated with tolerance to infections.

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## THE STATE OF BULGARIA'S COMMON BIRDS 2011: RESULTS FROM THE COMMON BIRD MONITORING SCHEME FOR THE PERIOD 2005—2010

Presented by **Iordan Hristov**

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Farmland birds in Europe are decreasing with unprecedented rate as revealed by the farmland bird index developed on a regional and national scale. At present, the state of common birds in South-East Europe is represented only by the Bulgarian Common Birds Monitoring Scheme, producing the only Farmland Bird Index for the Balkan region. In 2011, the state of 38 common bird species in Bulgaria is being assessed for the fourth time (since 2008). The analysis provides national trends for the period 2005—2010 applying TRIM software. The species are grouped according to three major habitat types: farmland, forest and “other” birds that occupy more than one habitat type. The farmland bird index consists of seventeen species, the index representing the state of forest birds consists of ten species, and the index for “other” birds includes eleven species. The multispecies indices are produced using geometric mean. The Bulgarian species trends feed into the production of the European Farmland Bird Index for the continental biogeographical region. The results are discussed in the context of habitat alteration and land use change in Bulgaria. The national trends are compared to the European ones.

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## DYNAMICS OF PULSED PREY ABUNDANCE SHAPES AVIAN REPRODUCTION: STUDY ON THE COMMON VOLE (*MICROTUS ARVALIS*) AND ITS PREDATOR, THE WHITE STORK (*CICONIA CICONIA*)

Presented by **Jan Husek**

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According to life-history theory, temporal dynamics of environmental factors affect optimal reproductive investment of consumers. It has been suggested that improved breeding conditions in a predictable environment select for higher current reproduction. Likewise, increases in variability and uncertainty of the environment in general favor decreased current reproduction. We tested whether a consumer adjusts current reproduction according to the temporal variability and predictability of a major environmental factor, the food supply. We used the white stork (*Ciconia ciconia*) as a model species, which preferentially feeds on the common vole (*Microtus arvalis*). Variability, cycle amplitude, and direct and delayed density dependence (i.e., predictability) of vole population dynamics were estimated in 15 Czech and Polish regions. In each region, the reproductive response of storks to voles was approximated by the cross correlation coefficient between annual stork productivity and vole abundance. The reproductive response of storks to voles was strongest when the cycle period of vole population dynamics was shortest and when vole numbers fluctuated more. Yet, the effects of both variability and predictability of the food supply on stork reproduction were present even when the effects of either one were controlled for; and thus appeared to act independently. We support the general view of plasticity in a consumer's temporal reproductive investment in relation to variability in food abundance. Our results, however, contrast with the theoretical prediction that reproductive investment is increased in a variable environment only if the future is predictable.

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## URBANIZATION AFFECTS SELECTIVE PRESSURES AND LIFE-HISTORY STRATEGIES IN COMMON BLACKBIRDS

Presented by **Juan Diego Ibáñez-Álamo**

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Nest predation and food limitation are the two main factors proposed to shape life-history traits. However, contradictory results of previous studies impede a clear interpretation of which of these two selective pressures, if any, is more important in urban habitats compared with natural situations, and whether birds can confront them by adjusting their life-history strategies. We investigated life-history syndromes of three common blackbird (*Turdus merula*) populations differing in their human influence (urban, rural and woodland). We analyzed daily nest predation and nestling starvation rates to assess the relative importance of these selection pressures in each habitat. Simultaneously, we investigated several life-history traits to test if blackbirds are adapted to their main source of selection. Food limitation was more important in the city, while nest predation was the most important selective force in the forest. The rural habitat was characterized by an intermediate influence of these two factors. Life-history syndromes, as the covariation of a suit of traits, confirmed these results as blackbirds seem well adapted to the main cause of selection in each habitat. Our results are consistent with urbanization imposing new challenges on birds, and that they adaptively respond to them. In addition, there were no differences in fledging rate among habitats. However, only 17% of nests were successful in the woodland, but reproductive success increased to 46% and 53% in the rural and urban populations, respectively, suggesting a significantly higher fitness with increasing human impact. This suggests that blackbirds benefit from human activities, which could be the ultimate explanation why this species has been expanding into urban areas.

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## GRADUAL CHANGE IN THE MIGRATORY PASSAGE OF WILLOW WARBLER (*PHYLLOSCOPUS TROCHILUS*) POPULATIONS THROUGH THE EASTERN PART OF THE BALKAN PENINSULA REVEALED BY GENETIC MARKERS

Presented by **Mihaela Ilieva**

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Willow warblers are one of the most abundant long-distance passerine migrants on the Balkans in autumn. Despite the species vast breeding range all populations winter in sub-Saharan Africa. This makes the Balkan Peninsula a possible crossing point for birds with different origin. In order to reveal the population composition, the differences in the passage times and the migratory directions of the populations passing through the area we trapped a large number of birds covering the spring and autumn migration periods of the species. The study was carried out at Kalimok Field Station in north-eastern Bulgaria (41°00'N 26°26'E). Several morphometric measurements, blood and feather samples were taken from each bird. Orientation experiments in Emlen funnels were performed with part of the willow warblers in the first night after the capture. We analysed two AFLP-derived genetic markers, showing variation in willow warbler in connection with the place of origin. We found a gradual change in the migrating populations of willow warblers during the autumn. The proportion of birds originating from Eastern Europe was higher in August and first half of September, whereas the number of willow warblers from northern Scandinavia increased later with the progress of the season. The birds from both groups showed predominantly south-west directions in autumn. The migratory directions of the willow warblers in the region are possibly shaped by large geographical barriers such as the Carpathian Mountains and the Black Sea.

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## CATERPILLAR ABUNDANCE AND CAROTENOID-BASED COLORATION OF VENTRAL SIDE OF GREAT TIT NESTLINGS

Presented by **Tatyana Ilyina**

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Dietary carotenoids play an important role both in visual signaling and in the physiology of birds as pigments, antioxidants, and immune-stimulants. Carotenoid concentration in Lepidoptera was shown to be richest in comparison to other invertebrates in the diet of insectivorous birds. As a rule, caterpillar abundance varies markedly during long reproductive seasons. Based on data on the seasonal dynamics of caterpillar biomass in forest habitats at Zvenigorod biological station (Moscow region), we compared carotenoid concentration in the yellow ventral feathers of Great Tit nestlings from first and second broods, and from different natural habitats within the same breeding cycle. Diet composition of each brood was evaluated using video recordings of their nest boxes. Carotenoid concentration in feathers was measured by Ramon spectroscopy. Results on asymmetry in concentrations of carotenoids in feathers of nestlings from broods of different types are discussed.

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## THE DISTRIBUTION OF THE CONSERVATION CONCERN BIRDS SPECIES IN THE EAST OF ROMANIA

Presented by **Constantin Ion**

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In the context of global warming and unfulfillment of the requirements of biodiversity conservation in Europe, we analyzed the avifauna diversity in the wetlands of Eastern Romania (Moldova region). We made ornithological observation in 84 sites, between 2008—2010, where we registered 201 bird species, 134 in the breeding period, 164 during migration and 114 in winter. We identified 18 bird species of conservation concern (Ferruginous Duck, Corncrake, Pygmy Cormorant, Little Bitern, Night Heron, Squacco Heron, Little Egret, Great Egret, Purple Heron, White Stork, Glossy Ibis, Spoonbill, Avocet, Black-winged Stilt, Common Tern, Black Tern, Whiskered Tern, Bluethroat), which are included in Annex I of the Birds Directive. We compared our results concerning their distribution with those from the last 50 years of specialised literature, using GIS coordinates in the UTM projection system. In our investigations, we identified more breeding sites, which are not designated as SPA, than those signalled until now for most species. Also, in some areas where human impact has grown considerably, we were unable to confirm nesting places for some species during the last three years. However, reporting of new nesting sites for some species may be a result of increasing observation frequency, and it should be noted that the spread towards northern areas is obvious. The changes in the distribution of the studied species can be the result of climate change, increase of human impact on one hand and the full protection of wetlands on the other. Today, a permanent monitoring and review of bird diversity in SPAs are needed in order to maintain the breeding conditions and to identify potential threats.

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## **OXIDATIVE STRESS AND URBANIZATION: GENETIC VARIATION, DIETARY MODULATION AND THE SURVIVAL VALUE OF GLUTATHIONE**

Presented by **Caroline Isaksson**

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With an increasing human population size, urbanization is unavoidable, and with it comes increased anthropogenic pollution. Coping with pollution is a major challenge for all organisms living in urban habitats and many of the pollutants are oxidants. Thus, increased defence mechanisms, such as anti-oxidants and repair systems, should be under selection in urban habitats to avoid cellular deterioration and associated ill health and premature onset of senescence. In addition, urbanization effects on animal diet can influence oxidative stress via intake of dietary anti-oxidants, or pre-cursors for endogenous antioxidants. Diet may therefore mediate the effects of pollution on individual survival and suggest that nutritional variation may influence both the oxidative stress response itself and the expression of genetic variation in the ability to cope with oxidative stress. A recent meta-analysis showed that the endogenously synthesized glutathione is one of the most important anti-oxidants under pollution stress. Thus, the glutathione system is likely to be under selection in oxidative stressful environments. Here I present the results from two experiments on great tits, one large field manipulation of habitat quality and one laboratory experiment, aimed to address (i) if glutathione is heritable in a natural population and whether the expression of genetic variation varies across habitats of different quality; (ii) if glutathione levels are associated with increased probability of survival; (iii) if variation in dietary carotenoids influences activity of glutathione and (iv) whether the extent to which it does differs for urban and rural birds. The results clarify the importance of nutrition, habitat and development for oxidative stress balance, and suggest an integrative framework to understand adaptation to urbanization.

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## ECOLOGY OF THE SHORT-TOED EAGLE IN NORTHERN BELARUS

Presented by **Vladimir Ivanovsky**

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We studied the Short-toed Eagle in northern Belarus in 1981—2010. About 50—70 pairs of this raptor breed in an area of about 40 000 km<sup>2</sup> with average density of 1.2—1.7 pairs per 1000 km<sup>2</sup>. The breeding density becomes much higher in southern Belarus — more than 7 pairs per 1000 km<sup>2</sup>. In northern Belarus, Short-toed Eagles occupy mainly bogs with tall pines and dry stands with sparse mature pines. Most of the nest sites (n=24) were found in pine bogs and transitional mires (87.5%). The rest (12.5%) were situated in dry pine forests interspersed with clearings and small sphagnum bogs. The distance between different nests of the same pair varied from 30 m to 1.5 km. Reproduction success was 66.7% (0.6 fledglings per pair) in 1981—1988, and 87.8% (0.87 fledglings per pair) in 1989—2010. Short-toed Eagles can tolerate the presence of other birds of prey on their territories. We found a nest of an Osprey in 700 m distance from a Short-toed Eagle's nest; Golden Eagle and Hen Harrier nests were situated in about 1 km distance, Sparrowhawk in 300 m, and Common Buzzard in 350 m distance from the Short-toed Eagle nest. One of the nests of the Short-toed Eagle was found in the centre of a large lekking place of the Capercaillie. Minimal distance between nests of two neighboring breeding pairs was 6 km. Breeding phenology was studied, too. Fresh clutches were registered in April 27 1991, April 28 1998, and May 5 1992. Hatching occurred during the first decade of June. Fledglings can remain in nest as late as the second half of August. On September 23 2009, adult birds were still feeding fully grown and fledged young at the nest. Snakes (Adder and Grass Snake) made up about 88.1% of prey in the diet of the Short-toed Eagle. The population density of Adder (the main prey) was 9 individuals per ha on pine bogs. Mammals were rarely taken. More than 60% of records of hunting Short-toed Eagles refer to pine bogs, 30% to dry pine forests, and 10% to clearings, river valleys, forest glades and other open spots.

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## DO GARDEN WARBLERS (*SYLVIA BORIN*) WINTER IN OBUDU, SOUTHEAST NIGERIA?

Presented by **Soladoye Iwajomo**

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Many Palaearctic migrant bird species winter in sub-Saharan Africa, but relatively little is known of their movements within Africa. One exception is the Garden Warbler (*Sylvia borin*) which has been studied at several sites in West Africa. Studies conducted in Nigeria have shown that in the Guinea savanna individuals, after arriving in the end of August—beginning of September, increase their body mass in October—November in preparation for a new migration leg to wintering sites further south. Whether this movement consists of a single long flight to their final wintering ground or if they break up the journey in several shorter flights is unknown. In order to provide more information on the stopover behaviour of the species in Nigeria, we studied Garden Warbler passage, body mass and moult at Obudu, southeast Nigeria (Oct—Dec 2005 and Dec 2007—Jan 2008). The first Garden Warblers arrived at Obudu from mid-October and the numbers gradually increase with time. This influx is clearly different from that which has been recorded from other sites in West Africa. In addition, several individuals started their winter moult at the site, the timing of which differed from records of previous studies. Average fuel loads were lower at Obudu than has been reported in Central Nigeria. This, in addition to the capture of moulting individuals, suggests that Garden Warblers may not embark on a longer journey southwards in mid winter, and possibly some may even winter at Obudu. Otherwise they may adopt a moult-migration strategy.

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## COLLARED FLYCATCHERS PROSPECT PUBLIC INFORMATION FROM GREAT TIT BROODS

Presented by **Tuomo Jaakkonen**

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Previous studies have shown that prospecting conspecific nests and broods is common in cavity nesting birds, particularly in flycatchers (*Ficedula* spp.), large broods with actively feeding parents being more attractive for conspecific prospectors than small broods. The acquired information is then later used in nest-site selection and dispersal decisions. Cavity-nesting bird guild consists of many species using the same resources, which makes interspecific information use and prospecting likely. Yet, very little is known about the prevalence of interspecific prospecting and whether same factors affect it than in conspecific context. We conducted a long-term (3 years) experiment on Gotland in which we manipulated great tit (*Parus major*) brood sizes (increased, decreased and control) to examine whether enhanced tit brood size increase the possibility of the collared flycatcher (*Ficedula albicollis*) prospecting, as suggested in intraspecific context. We recorded nearly 300 great tit nests, of which about 20% was visited by a flycatcher male during two hour recording period. This is nearly as frequent as intraspecific prospecting. In contrast to intraspecific prospecting, interspecific prospecting was more likely in the decreased brood size treatment than in the increased or control treatment. This may be due to quieter audible signals coming from the nest with low number of nestlings requiring closer examination. Another possibility is that poor performing heterospecific individuals are an important source of information. What such interspecific information is used for is a challenge for future studies.

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## POST-FLEDGING SURVIVAL OF THE BLACK-HEADED GULL (*LARUS RIDIBUNDUS*)

Presented by **Māra Janaus**

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Pre-fledging survival of the Black-headed Gull was studied in 1974—1985, 1990, 1993—1996 on the Lake Engure, Latvia. In total, the fate of 8565 hatched and ringed chicks from 4143 clutches on 93 control plots was followed-up till fledging. The following parameters, potentially responsible for pre-fledging survival, were examined: date of hatching; number of eggs and hatched chicks in the nest; hatching sequence; hatching weight (beginning in 1977); number of neighbouring nests in 1 m and 1.5 m radius; weather conditions. Until December 31 2010, i.e., more than 15 years after the last chicks were ringed, 98% of them deceased, and 115 random recoveries (2.7% of fledged birds) obtained from these birds allow to check whether these parameters are essential for post-fledging survival (birds found at an age more than one year, as well as those perished due to human violence (shot, road victims, etc.) until one year of age were considered survived). It was found that all parameters mentioned above in greater or lesser extent but statistically significant are responsible for pre-fledging survival, while only two of them proved to be essential for post-fledging survival. First and most relevant of them is hatching date: Earlier hatched chicks have better survival; presumably this parameter reflects the quality of parents. Older and experienced adults are comparatively early breeders. The second important factor was weather conditions during the pre-fledging season. Chicks hatched in years with high precipitation level and low temperatures during chick rearing season, especially at the end of it, gave comparatively less random recoveries (=lower post-fledging survival) than in years with optimal weather conditions in this season.

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## HOW TO PROTECT A CLUTCH AGAINST MICROBIAL INFECTION: THE ROLE OF NEST MATERIAL AND INTERMITTENT INCUBATION

Presented by **Veronika Javůrková**

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Many precocial birds begin incubation after clutch completion. Such a mechanism ensuring hatching synchrony, however, may increase the risk of bacterial infection of the egg content, responsible for hatching failure. Covering a clutch by nest material that includes down feathers treated with uropygial oils and waxes which are essential antimicrobial substances, as well as intermittent incubation during pre-incubation period may represent strategies that could eliminate the risk of trans-shell infection. Here we tested how these two mechanisms affect hatching success and the risk of trans-shell infection. Mallards' eggs (N=160) in placed in artificial nests (N=40) were randomly distributed in the breeding habitat following a balanced 2x2 design: i.e., 50% of eggs were covered by nest material from a Mallard's nest and 50% of eggs were placed daily in the incubator to imitate the intermittent incubation. RT-PCR was used for the quantitative analyses of microbial infection in the non-invasively collected egg white samples. Diversity of egg white microbial community was further examined by DGGE method. Our data showed that covering of clutch by nest material significantly decreased the probability of microbial infection. Although, intermittent incubation had no effect on probability of microbial infection, it decreased diversity of microbial community in the eggs and enhanced hatching success. Here we document that both covering of clutch by nest material and intermittent incubation are mutually acting mechanisms responsible for maintenance of egg viability and reducing hatching failure in precocial birds.

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## **RELATIONSHIPS BETWEEN GLUCOCORTICOID LEVELS AND FITNESS: WHAT ARE THE PREDICTIONS?**

Presented by **Lukas Jenni**

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An often asked question is whether and how glucocorticoids are related to fitness measures. This question is particularly interesting for conservation biologists and people interested in animal welfare. It has often been observed that glucocorticoid levels increase when environmental conditions deteriorate. It is also often the case that fitness is lower when environmental conditions are suboptimal. From this it was concluded that there should be a correlation between glucocorticoid levels and fitness (the cort-fitness hypothesis). However, empirical findings are mixed and the hypothesis is not supported by many studies. In this presentation, I will explore in more detail the predictions that can be derived from current theory and findings regarding the relationship between glucocorticoid levels and various measures of fitness. This will lead to explanations why a correlation between glucocorticoid levels and fitness cannot always be found. Finally, I will present guidelines for the use of glucocorticoid levels in conservation biology as a measure of condition or health.

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## **THE GLUCOCORTICOID STRESS RESPONSE: ADAPTIVE MODULATION AND APPLICATION IN CONSERVATION BIOLOGY**

Presented by **Susanne Jenni-Eiermann**

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As a reaction to a wide variety of stressors, vertebrates up-regulate the secretion of glucocorticoids (corticosterone in birds), a phenomenon known as stress response. This stress-induced corticosterone regulates and influences many behavioural and physiological processes. In general, processes serving self-maintenance and survival are favoured while others (e.g., those serving reproduction) are down-regulated or suppressed. Apart from the classical response to an acute and strong stressor, corticosterone levels also vary across the season and with environmental conditions on a lower and longer-term basis. Corticosterone secretion is mediated through the hypothalamo-pituitary-adrenal axis which integrates internal and external information from the brain, anterior pituitary and adrenal glands. From life-history theory it follows that the glucocorticoid stress response is modified according to the relative value of immediate self-maintenance and survival versus other processes such as reproduction. In this talk I will examine a series of factors which modulate the stress response in a presumably adaptive way. On the other hand, the stress response also depends on past experience, notably during early development, and may be influenced by the mother through hormones deposited in the egg. In conservation biology, the level of corticosterone is often taken as a measure of condition or health of individuals and populations. The underlying question is whether there is a relationship between corticosterone levels and fitness. Finally, I will explore whether birds can adapt to new situations by evolving the “best” modulation of stress response.

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## **CONDITION OF THE WHITE STORK (*CICONIA CICONIA*) UNDER ENVIRONMENTAL STRESS: ECO-PHYSIOLOGICAL AND RELATED RESPONSES (CAUSES OF CHANGES IN WHITE STORK POPULATIONS IN DISTURBED ENVIRONMENTS)**

Presented by **Leszek Jerzak**

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The aim of our studies was to estimate eco-physiological consequences of element intake from anthropogenic environments, reflected by the changes of White Stork nestlings' blood. The investigations were carried out during the breeding seasons 2004—2009. Blood samples were collected from 616 young storks growing up close to the Odra meadows near the village of Kłopot and in SW Poland (52°07'56.3"N, 14°42'10.4"E). (1) We found relationships between toxic heavy metals Pb, Cd and macroelements Na, Mg, Fe and to a minor extent with microelements Cu, Co and the activity of oxidant enzymes SOD, CAT, CP, GR, GPx, and TBARS products in the blood of nestlings. They have an important impact on the increase of antioxidant enzymatic activity of most investigated enzymes. Interactions with Ca were not significant. (2) The activity of SOD, CAT, and CP and TBARS products are determined by interactions of macroelements and toxic heavy metals. (3) Macroelements influenced enzymatic activity through excess as well as deficiency of their concentration in the environment, but they also modified oxidative stress by their impact on the level of free radicals. (4) We did not find interactions between macro- and microelements. Only some of them were significant, e.g., those with Cu. We noticed a predominance of Pb and Cd in element—enzymes interactions. (5) Element—enzyme activity predominated especially in the case of macroelements Na, Mg, Fe, and toxic metals Pb, and Cd. We can explain this tendency by an intensive and prevailing access of toxic metals in redox reactions.

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## WHO ATE WHAT AND WHEN? APPLYING BAYESIAN METHODS TO IMPROVE ESTIMATES OF FORAGER FUNCTIONAL RESPONSE CURVES

Presented by **Alison Johnston**

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For many bird species migration includes time-limited stop-over locations at which individuals must maximise prey ingestion. The shape of the functional response curve relating the abundance of prey to the intake rate of foragers is often used to understand time budgets, carrying capacities and inform management. A robust functional response requires observations across a wide spectrum of prey densities. As predators forage in higher density areas, this is difficult to accomplish in the field, but can be achieved by experimentally manipulating prey density and observing the foragers' response. Typical data include initial density for each treatment, the number of foragers and their peck rates estimated by analysis of video footage, and the number of prey items ingested during the experiment (inferred by the number remaining). However, this conventional approach has a number of limitations; depletion of prey during the course of an experiment is not considered and it is difficult to generate functional response curves for several species across a range of densities. Bayesian methods can overcome these limitations, and in addition provide some other benefits to the analysis framework. We illustrate this method using an experimental dataset where several wader species consumed horseshoe crab eggs. We consider MCMC methods which analyse the number of prey items consumed over the course of the experiment, treating the 'observed' number of prey during the experiment as missing data points. Foragers are assumed to ingest prey at a rate based on Holling's disk equation, with the parameters of this equation being estimated by the MCMC approach and allowed to vary across predator species. The (more) instantaneous prey densities are based on depletion of prey during the experiment inferred from the predator observations and the estimated disc equation. This seemingly circular problem can be addressed using this approach.

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## HAZEL GROUSE OCCURRENCE IN FRAGMENTED FORESTS ON THE VERGE OF ITS CONTINUOUS DISTRIBUTION: HABITAT QUANTITY AND CONFIGURATION MORE IMPORTANT THAN QUALITY

Presented by **Łukasz Kajtoch**

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The Hazel Grouse is a characteristic bird of large Eurasian forests. However, in the Carpathian Foothills it occupies isolated forest patches located inside the agricultural matrix. The aim of this study was to investigate the effects of habitat quality, quantity and configuration on the occurrence of Hazel Grouse in agro-forestry landscapes of the Carpathian Foothills (900 km<sup>2</sup>, 15% forested). Hazel Grouse were detected in 25 out of 53 forests patches. Birds were found in forests of different age and type, except for pure deciduous ones. Forests inhabited by grouse were 3.5-fold larger (average 408 ha) than patches without them. Also number of wooded corridors between forests was ca. 4-fold greater for grouse patches. Frequency of open land was 0.8-fold lower in surroundings of grouse patches. Distances between forests (especially those inhabited by Hazel Grouse) were much shorter for grouse patches. The most important habitat quality factors were presence of bilberries, conifer regrowths, ant-hills, clearings with pioneer trees, and a greater length and frequency of valleys. Among multivariate models, biogeographic factors, landscape connectivity, and presence of bilberries, were the most informative predictors for Hazel Grouse occurrence. The most probable explanation of Hazel Grouse presence in agro-forestry landscapes is its metapopulation dynamics — birds disperse from the mountains (sources) into foothills (sinks). Such a scenario also explains 12—14-year periods of fluctuations in grouse numbers detected in the study area. Between 1985 and 2007, some sub-populations declined and even went extinct, but afterwards new birds colonized empty forests. The presented information could be valuable for the conservation of the Hazel Grouse and for setting up managing plans for forestry to sustain connectivity between fragmented habitat patches.

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## CHANGES IN DISTRIBUTION AND NUMBERS OF THE OSPREY (*PANDION HALIAETUS*) IN LATVIA

Presented by **Aigars Kalvāns**

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Information on distribution and numbers of Ospreys (*Pandion haliaetus*) were collected in all Latvian territories during 2007—2009. First available distribution data come from the Latvian Breeding Bird Atlas 1980—1984, where the Osprey was recorded in 94 5x5 km squares (3.4% of the total 2785 squares). In the period 2007—2009, the Osprey was recorded in 246 squares (8.8% of all squares). The Osprey breeds all over Latvia, except for two districts in the middle of Latvia. First data of breeding population size come from the 1940s (6 pairs). From the beginning of the 1980s, the population increased rapidly. At present, the population is estimated to hold 180—200 pairs. Over the last 30 years, the number of breeding pairs has increased by more than 50%. The Osprey population density in Latvia ranges between 2.8—3.1 breeding pairs per 1000 km<sup>2</sup>. The highest densities are found in two districts in the western part of Latvia: 6.0 and 7.6 breeding pairs per 1000 km<sup>2</sup>.

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## BLOOD PARASITES MEDIATE MORPH-SPECIFIC MAINTENANCE COSTS IN A COLOUR POLYMORPHIC WILD BIRD

Presented by **Patrik Karell**

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Parasites can mediate profound negative effects on host fitness. Colour polymorphism has been suggested to covary genetically with intrinsic physiological properties. Tawny owl colour polymorphism is highly heritable with two main morphs, grey and brown. We show that both morphs have similar leucocytozoan blood parasite infection rates, but that blood parasite infection is associated with decreased body mass in brown but not in grey females. Experimental medication against leucocytozoan blood parasites enables grey females to maintain body mass during breeding, whereas medicated brown females decline in body mass similarly to control females of both morphs. We conclude that leucocytozoan blood parasite infection has differential somatic costs between the two highly heritable tawny owl colour morphs, where costs are more pronounced in the grey (little pigmented) morph than in the brown (heavily pigmented) morph. Because our descriptive results imply the opposite pattern, our findings highlight the need of experimental manipulation when studying heritable variation in hosts' response to parasitism.

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## MIGRATORY BEHAVIOUR OF CORY'S SHEARWATERS (*CALONECTRIS DIOMEDEA*) FROM VAN IONIAN SEA COLONY: AN APPLICATION OF MINIATURE GEOLOCATION TECHNOLOGY

Presented by **Georgios Karris**

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In this work, we provide data on the entire annual migration patterns of Cory's Shearwaters breeding in the eastern Mediterranean. It is the first time that an entire migratory cycle has been recorded in this species. Geolocators (global location sensing units based on ambient light) were attached to three adult individuals caught at their nesting sites in the south Ionian Sea, at the largest colony of the species in Greece, and tracked between two consecutive breeding seasons (2009—2010). The tracked birds travelled a straight-line migratory distance of 5800 to 7200 km, spending an average of  $16.5 \pm 2.5$  days to reach the wintering grounds, and  $9 \pm 3.6$  days to return at the breeding area. The individuals remained away from their colony for approximately 4.5 months and travelled faster during spring migration (748 km per day) than during autumn migration (445 km per day). Two of the birds wintered in tropical waters off the coast of West Africa whereas the third spent the winter mainly in the equatorial waters of the eastern Atlantic. The foraging area in the Ionian and the Adriatic Seas during the breeding season was of comparable size to that in the wintering area in the Atlantic. Telemetric evidence revealed an almost synchronised departure from the breeding site on October 24/25 2009, but a significant spread of departure dates (February 17 to March 15 2010) from the wintering areas. The knowledge gained on the migration route and the wintering areas of Cory's Shearwaters originating from the eastern Mediterranean population will contribute to the understanding of the dynamics of large-scale pelagic migration processes.

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## **OXIDATIVE STRESS AND ANTIOXIDATIVE POTENTIAL IN GREENFINCH COCCIDIOSIS**

Presented by **Ulvi Karu**

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Parasite-mediated selection is currently believed to play an important role in the evolution of life histories and ornamental traits. Parasitic infections withdraw resources that their hosts could otherwise use in ornamental traits and other physiological functions. To fight off parasites, organisms often use oxidative products and free radicals produced during immune response. However, these reactive species can also cause extensive damage to biomolecules. To counteract these damages, organisms rely on antioxidants. We performed an experiment in captive greenfinches in order to test whether and how experimental infection with coccidia affects parameters of oxidative balance such as TAC, SOD, uric acid and carotenoids.

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## HOME-RANGE AND RESOURCE USE BY ELEONORA'S FALCON (*FALCO ELEONORAE*) IN ITS WINTERING QUARTERS INFERRED BY SATELLITE TELEMETRY DATA

Presented by **Christina Kassara**

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Recent satellite studies have revealed the wintering grounds of Eleonora's falcons originating in Spain, Italy and Greece. In line with previous field observations, satellite telemetry data have confirmed that Madagascar constitutes the wintering area of more than 80% of the global population of the species. Yet, little is known about its status and distribution in Madagascar. Here, we used satellite telemetry data from four Eleonora's falcons to explore resource use that might affect patterns of distribution in their wintering quarters. Evidence on its diet suggests that the species' distribution is mainly influenced by insect abundance, which, in turn, is affected, *inter alia*, by climate, vegetation status and topography, whose effect on the observed spatial use we were able to investigate. We focused on daily movements and inferred individual home range areas to compare resource use with resource availability. All four falcons overwintered in Madagascar. Time of arrival and, to a lesser extent, time of departure from wintering grounds varied among the four individuals. From a total of ca 2000 satellite fixes received during the wintering season, we filtered out inaccurate locations, night-time locations and locations observed right after the completion of autumn migration or just before the onset of spring migration. The remaining 286 fixes suggest that the four falcons were mainly active around the eastern part of Madagascar, up to the latitude of Antananarivo. Preliminary results show that resource use within the home range (3rd order selection) is not consistent among the four individuals. We discuss these findings in conjunction with forthcoming results on resource utilization across the entire area of Madagascar (2nd order selection). This research is useful for monitoring the population status of Eleonora's falcon in Madagascar, as it identifies important areas for overwintering through the unraveling of species' interactions with its environment.

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## CHANGE IN THE STRUCTURE OF BIRD POPULATIONS IN THE PROCESS OF FALLOW LAND OCCLUSION OF PLANT SPECIES

Presented by **Sofia Kazartseva**

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In the end of the twentieth century, socio-economic transformations in the agricultural production of Russia have led to a reduction of croplands. Overgrowing of uncultivated lands of natural vegetation during de-mutative processes has caused changes of ecological conditions. This led to the transformation of avifauna associated with agricultural land. Bird species and density of their population were studied in the nesting period in 2003—2010 on three fallow lands of the forest-steppe zone. In early studies, fallow lands were at a weeding stage of succession. During 2003—2010, penetration took place in grass canopy through wood species from adjacent to field-protection forests: on the first fallow land, *Pinus sylvestris* L., on the second, *Ulmus globra* Huds., and on the third, *Acer negundo* L. There were also changes in the composition of grass cover. So, by 2007, the predominance of *Calmagrostis epigeios* L. (first fallow land site) or *Elytrigia repens* L. (second and third fallow land site) was registered. It is established that at the initial stages of the first fallow land occlusion the number of bird species was lower than the other two. In 2010 the vegetation had grown to a certain height, and the landscape had changed. At the first fallow land site, an increase in bird species richness by 8 was noted, while at the second and the third fallow land site, there was a decrease by 4 and 3 species, respectively. Overall density of populations of birds on the three fallow land sites decreased through overgrowing.

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## **CONSERVATION OF CORNCRAKES IN LATVIA 1989—2010: AGRICULTURAL LANDSCAPES VS. NATURA 2000 SITES**

Presented by **Oskars Keiřs**

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We analysed countrywide Corncrake monitoring data collected annually on 69 sample plots since 1989 to investigate how the population of the species and available farmland habitats have changed during this period. We identified habitat categories that are most important for maintaining the Corncrake population both in terms of having highest densities of calling males and holding largest absolute numbers of calling males. The data obtained in monitoring plots yielded estimate of the Corncrake population in Latvia as 48 000 to 58 000 breeding pairs, placing Latvia among the most important countries for the conservation of this species on a Pan-European scale. As the species is a strict farmland specialist, the state of the Latvian farmland plays a key role in the conservation status of the species. It has been estimated that nearly half of the country's Corncrake population (48—50%) inhabits abandoned agricultural lands. Since the beginning of the 21st century and especially after Latvia joined the EU in 2004, large funds have been allocated to its agricultural sector. Due to this, large parts of agricultural areas that were previously abandoned not only returned into agricultural practice but were managed more intensively than before their abandonment. At the same time, the areas less accessible for intensive farming continued to overgrow and this polarization of farmland is characteristic not only for Latvia but also for other countries in the region. In total, all Natura 2000 territories in Latvia host no more than 4000 Corncrakes — less than 10% of the estimated population number. Thus the protection of Corncrakes is much more important in agricultural landscapes, where, at least in Latvia, it is largely overlooked by policy makers in both environmental and agricultural agencies.

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## MODELING AVIAN ALTITUDE DISTRIBUTION TO IMPROVE FLIGHT SAFETY

Presented by **Michael Kemp**

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Models to predict the timing and intensity of migration have already improved flight safety and efficiency: reducing airborne collisions, cutting costs, and saving lives. There are, however, still issues needing attention and areas for improvement. In particular, altitudinal information, i.e., data on the distribution of migration vertically in the atmosphere, has been lacking. A recently developed algorithm to extract bird-related echoes from Doppler weather radars, such as those comprising the OPERA network, provides high-resolution altitudinal information on migrating birds. We examine a time series of these data from a radar in the Netherlands. Using various altitude distribution models to predict the distribution of birds for a given set of weather conditions, we explore relationships between the altitude distributions of migrating birds and altitudinal profiles of meteorological variables. We find that in this area, in contrast to results from lower-latitude desert-like areas, that wind-only models are rather poor predictors of altitude distribution. Instead, birds appear to remain below altitudes exhibiting either clouds or sub-zero temperatures, thus they often do not reach high-altitude wind optima. Our data do suggest, however, that birds attempt to minimize side-wind drift when selecting altitudes for migration. Models predicting avian altitude distributions, coupled with models of the timing and intensity of migration, have the ability to improve flight safety even further. We present some preliminary results showing the potential of these models and discuss the possibility of a European-wide prediction and radar-based monitoring network with cross-border standards of the timing, intensity, and altitudinal distribution of migrating birds.

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## THE EFFECT OF MOULT ON IMMUNITY OF PIED FLYCATCHER MALES DIFFERING IN MELANIN-BASED COLORATION

Presented by **Anvar Kerimov**

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On the contrary to carotene-based coloration, the melanin based coloration of birds is widely accepted as a low cost trait. However, this statement conflicts with the results of some recent studies which, in particular, showed the environmental component of variation of melanin coloration. The Pied Flycatcher, the species with exaggerated polymorphism of melanin-based background coloration, tends to combine the late phase of monocyclic reproduction with moulting. Experimental challenge of humoral immunity in males which did not moult during the chick-rearing period led to the same responses in birds of different colour types. However, males of different colour types combined chick rearing with moulting markedly differed in their antibody titres. As compared with non-moulted conspicuous males with rich melanin colouration, moulted ones of the same colour showed a lowered immune response. At the same time, the immune response was sharply reinforced in moulted males of intermediate and cryptic colouration in comparison with non-moulted males of the corresponding colouration class. This result suggests that effects of colour type on immunity are pronounced under the influence of energy demanding moult. Besides additional energy and other physiological expenses, avian moult is accompanied by increased risks of infection and, therefore, represents a challenge for the defensive capacity. According to analyses of long-term population data in the Moscow region, conspicuous males combined reproduction with moult significantly less frequently than pale males.

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## STATUS ASSESSMENT AND CONSERVATION PRIORITIES OF FOREST BIRDS IN LATVIA

Presented by **Viesturs Ķerus**

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Evaluation of bird populations in Latvia was last done in 2004 for “Birds in Europe II” (BirdLife International 2004), before Latvia joined the European Union. After joining the EU, Directive 2009/147/EC of the European Parliament, and of the Council of November 30 2009 on the conservation of wild birds, has become the main piece of legislation concerning bird conservation in Latvia. Forests form a major natural biome of Latvia, with an increasing share of over 50%, and strongly growing intensity of exploitation. To find out how this and the relevant national legislation safeguards the conservation status of forest-dwelling species, we analysed proportions of bird populations breeding in Natura 2000 sites. We paid particular attention to species listed in Annex I of the Birds Directive and other priority species for conservation. At the later group, we included 98 species which have disproportionately large populations in Latvia. Conservation status of all species was re-assessed using regionally adapted criteria of IUCN. Of 214 bird species breeding in Latvia, 77 breed predominantly or exclusively in forests, 18 of them being threatened or nearly threatened. Annex I of Birds Directive includes 21 forest bird species (13 priority species), but the average proportion of these species’ populations protected within Natura 2000 sites is only 11%. National legislation of Latvia provides an opportunity for making micro-reserves for two more species (in addition to 12 from the ones listed in the Birds Directive), but 54 forest bird species, 31 of which are priority species and 7 — threatened or nearly threatened species, have no measure of conservation. Due to the facts that more than half of the priority forest bird species are not listed in Annex I of Birds Directive, and the species that are, have very low level of protection, we suggest additional conservation effort.

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## **PARASITE RESISTANCE AND SEXUAL SELECTION IN THE BLACK GROUSE (*TETRAO TETRIX*)**

Presented by **Matti Kervinen**

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Black grouse is a galliform lekking species with strong sexual selection, both male-male interactions and female choice, playing a major role. Furthermore, male mating success is highly skewed. We have studied a population of black grouse since 2001 at the individual level in Central Finland. Expression of many male sexual signals is dependent on male parasite load, even among the most successful males. For example blue coloration and lyre length are affected by male microfilaria load. Recently, we have developed a method based on qPCR to measure leucocytozoon, plasmodium and haemoproteus levels in the black grouse. Preliminary analysis indicates that most of the individuals indeed have these parasites, but parasite load varies a lot between the individuals. The role of these parasites, and additionally the role of microfilaria and trypanosome, will be presented in relation to male mating success, behaviour during the lekking season, and physiological condition.

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## HOW I BECAME A BAYESIAN — OR DID I?

Presented by **Marc Kéry**

Marc Kéry

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Bayesian analyses in population ecology are becoming more numerous all the time. I am a population ecologist whose modeling has turned almost exclusively Bayesian over the past few years. The main reason for that is the advent of the flexible WinBUGS software, which allows non-statisticians to understand and fit potentially also very complex models. I present some examples of where WinBUGS has enabled me to conduct a much better analysis than what I would have been able to do with maximum likelihood analysis. I present reasons for why it can be advantageous for a population ecologist to become a Bayesian for statistical analysis. However, I will also describe some of the challenges inherent in the Bayesian approach to statistical modeling and will argue for a pragmatic choice between the available modeling techniques.

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## MIGRATION PHENOLOGY AND THE CHANGES IN TIMING OF MIGRATION OF TWO PHYLLOSCOPUS SPECIES IN HUNGARY

Presented by **Andrea Kiss**

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The timing of migration of many bird species has changed recently, presumably due to climate change. We used the data of 3299 Wood Warblers (*Phylloscopus sibilatrix*) and 2686 Willow Warblers (*P. trochilus*) caught and ringed at the Ócsa Bird Ringing Station between 1988–2009 in Hungary to analyse the migration timing and pattern of these species. Age and sex groups were analysed separately. Wood- and Willow Warblers are long distance migrants. None of them bred in the study area, and the birds stayed only for short periods there, mostly 1 day. The timing of migration has changed in both species. In Wood Warblers the timing of spring migration advanced by 11 days during the study period, according to the results of 50% quantile regression. In autumn, only juvenile birds showed a significant shift. Although the start of migration has not changed, the length of the migrating season has expanded, with the latest birds (75% quantile) arriving 6 days later. In Willow Warblers, changes have been found only in autumn: adults arrive 14, juveniles 20 days later (50% quantile). We found significant relationships between migration timing and wing length in both migration seasons, in both species. In the Wood Warbler, the longer winged individuals arrive earlier in both seasons. Probably sex related differences cause the observed patterns in spring, with longer winged males migrating earlier than short winged females. The relationship between wing length and migration timing in autumn can either be explained by male territorial behaviour on the wintering grounds or by a probable leap-frog migration strategy. In the Willow Warbler, the longer winged birds migrate earlier in spring, but in autumn the shorter winged individuals are earlier. In both species, wing-length distributions differ significantly between spring and autumn migrants, suggesting a loop migration strategy. Moreover, adult Wood Warblers migrate on average 4.9 days earlier than juveniles.

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## THE EFFECT OF PARENTAL TRAITS ON PROVISIONING RATE IN THE COLLARED FLYCATCHER

Presented by **Dorottya Kiss**

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Nestlings of altricial birds are entirely dependent on the provisioning of their parents. To maximize their lifetime reproductive success, parents have to make decisions on provisioning investment according to environmental conditions and their intrinsic quality. In two breeding seasons, we examined associations between parental feeding activity and potential signals of parental quality, clutch size and laying date in the collared flycatcher (*Ficedula albicollis*). Offspring were cross-fostered, therefore we could investigate effects of both the original and rearing parents' quality on feeding rates. We found that rearing females provisioned the nestlings more often when they reared more offspring. Feeding rate of the females differed between experimental years and was higher in the year when food was more abundant. The wing patch size of genetic mothers, a sexually selected plumage trait, correlated significantly positively with the provisioning rates of both rearing parents. This may suggest that nestlings of females with larger wing patch begged more intensively and as a result were fed more often than nestlings originating from smaller patched females. None of the traits of the original or rearing males correlated with feeding rates of the parents.

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## **TACKING PASSERINE BIRDS USING GEOLOCATORS, A NEW CHAPTER IN THE RESEARCH OF BIRD MIGRATION?**

Presented by **Raymond Klaassen**

Raymond H.G. Klaassen

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Our current understanding about bird migration strategies is strongly biased towards species that are large enough to carry tracking devices such as satellite transmitters. This is worrisome as small birds represent the vast majority of migratory birds, and small birds might behave very differently than larger ones. In fact, how small birds exactly organize and accomplish their impressive migratory travels is largely unknown. Recently it has become possible to track small birds using geolocators (also called lightloggers). Geolocators will potentially revolutionize the study of bird migration as it allows unravelling migratory routes, stopover sites and wintering areas also of the smallest bird species. Now that the first results of geocator studies are available, it is time to evaluate what new insights this exciting technique has brought to the field. In my talk, I first sketch the migration strategies of relatively small birds, using data on, amongst others, Red-backed Shrike, Great Reed Warbler, and Common Swift. Then I make a comparison of strategies and migratory performance of small and large birds. Finally, I put some theoretical predictions about the migrations of passerines to the test.

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## VOCAL DEVELOPMENT IN NONPASSERINES: EVIDENCES OF VOICE BREAKING IN CRANES (GRUIDAE, GRUIFORMES) AND AUKS (ALCIDAE, CHARADRIIFORMES)

Presented by **Anna Klenova**

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Birds without vocal learning differ in their vocal development. For Anseriformes and Galliformes the gradual, while for Gruiformes, Procellariiformes and Coraciiformes, jump-like changes of frequency call variables throughout ontogenesis, have been reported. But distribution of vocal ontogeny types among other bird taxa and the biological features that determined their presence in birds are poorly studied. We analyzed vocal development in cranes: in red-crowned (*Grus japonensis*) and demoiselle cranes (*Anthropoides virgo*), that are similar in biology, but differ in morphological size; and in auks: in crested (*Aethia cristatella*) and parakeet auklets (*A. psitaculla*), tufted (*Fratercula cirrhata*) and horned puffins (*F. corniculata*), that are similar in biology and size, but differ in adult vocal repertoire structure. We traced the call development in 31 red-crowned and in 12 demoiselle cranes from hatching to 1—1.5 years old (recordings were made in Oka Crane Breeding Center) and in 22 crested and 12 parakeet auklets, 15 tufted and 14 horned puffins from hatching to fledgling at 35—45 days old (recordings at natural colony on Talan Island, Sea of Okhotsk). We observed the jump-like transition from high-frequency juvenile calls to low-frequency adult-like calls through the stage of two-frequency calls (the voice breaking) in all species. In cranes, the onset of voice breaking coincided with achieving adult weight (7 months old in largest red-crowned and 1.5 months in smallest demoiselle crane), while its completion corresponded with dates of parent-chick bond breaking (11 months old in both species). In auks the structure of chick vocal repertoire was universal for all four species, despite clear differences in adult vocal repertoire; the voice breaking began just prior to fledgling or after leaving the nest. We suppose that jump-like vocal development with longtime high-frequency call retaining could be explained by the necessity of long-term parental care.

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## FACTORS AFFECTING INCUBATION BEHAVIOUR OF THE REED WARBLER (*ACROCEPHALUS SCIRPACEUS*)

Presented by **Ewelina Klimczuk**

Ewelina Klimczuk

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The study was carried out in 2007 and 2008 at fish-ponds in “Stawy Milickie” nature reserve. The incubation behaviour was studied in a population of Reed Warbler. Reed Warbler is a small passerine bird with biparental care. Both sexes participate in incubation and rearing the young, but only females develop brood patches. The aim of this study was to estimate the influence of time of day, breeding season, incubation phase progress, clutch size and weather conditions on male and female Reed Warblers’ incubation behaviour. As the conditions under which males take care of the clutch are still poorly understood, I addressed this issue in male Reed Warblers, which incubate the eggs despite the lack of a brood patch. Female Reed Warblers incubated eggs constantly, but males’ contribution was variable. Females devoted roughly equal time into incubation (48.9% of time incubating), independently of the considered factors. Male nest attentiveness varied depending on the time of day. A male spent more time incubating in the morning than later in the day (34.9% in the morning, 32% and 27.3% during midday and evening, respectively). Perhaps, males enable females to increase their foraging time. Male contribution to incubation was neither correlated with breeding season progress nor with day of incubation. Nests with different clutch sizes received equal female and male care. Besides the time of day, the most important factor affecting male incubation behaviour were ecological parameters. During windy weather, males showed shorter incubation bouts. Males devoted less time to incubation when it was raining (24.8%), while females increased their incubation effort (59.8%). According to the literature, Reed Warblers begin incubation with the penultimate egg, but this study revealed that both sexes were observed at the nest during egg laying. Interestingly, males spent much more time on the eggs (49.1%) than did females (13.1%), before the beginning of full incubation.

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## ASSOCIATION BETWEEN DRD4 GENE POLYMORPHISM AND ESCAPE BEHAVIOUR IN BLUE TITS

Presented by **Edward Kluen**

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To improve our knowledge of the evolutionary and ecological significance of variation in personalities of wild animals, recent studies have focussed on genetic mechanisms underlying personality variation. Single Nucleotide Polymorphisms (SNP) of the dopamine D4 receptor gene (DRD4) have been found to be associated with behaviours related to novelty seeking in several domesticated species (dogs, horses and chicken) and captive monkeys. Recently, research on great tits (*Parus major*) showed that polymorphisms of the DRD4 gene were associated with individual variation in exploratory behaviour in birds bred in captivity and in the wild. We designed a “simple” behavioural assay to test several behavioural traits in free living blue tits (*Cyanistes caeruleus*) in Finland, using a bird cage. In 3 winters, over 220 individuals were tested in this assay of which over 50 were tested twice or more. Hence, we were able to calculate repeatabilities of the different behavioural traits. In addition, blood was sampled from all birds tested for the first time and analysed for DRD4 gene polymorphisms (2 SNPs). Finally, to put the behaviour measured in the cage into a more ecological perspective, we investigated a form of “selection”. We tested whether individual behaviour measured in cages was associated with whether the bird was breeding in the consecutive breeding season. From our behavioural assay we found two repeatable behavioural traits (one neophobia related trait and escape behaviour). Escape behaviour was found to be associated with polymorphism of the DRD4 gene. Hence, evidence is accumulating that this genomic region is associated with personality traits in tits. Escape behaviour also shows a loose association with birds’ breeding performance in the following season.

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## TIME-SERIES MODELLING OF THE DYNAMICS OF CHANGING BIRD MIGRATION PHENOLOGIES

Presented by **Endre Knudsen**

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While time-series analysis is a popular tool for modelling population dynamics, it is rarely applied in the study of phenological change, which largely has proceeded by using linear trend analysis and correlative approaches. However, more robust and mechanistically enlightening models would result from modelling the year-to-year dynamics of phenology, while accounting for observation error and separating between sources of variability at different levels. Using a 30-year time series on the spring migration at Ottenby bird observatory, Sweden, we show how 15 species of long-distance migrants differ in their ability to track environmental change through plastic responses. We apply state-space time-series models, fitted using Bayesian MCMC methods, for separating responses to between-year variability in the local environment from responses to winter and flyway conditions as well as latent long-term fluctuations not representing a common response to the environment. While the former two were rather synchronous across species and instantaneous, the latter were out of phase yet directionally consistent over time and capable of explaining observed fluctuations in bird migration phenology during periods of weak environmental control. Plastic responses fluctuated over time, and since the late 1990s the latent long-term trend component diverged across species and for some species strongly increased in magnitude, potentially impairing the ability to respond to short-term environmental fluctuation and further decoupling the dynamics of phenology across species. The role of such intrinsic dynamics of phenology needs to be further investigated, and time-series analysis offers a flexible and statistically well-founded approach to increase our mechanistic understanding of changing bird migration phenologies.

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## THE PROGRESS OF PRE-MIGRATORY FUEL DEPOSITION IN ADULT REED WARBLERS (*ACROCEPHALUS SCIRPACEUS*) IN AUTUMN STUDIED BY RADIO TELEMETRY

Presented by **Dmitry Kobylkov**

Dmitry Kobylkov, Andrey Mukhin, Vladislav Kosarev

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The pre-migratory time is a crucial period in a lifecycle of migratory birds, when great physiological changes between breeding and migration occur. The successful moult and fattening may predetermine the success of upcoming migration. The aim of our study was to reveal fuel deposition changes in natural conditions in adult Reed Warblers prior to autumn migration. The data for this study was collected during two field seasons 2009—2010 years on Courish Spit of Baltic Sea. Local adult birds were marked by radio transmitters (LB-2N, Holohil Inc., Canada) at the end of the breeding season. We kept birds under telemetric control constantly during dark periods and checked their presence at the field site 4 times during the light part of a day until their departure. The recapture of these Reed Warblers was carried out by means of actively driving them into mist-nets. For the entire period of our study, 12 birds were marked, 6 of them were recaptured at least once before the first migratory flight. 5 of 6 Reed Warblers showed increased body mass. The rate of body mass increase was higher closer to departure ( $y = -0.074 \ln(x) + 0.2399$ ,  $R^2 = 0.0361$ ). The largest recorded body mass was 16.4 g, that is 40% of lean body mass ( $y = 0.0698x + 6.7699$ ,  $R^2 = 0.0315$ ). Condition index (wing length/body mass (CI)), fuel deposition rate (FDR) and fat level (ESF system) increased noticeably until the time of departure, while the most intensive fuelling took place during the last five days. Calculated mass of birds in the night of departure is: FDR=34% (14.8—15.9 g), fat level=6, CI=0.224. All but one birds left the controlled area at night after the end of civil twilight. Our data reveal that fuel loading starts not on stopovers, but already on the breeding site, before the first migratory flight. Such a big mass gain could allow birds to fly more than 300 km without refuelling.

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## DOES METAL POLLUTION INCREASE OXIDATIVE STRESS IN SMALL PASSERINE SPECIES?

Presented by **Miia Koivula**

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Metals can cause oxidative stress by increasing the formation of reactive oxygen species (ROS) when there are insufficient amounts of antioxidants to defend the growing amount of free radicals. We aimed to find the most reliable biomarkers to detect pollution-related oxidative stress in wild birds by comparing oxidative stress status in great tit (*Parus major*), blue tit (*Cyanistes caeruleus*) and pied flycatcher (*Ficedula hypoleuca*) nestlings at populations in polluted and unpolluted areas. Different species are known to differ in their tolerance against oxidative stress, and we expected to find species-specific differences in their vulnerability against oxidative stress in polluted environment. We have used antioxidants (total GSH, GSH:GSSG, carotenoids) and several antioxidant enzymes (GP, GST, SOD, CAT) as indicators of oxidative stress. Our earlier studies with great tit nestlings did not show direct connections between dietary metal exposure and antioxidant or antioxidant enzyme levels. These results indicate that the exposure levels found in our study area are probably not high enough to cause oxidative stress in great tit nestlings. However, the activity of GP was slightly higher in the polluted environment mainly due to poorer condition and subsequently higher level of oxidative stress in the nestlings in polluted area. Therefore, we suggest that GP activity can be used as a sensitive indicator of condition related oxidative stress. The activity of this enzyme was not directly related to metal exposure, but more likely to some secondary pollution-related change in nestling condition, such as inferior growth.

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## **COMPARING THREE DIFFERENT WAYS TO EXPRESS BIRD POPULATION CHANGES: WHY DO THE PREDICTORS DIFFER AMONG THE CHANGES IN ABUNDANCE, DISTRIBUTION, AND POPULATION TREND?**

Presented by **Jaroslav Koleček**

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Bird population changes may be characterized by several ways — as change in (i) abundance, (ii) population trend and (iii) distribution. These measures are widely used in studies focused on predictors of bird population changes, but interpretation of significant results might differ depending on the measure used in a respective study. Comparison of results among studies is thus difficult, because it is unclear what the biologically relevant differences and methodical artifacts are. To focus on such methodical problems, we compared these different measures in Czech populations of 178 bird species, analyzing data from Birds in Europe I and II and breeding bird distribution atlases. Changes in abundance in 1990—2000 were positive in forest birds, while changes in population trends between 1970—1990 and 1990—2000 were positive mostly in protected birds. Changes in distribution between 1985—1989 and 2001—2003 were connected with latitudinal distribution. No significant predictors were common for individual types of measures. Change in abundance strongly correlated with change in distribution, and less markedly but still significantly also with change in trend. In contrast, the correlation of change in trend and change in distribution was the weakest. Results may predict a higher sensitivity of abundance to habitat changes. Effect of legal protection on the trend change may be connected with the year 1992 when the new act on nature conservation was approved. Distribution has been more influenced by range position, because climatic changes affect colonization of new areas. Although individual measures of population changes are positively correlated, their predictors are different, and it is necessary to be aware of their expression.

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## INDIVIDUALITY IN JUVENILE CALLS OF FOUR COLONIAL SEABIRD SPECIES (ALCIDAE, CHARADRIIFORMES)

Presented by **Yulia Kolesnikova**

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It is usually assumed that individual recognition between parents and chicks develops when and where it is needed to restrict parental care to bird's own offspring. Here, we tested this hypothesis on four related colonial seabird species of auks (*Alcidae*) that differ strongly in their nestling strategies. The first three studied species, the crested auklet (*Aethia cristatella*), tufted (*Fratercula cirrhata*) and horned puffins (*F. corniculata*) possess semi-precocial development and their nestlings stay at the nest until fledging. In the last species, the ancient murrelet (*Synthliboramphus antiquus*), precocial chicks leave the nest at night in two days after hatching. In the first group of species, the parents only need to return to the correct burrow to find their own chick, while in murrelets, parents need to recognize their own chicks at sea from hundreds of strangers that have hatched at the same time in the colony. For murrelets, the presence of vocal parent-chick recognition has been previously proven, however individuality in juvenile calls of other species have not been studied yet. We analyzed calls of 14 new born chicks of each species (6–10 calls per chick, 539 calls in total) and compare the degree of individuality in juvenile calls of different species. The call recordings were made during July–August 2010 at natural colonies (Talan Island, Sea of Okhotsk) from chicks at nest burrows at an age of 1–4 days for the first three species, and at the sea-shore in the night of departure for ancient murrelets. With help of DFA and coefficients of variation CV, we found that individual signatures were more pronounced and reliable in juvenile murrelet calls than in those of the other three species (84% vs. 42.9%, 53%, and 40.4% of correct assignment, DFA). Furthermore, the calls of juvenile auklet and puffins have a universal and very simple structure, while calls of juvenile murrelets are completely different and contain also some qualitative differences in the shape of frequency modulation.

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## HOW ARCTIC-BREEDING GEESE TIME THEIR SPRING MIGRATION

Presented by **Andrea Kölzsch**

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Geese breeding in the high arctic have a very tight schedule at their breeding sites. Therefore, arriving at the right time and in good condition is essential. Several studies indicate that herbivores, like geese, follow the flush of plant growth during spring migration. Unlike previous work, we tested this so-called green wave hypothesis at the level of the individual using GPS data of white-fronted geese (*Anser albifrons*; 13 complete tracks). We found that these geese arrived at spring stopovers at the peak of GDD jerk, an index of the green wave, with breeders tracking the GDD jerk maxima more closely than non-breeders. Furthermore, we compared their habitat preferences for spring stopover sites with those of barnacle geese (*Branta leucopsis*; 11 complete tracks). Barnacle geese also seem to follow the green wave and use wintering and breeding grounds that widely overlap with those of white-fronted geese. However, they greatly differ in their spring migration movement strategy, which we show is related to the different foraging preferences of the two species.

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## ADULT AND OFFSPRING SEX RATIOS IN THE DECLINING BALTIC BLACK STORK (*CICONIA NIGRA*) POPULATION

Presented by **Annika Konovalov**

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According to the Fisher's theory, sex ratio should be approximately 1:1 when both sexes are equally costly to produce for parents. Sex ratio is also a good indicator of the state of populations, e.g. it is biased due to ecological stress, and therefore it needs to be monitored in threatened species. The black stork (*Ciconia nigra*) is a species showing minor size dimorphism, with males being slightly larger than females, and thus the sex ratio should be close to 1:1. The species is declining in the Baltic states and therefore we tested here the hypothesis about equality in sex ratios using molecular sexing and photographs taken at nests by automatic cameras. In nestlings, the sex ratio was close to predicted 1:1 indeed, being slightly biased towards the excess of females. Surprisingly, the equality in sex ratios was not the case for adults with females being less abundant, which can refer to different mortality rates or dispersal between the sexes. Whatever the mechanism, lack of partners could be one of the reasons for the low breeding frequency and high nest abandonment rate, and thus also the decline of the Baltic black stork population.

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## BREEDING IN SYMPATRY, WINTERING FAR SEPARATED — CHANGES IN FORAGING PATTERNS OF TWO SOUTHERN SKUA SPECIES IN THE ANNUAL CYCLE

Presented by **Matthias Kopp**

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Details on behaviour of pelagic seabirds during the non-breeding season are often not known, but this period can be important for individual performance in the subsequent breeding season. While wintering birds have to fill-up resources, renew feathers for being prepared for spring migration and reproduction. Recent development in geolocation and stable isotope analysis allows studying the spatial distribution and the trophic niches during the non-breeding season. This, together with studies during breeding period, provides insight into the whole annual cycle. We studied annual patterns in foraging behaviour of two seabird species, the Brown Skua (*Catharacta antarctica lonnbergi*) (BS) and the South Polar Skua (*C. maccormicki*) (SPS) breeding in the maritime Antarctic. When breeding in sympatry, skuas are forced to divide food sources resulting in a generalist, the more competitive BS, and a specialist, the SPS. Geolocator data showed that wintering areas differed fundamentally. While BS winters in the Argentine basin, SPS winters in the northern Atlantic and Pacific Ocean. Sympatric breeding but separated wintering raises the question of whether foraging patterns are consistent between breeding and non-breeding season. We used data of stable isotopes in feathers grown during moult in winter to characterise the trophic patterns during the non-breeding season. During wintering, skuas showed similar discrimination compared to the breeding season with BS foraging without any preference resulting in a wide trophic spectra of food in comparison to the specialised foraging and narrow food spectra in SPS. Moreover, BS foraged at higher trophic levels during winter than during the breeding period, but SPS remained at the trophic level during the breeding and non-breeding period.

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## SEARCH FOR CONVERGENCE PATTERNS IN FORAGING GUILD STRUCTURE OF BIRD ASSEMBLAGES BETWEEN FORESTS IN THREE ZOOGEOGRAPHIC REGIONS

Presented by **Martin Korňan**

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Foraging guild structure of bird assemblages of three model plots in three zoogeographic regions were compared by means of a posteriori analysis. The research was conducted in a beech-maple-birch forest with admixture of spruce in the Hubbard Brook Experimental Forest in USA (Nearctic region), eucalyptus forest in the Bondi State Forest in Australia (Australian region) and beech-fir forest in the rámková National Nature Reserve in Slovakia (Palearctic region). Foraging guild structure was determined from observed frequencies of utilization of foraging substrates, foraging maneuvers and foraging heights by individual species. Data matrices 22 species  $\times$  24 variables (Nearctic), 41 species  $\times$  22 variable (Australian) and 26 species  $\times$  38 variables (Palearctic) were constructed from the database of foraging observations. Multivariate numerical procedures such as bootstrapped cluster analysis (UPGMA) and correspondence analysis (CA) were applied for determination and interpretation of the foraging guild structure. Four guild categories (litter/ground and trunk foragers, two distinct guilds of foliage gleaners) were determined in the bird assemblage of Nearctic forest (critical threshold level  $\alpha=0.1$ ), nine guild categories (nectar foragers, two guilds litter/ground foragers, foliage gleaners, bark foragers, two guilds of flycatchers, ground/trunk pouncers, plant eaters) in Australian forest and eight guild categories (litter foragers, herb layer foragers, trunk prober, bark gleaners, stream foragers, foliage gleaners, arboreal flycatchers, sweepers) and one independent dendrogram branch in the Palearctic forest. Presence of three analogous guild categories connected to foraging in/on litter/ ground, on trunk and on leaves implies convergent evolution in the structure of forest bird assemblages on the global scale, perhaps related to similarities in the physical structure and food resources of these geographically distinct forests.

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## **MIGRATORY CONNECTIVITY DERIVED FROM COMBINING RING RECOVERY DATA WITH UNKNOWN NUMBERS OF RINGED BIRDS AND TRACKING DATA: THE COMMON NIGHTINGALE AS AN EXAMPLE**

Presented by **Fränzi Korner-Nievergelt**

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The large data bases on ring reencounters, e.g., in Europe and North America, contain for many individual birds little information whereas modern tracking technology provides for a few individuals detailed information about their migration. The combination of ring reencounter and tracking data promises elucidating migratory connectivity more clearly than the separate analyses. We present a general, combined statistical model to estimate population specific migration patterns in Common Nightingales based on the Euring reencounter data for which the number of ringed birds is unknown. Our approach combines a conditional Cormack-Jolly-Seber mark-recapture model with a multinomial model in a Bayesian framework. This framework allows including information from tracking data of a few individuals. We found that birds from western central European populations predominantly migrate to the western parts of the non-breeding range whereas the major part of southern central European populations migrate towards the central part of the potential non-breeding area. Only small proportions of the populations in north-eastern central and eastern Europe migrated towards the western Africa. We present, for the first time, estimates of the distribution of Common Nightingales during the non-breeding period and show how spatial variation in reencounter probability can be accounted for when analysing migratory connectivity based on ring reencounter data with unknown numbers of ringed birds. We further show how to combine ring recovery and tracking data to infer migratory connectivity.

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## WIND DRIFT COMPENSATION OF RAPTORS CROSSING LARGE WATER BODIES

Presented by **Vladislav Kosarev**

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Raptors are able to compensate for wind drift, but detailed mechanisms of the compensation process remain unclear. Raptor flight consists of two main phases; during the soaring phase birds drift with the wind and gain height in thermal updrafts, during the gliding phase birds move / fly / glide towards the migratory direction and may compensate for the drift. The existence of two clearly separated phases allows to analyze mechanisms of wind drift and compensation in more details than for non-soaring species. Long tracks of raptors migrating between Scandinavia and northern Europe across the Baltic Sea (Fehmarnbelt), including both flight phases were recorded by tracking radar Superfledermaus (SOI). We present detailed characteristics of tracks and describe several methods of wind drift compensation (before drift, after drift, and drift in the direction of migration) in relation to the distance to the coast line and the influence of weather conditions on drift length and direction and its compensation.

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## WHAT ARE THE ECOLOGICAL TRAITS CORRELATING WITH PREDICTED SHIFTS OF EUROPEAN BREEDING RANGES IN CZECH BIRDS?

Presented by **Michaela Koschova**

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There are a number of future projections of species' geographic ranges developed under conditions of ongoing climate change. However, only a few studies have assessed what the characteristics of species showing projected range shifts of similar magnitude are. Examination of such relationships is important for the development of effective conservation strategies to mitigate the effects of climatic changes. For this purpose, we calculated the predicted shifts of European ranges in Czech birds based on maps in *A Climatic Atlas of European Breeding Birds* and explored relationships between these predicted shifts and several ecological traits. We found significant effects of the type of European distribution and habitat requirements. Concerning the type of European distribution, the largest shift is predicted in the central species and the northern species compared to widespread and southern species. Depending on habitat type, the largest shift is expected for forest birds, in contrast to urban species which are predicted to shift their ranges only slightly. These different trends are probably attributable to spatial constraints that are different among these specific groups. This pattern could be explained by higher sensitivity of forest species to climatic changes compared to urban birds, because species in urban habitats are more limited by other factors than climate. Finally, we have found that species with high levels of legal protection will shift more than other species indicating future challenges for bird conservation in the Czech Republic.

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## CHANGES IN MIGRATION AND BIOMETRICAL TRAITS OF THREE CLOSE RELATIVE ACROCEPHALUS SPECIES

Presented by **Szilvia Kovacs**

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Changes in migration phenology, body mass and wing length of three closely related long-distance migratory *Acrocephalus* species (Sedge Warbler — *A. schoenobenus*, Reed Warbler — *A. scirpaceus* and Marsh Warbler — *A. palustris*) were examined. Between 1989—2009, the median spring arrival date of Sedge Warblers and Reed Warblers advanced by one week, while Marsh Warblers showed no change. The median autumn arrival time of Sedge Warblers was postponed by two weeks, Reed Warblers and Marsh Warblers migrated one week later. The average body mass of Reed Warblers and Marsh Warblers decreased significantly during spring and autumn migration, while body mass of Sedge Warblers decreased only in autumn. The average wing length of the species increased significantly during both seasons. Although the studied species are closely related, the causes of change can be explained by different hypotheses. In case of the Sedge Warbler and Marsh Warbler, the increasing trapping number of long-winged northern birds may indicate a northward shift in the distribution or a larger reproductive success in the northern breeding territories as a possible effect of climate change. In case of the Sedge Warbler, a further effect could be caused by an expansion of the Sahara desert, in which case birds have to fly longer distances without food and this may be the selective force favouring longer wings. Reed Warbler populations breeding in Northern Europe do not migrate through the Carpathian Basin. Intriguingly, in the Reed Warbler, wing length also increased significantly. We may explain these changes by the different trends in timing of migration of the two sex groups, or by the biased rate of birds using eastern or western migration routes. The eastern migration route is longer, so it is possible that the ratio of birds using the eastern migration route recently increased in the migrating population passing Ócsa stopover site.

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## EXTREMELY LOW AMBIENT TEMPERATURE AFFECTS HAEMATOLOGICAL PARAMETERS AND BODY CONDITION IN WINTERING GREAT TITS

Presented by **Tatjana Krama**

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In high latitudes, thermoregulatory and behavioural adjustments of birds allow survival under extreme ambient temperatures and unpredictable food availability. Dominant individuals in social species often monopolize safe microhabitats and food resources, which may lead to greater levels of stress in subordinates. The results of this study revealed that certain haematological indices of health state and body condition of wintering great tits (*Parus major*) were dependent on their sex and age under conditions of extreme ambient temperature. Heterophil and lymphocyte counts revealed a significant increase in heterophil/lymphocyte ratio in female great tits during the course of cold spells. We also found that the condition of pectoral muscle deteriorated only in females, especially in the first year individuals. Since sex appears to be the most important predictor of the dominance rank and survival, elevated physiological stress in adult and first year females during cold spells may be explained in terms of increased resource monopolization by dominant individuals. In partial migrant species, such as great tits, some birds migrate while the rest of the population remains sedentary: females and juveniles normally constitute most of the migrants. Our results suggest that these patterns may derive from the fact that migration may be less costly for females in comparison to spending the winter in higher latitudes where their survival is challenged by extreme environmental change.

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## RETENTION OF COOPERATION AFTER INVOLUNTARY DEFECTION SHOWS BIRD ABILITY TO FORGIVE

Presented by **Indriķis Krams**

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Reciprocal altruism is a form of mutual cooperation in which one individual helps an unrelated individual and then receives assistance from that individual later. Reciprocity creates the obvious dilemma in which there always is a short-term benefit to cheating, therefore cooperators must avoid being exploited by non-cooperating cheaters. In theory, this can be achieved by following various decision rules, usually variants of the tit-for-tat (TFT) strategy. TFT defects following a defection by the opponent, making cheating unprofitable. The strength of TFT, however, is also its weakness. In natural 'noisy' environments, where animals commit mistakes in implementation or interpretation of moves, and are often unable to cooperate the stringency of TFT should lead to a permanent breakdown in cooperation. Here we show that wild pied flycatchers *Ficedula hypoleuca* use a TFT with an embedded decision rule that allows to forgive the neighbors that were perceived as unable to cooperate during mobbing of predators. This is consistent with the previously proposed sympathetic retaliator strategy which to date has been considered to be vulnerable to exploitation by individuals that are constantly unable to cooperate. We show that the ability to excuse may sustain cooperation under some degree of uncertainty.

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## **ANALYSIS OF CONSPECIFIC BROOD PARASITISM IN COMMON POCHARD (*AYTHYA FERINA*)**

Presented by **Jakub Kreisinger**

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Factors determining the prevalence of conspecific brood parasitism (CBP) were analyzed in a semicolonially nesting diving duck, the Common Pochard. CBP was detected using a set of 17 microsatellites. Maternal and offspring DNA was gained by non-invasively by collecting feathers from nest lining and dead embryos, or egg membranes from hatched eggs, respectively. Our results confirmed considerably high CBP rates in pochard; i.e., 39% eggs were laid parasitically, 89% nests contained  $\geq 1$  parasitic egg. Our data do not suggest that hosts reduce their clutch size due to CBP and that the intensity of CBP reduces hatching success of host eggs. Parasitic eggs exhibited decreased hatching success compared to host eggs (i.e., 96.4 % vs. 72.1 % of hatched non-parasitic and parasitic eggs). Hatching failure was caused mostly by the improper timing of the laying of the parasitic egg, yet we cannot exclude alternative explanations. Our data do not support that kin selection affects host-parasite interactions in pochard. Females were not parasited less or more likely by related females than expected by chance. In addition, although the coefficient of relatedness between two individuals in the population decreased with increasing distance of their nests, the probability of parasite host interaction between two individuals was not affected by their breeding distance.

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## COMPARING TWO DIFFERENT MIGRATION STRATEGIES OF TRANS-SAHARAN PASSERINE MIGRANTS

Presented by **Mikkel Willemoes Kristensen**

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Many species of European passerines migrate to Africa each winter. Different species and different populations winter in different regions of sub-Saharan Africa, show different winter behaviour, use different migration routes, different stop-over sites and have different migration timing and duration. I will compare the migration patterns of two common Danish trans-Saharan passerine migrants using light-based geolocators. The birds were tracked during the winters 2009/10 and 2010/11. The redstart (*Phoenicurus phoenicurus*) is believed to migrate southwest from Denmark, cross the Mediterranean through the Iberian Peninsula and winter somewhere in the West African Sahel. The thrush nightingale (*Luscinia luscinia*) is thought to migrate south or southeast from Denmark, cross the Mediterranean either through Greece or Italy or even go around it via the Strait of Bosphorus and winter somewhere in eastern or southern Africa. As these two species show such different migration patterns, they are bound to have different strategies in their migration patterns and winter- and stopover-site ecology. The comparisons in migration timing, speed, avoidance of barriers and pre-migratory feeding movements, will reflect the contrasting strategies undertaken by these two species, and hopefully increase our understanding of the mechanisms of migration pattern evolution.

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## METHICILLIN- AND GLYCOPEPTIDE-RESISTANT BACTERIA IN AVIAN FAECAL SAMPLES

Presented by **Marek Kucharczyk**

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Avian faecal samples were analysed regarding the presence of bacteria related to human enteric diseases. Besides of bacteria representing the genera of Enterobacteriaceae (*Escherichia*, *Enterobacter*, *Yersinia*, *Citrobacter*, *Proteus*) the most numerous isolates belonged to *Campylobacter* and *Enterococcus*. Over the last years, the increase in the incidence of human infection and colonization with glycopeptide-resistant enterococci (GRE) was observed. The susceptibility studies of isolates of *Enterococcus* to vancomycin and teicoplanin were undertaken to assess avian wildlife as reservoir of GRE strains. The vancomycin resistant enterococci were recovered from approximately 5 percent of the total number of *Enterococcus* strains. The presence of the van resistance genes was assayed by PCR. Recently, infections by isolates of *Staphylococcus aureus* that contain the enterococcal vancomycin resistance vanA gene cluster and the methicillin-resistance gene *mecA* were reported. *Staphylococcus* including the vancomycin resistant *Staphylococcus* isolates were screened by PCR employing widely used primers for amplification of the *mecA* gene.

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## **NOCTURNAL BIRD MIGRATION NEAR OFFSHORE WIND FARMS – FROM VISUAL PERCEPTION TO PHOTOTACTIC REACTIONS**

Presented by **Christoph Kulemeyer**

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The risk of birds colliding with man-made structures, such as wind turbines in offshore wind farms, is of major conservation concern. Yet, predictions on avian collision risk tend to concentrate more on stochastic processes than on ecological attributes and behavioural responses that render some species vulnerable. Offshore wind farms may negatively affect night-migrating birds by phototactic attraction under unfavourable weather conditions. To assess potential effects, migration rates need to be quantified in relation to weather variability at existing wind farms. Our state-of-the-art radar system (Bird Scan) installed on the research platforms FINO 1 next to the wind farm “alpha ventus” in the North Sea (and on FINO 2, near the planned wind farm “Baltic II”) operates on the basis of defined detection volumes, allowing a precise quantification of passerine and non-passerine radar echoes over extended time periods. Our study design at FINO 1 includes alternating measurements within and outside the wind farm in order to assess avoidance and/or phototactic aggregations of migrants under certain weather situations. At the same time, we are investigating behavioural responses of birds at a smaller spatial scale, using motion-controlled infrared cameras directly mounted on the nacelle and shaft of a wind turbine. Through this approach, disoriented birds can be automatically “ground-proofed” and set in relation to the overall migration volume detected by radar. First results suggest that birds get attracted, and possibly trapped, within the wind park when visibility is poor. By combining such information with large-scale migration patterns derived from weather radar, it may become possible to determine the exact circumstances under which bird collision risk increases. This information is important to inform policy decisions regarding conservation and mitigation strategies. Funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

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## HOW DOES PLASTICINE VS. COATED PLASTICINE EGG USE INFLUENCE THE SURVIVAL OF ARTIFICIAL GROUND NESTS?

Presented by **Kornélia Kurucz**

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Artificial nests are widely used to investigate relative rates of nest predation in birds. In most nest predation experiments with artificial nests, plasticine eggs are often used beside real eggs in order to better identify nest predators based on their tooth or beak marks. However, the application of plasticine eggs in ground nests is often heavily criticised, because the smell of plasticine is thought to affect the results by attracting nest predators searching based on olfactory cues. Haskell (1999, *Anim. Behaviour*) in his experiment coated plasticine eggs with a thin rubber layer, but this method did not spread. In our methodological study we aimed to answer the following questions: How does the survival rate of ground nests vary if we place one plasticine (P) vs. one coated plasticine egg (C) next to one quail egg (Q) applying quail-quail egg combination as control? What is the share of different predator types (small or large mammal or bird) in the predation events of different nest types? The study was carried out in the interior part of intensively managed wheat fields in South Hungary during summer in 2010. Artificial nests with 15 randomly placed egg combinations were monitored in ten independent wheat fields. Analysing the Mayfield nest survival rates, we found that nests with quail and plasticine eggs experienced significantly higher predation than those containing two quail eggs or those with quail and coated plasticine eggs (the latter two combinations did not differ significantly). Almost the half of the nests was depredated, mostly by small mammals (69%). The higher predation of nests containing plasticine eggs can be related to its smell thereby attracting more small mammals than nests with natural and coated plasticine eggs. Therefore, we recommend using real eggs with coated plasticine eggs instead of plasticine eggs, since the latter overestimate predation rates, while coated plasticine eggs still allow identification of predator types.

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## THE MICRORESERVE APPROACH IN CONSERVATION OF WHITE-TAILED EAGLE IN LATVIA — A TOOL IN PROTECTING DISPersed SPECIES IN FRAGMENTED FOREST LANDSCAPE

Presented by **Jānis Kuze**

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Forestry causes changes in forest structure, and related disturbances are supposed to be among the major factors affecting the populations of some forest dwelling bird species. This impact on species is mostly negative, because the old-growth forest ecosystems or particular forest structures are usually removed during forestry operations. To tackle the problem, a network of small protected areas (microreserves) around the nests of protected bird species was created as early as the late 1970s in Latvia, and this approach has been further developed for application in fragmented forest landscapes. The approach includes two different zones — microreserves (strict nature reserves) and bufferzones (seasonal management restrictions only). In the traditional approach, microreserves were bordered by bufferzones, but this approach was not efficient in fragmented landscapes and in cases where species like the White-tailed Eagle (*Haliaeetus albicilla*) frequently change their nesting sites. As a response to this, we developed and approbated the concept of “patchy microreserves”. With this approach, only sites suitable for current and future nesting are included in the microreserve. Surrounding unsuitable stands (clearcuts, plantations, etc.) are included in the bufferzone. With this new approach, the average size of a protected territory (microreserve and bufferzone taken together) has increased from 89 ha to 103 ha, whereas the proportion of the microreserve element has decreased in favour of the bufferzone. This approach enables efficient protection of breeding grounds of dispersive species and, to some extent, represents a compromise between the needs of nature protection and forest management interests.

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## CHARACTER DISPLACEMENT AND GRADUAL CHANGE IN PLUMAGE TRAIT COMPLEX OF THE PIED AND COLLARED FLYCATCHER

Presented by **Toni Laaksonen**

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Geographic variation in traits associated with fitness plays a key role in fundamental evolutionary processes such as local adaptation, population differentiation and ultimately, speciation. While patterns of geographic variation have been extensively documented, the selective forces causing variation are still hardly known. We studied geographic variation in the plumage traits of the pied flycatcher (*Ficedula hypoleuca*) and compared it to the sibling species collared flycatcher (*F. albicollis*). We found that all major visual plumage traits of the pied flycatcher have strongly diverged from the socially dominant collared flycatcher in the area of secondary contact. The conspicuousness of the plumage of the pied flycatcher increases with distance to the secondary contact zone, which suggests a cline maintained by gene flow. The different plumage traits are strongly or moderately correlated with each other, indicating that they evolve at least to some extent together. The pied and collared flycatchers are thus an exciting example of plumage patterns diverging in a relatively short time to two species that differ in appearance. The ongoing process of divergence in sympatry and convergence in allopatry in these birds provides a window to the evolution of highly divergent avian plumage patterns.

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## INFORMATION CONTENT OF PLUMAGE-LEVEL REFLECTANCE VARIATION IN THE COLLARED FLYCATCHER

Presented by **Miklós Laczi**

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Complex ornament systems, such as differently coloured patches across the plumage, have rarely been studied as a composite trait from the viewpoint of their information content. Collared flycatchers (*Ficedula albicollis*) display melanin pigmented and depigmented plumage patches. The spectral features of these patches are correlated across the plumage and seem to play a role in mate acquisition. In this study, we investigated the relationships of plumage-level colour axes with age, body size, previous and current body mass, laying date and clutch size. In males, all colour axes differed between second- and third-year birds, but not between older age classes. In females, coloration did not vary with age. Colour axes were unrelated to body size. The structurally based component of brightness variation was related negatively with previous year clutch size in males and also negatively with previous year condition in females. Other colour axes showed no such relationships, and current body mass and clutch size were also unrelated to coloration. These results suggest that plumage-level colour expression may be affected by age, past condition and reproductive investment, but the consequences of colour for current condition and reproductive output remain unclear.

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## **BIOTIC AND ABIOTIC FACTORS AFFECTING THE ECO-PHYSIOLOGY OF ALPINE BIRDS ALONG ALTITUDINAL GRADIENTS**

Presented by **Paola Laiolo**

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Mountains constitute excellent laboratories for studying the relative contribution of biotic and abiotic factors in ecological and evolutionary processes. Here we analyzed variation of bird health along an elevational gradient in the Cantabrian Mountains (NW Spain), one of the westernmost and southernmost mountain ranges of continental Europe. We centred on the water pipit *Anthus spinoletta*, an alpine passerine that inhabits a broad altitudinal range in our study area (from 800 to over 2000 m a.s.l.), and analyzed variation in cell immunity (T-cell subset CD4+, CD5+, CD8+) and blood pathogens (haematozoans, bacteria and viruses as determined through polymerase chain reaction assays). As predictors, we considered abiotic or environmental variables (habitat quality and quantity, rainfall and temperature), as well as biotic factors (intraspecific abundance). Although immune condition was negatively correlated with pathogen infection, variation in these two health indicators appeared to be dictated by different predictors. Pathogen prevalence and richness correlated positively with bird density, possibly as a result density-dependent pathogen transmission. Conversely, immune condition improved with elevation and colder temperatures. These results shows that (1) the influence of abiotic versus biotic factors on bird health may vary depending on the health indicator considered, and that (2) abiotic factors do not represent the sole drivers of individual condition on mountain tops.

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## ONSET OF BREEDING OF THE MALLARD (*ANAS PLATYRHYNCHOS*) IN WESTERN LATVIA IN 2005—2010: IMPACT OF AIR TEMPERATURE, WATER TEMPERATURE, PRECIPITATION, AND SNOW COVER

Presented by **Artūrs Laubergs**

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Factors influencing onset of breeding in Mallard in Western Latvia were determined by examining time of egg laying in 575 nests during 2005—2010. Data on Mallard breeding in elevated nesting platforms in ponds near Saldus and Tukums as well as lakes Engure and Kanieris were used. Capture and ringing of females was performed at 328 nests and morphological parameters and age of the female were recorded. Open-access information on weather conditions at the Mersrags weather station (57°33'N; 23°11'E) was used for analyses. Onset of breeding between years varied substantially: the mean date of the laying of the first egg ranged between March 28 (2007) and April 15 (2006). The range of the recorded extremes was even greater: March 18 (2008) and April 28 (2006). There was no statistically significant trend of the timing of the laying of the first egg during the study period (Mann-Kendall test — MK stat  $-0.77$ ,  $p=0.44$ ). Female characteristics (age, weight, and wing length) had no effect on the onset of breeding. Air temperature was the only factor having a statistically significant impact — maximum daily temperature seven days before laying of the first egg had the strongest positive effect ( $r^2=0.74$ ;  $p=0.05$ ). Amount of precipitation and snow cover as well as water temperature had no effect on the onset of breeding in this study. However, water temperature was not measured at the Mallard breeding sites, but at the weather station, what could have biased the study. We observed that Mallard lay their first eggs even at air temperatures below 0°C, the extreme minimum registered was  $-7.2^\circ\text{C}$ . In 2005—2010, most of the first eggs ( $n=26$ ) were layed when average daily air temperature had reached  $+4.8^\circ\text{C}$ .

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## **SPATIAL HETEROGENEITY OF RECAPTURE PROBABILITY IS SUBSTANTIAL IN MOST SPECIES AND HAS CONSEQUENCES FOR SURVIVAL ESTIMATES**

Presented by **Pascaline Le Gouar**

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Obtaining reliable population demographic parameters using mark-recapture analyses depends on the unbiased quantification of the probability that marked individuals are recaptured, given that they are alive. The assumption that this probability is equal for all individuals is likely to be violated in data collected with fixed traps and spatial structure of populations, for example through territoriality. Using data from the Dutch Constant Effort ringing scheme, we first documented that spatial heterogeneity in recapture probability occurred for most species in most sites even though the maximum distance between nets is only about 100 m in many sites. Then using simulations of spatially explicit capture-recapture data and comparing different capture-recapture modeling approaches (Robust Design, multistate modeling with uncertain state and spatial explicit Bayesian models), we have shown that such spatial patterns in recapture probability can lead to a bias of up to 15 % in the estimated survival rates and that this bias increased significantly with the heterogeneity of capture among individuals induced by size of home range. The bias varied significantly between square and linear trap settings and among modelling approaches. Among the different approaches tested, multi-state modelling performed best in terms of bias-reduction. The use of statistical methods which handle individual heterogeneity of capture is thus needed to accurately estimate vital rates (survival, recruitment and population size) when using a fixed setting of trap to monitor any mobile species.

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## MANAGEMENT OF MALLARD POPULATION REPRODUCTION IN A HUNTING AREA

Presented by **Natalia Lebedeva**

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The Mallard (*Anas platyrhynchos*) is the most popular game species for hunters in the South of European Russia. It is important not only to sustain its local population, but also to increase the density of this species in hunting areas. Long-term research revealed a decrease of the local Mallard population in wetlands of the Veselovsky reservoir (Wetland International). In this context, it was necessary to manage its regeneration on hunting sites. The chosen methods were the attraction of wild ducks to an artificial reed shelter for nesting and mallard farming with subsequent introduction of ducks into the wild. A farm for artificially breeding wild ducks was established in 2005. A total of 50 000 ducks were released into the wild (the water reservoir) by the beginning of the hunting season after five years of farming. Different methods were developed to protect the wild duck population and to enrich the hunting area with artificially bred ducks. Ringing of ducks showed that one third of the number of ducks shot by hunters consisted of artificially bred birds. Studying the introduction of Mallard into natural landscapes provided the opportunity to study features of their dispersal, breeding, and feeding behaviour.

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## **ANALYZING DEMOGRAPHIC FLOWS IN BIRD POPULATIONS: AN OVERVIEW OF APPROACHES AND APPLICATIONS TO BIRD POPULATION BIOLOGY AND CONSERVATION**

Presented by **Jean-Dominique Lebreton**

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In investigations of population change, population size and structure pertain to patterns while flows of individuals (death, birth, dispersal) pertain to process. For improving our understanding of mechanisms of population change, the estimation of these flows is thus a priority. It can be achieved in animal populations, birds in particular, based on the analysis of data on marked individuals. The development of computers was accompanied over the last 30 years by a genuine methodological revolution in methods for analyzing data based on marked individuals, or capture-mark-recapture (CMR) methods in the broad sense. Such data are commonly obtained in the many long-term studies conducted on bird populations. The application of CMR methods to conservation biology and population biology has produced a wide range of results in fundamental population biology as well as for applied management and conservation of populations. We will provide a non technical overview of so-called “capture-recapture” with an emphasis on “multistate models” in which individuals move between several states, such as, e.g., breeder / non-breeder or, in an epidemiological context, infected / non-infected. Estimating the transition probabilities between adequately defined states often provides key biological information. We will then review applications and discuss perspectives, in particular through the so-called “integrated models” than make it possible to combine capture-recapture analyses with other sources of information such as population size or structure surveys, hunting statistics, or information on vital rates such as fecundity.

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## SEXUAL SIZE DIMORPHISM AND SEX DIFFERENCES IN THE FOOD PROVISIONING TO NESTLINGS IN THE WHISKERED TERN (*CHLIDONIAS HYBRIDA*)

Presented by **Mateusz Ledwoń**

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Identifying the role of all factors and mechanisms responsible for the degree of sexual size dimorphism (SSD) is difficult, but measuring SSD, assortative mating and studying the ecology of species are crucial for testing the role and causes of SSD in birds. I measured and molecularly sexed 241 breeding adults Whiskered Terns captured in southern Poland from 2005 to 2010. Patterns of food provisioning were studied for two breeding seasons (2006—2007). Males were significantly larger than females in all six measurements. Two discriminant functions, one based only on the total head length and the second including the length of bill and the depth of bill at gonys, showed the same sex classification success — 95%. The total head length, bill length and bill depth at gonys were positively correlated within pairs. Dimorphism index in Whiskered Tern was greater than in other terns probably due to larger sex specialization in foraging niche utilization than in other terns. Males of Whiskered Tern delivered significantly more mass of prey than females. Males brought over 60% of vertebrates (fish and amphibians) while females delivered over 90% of invertebrates (small insects). The lower body mass of females in Whiskered Tern in comparison with males could predispose them to forage on smaller prey (insects) and to make frequent flights with food to chicks (items are always delivered singly). Males being larger than females may be predisposed to capture larger prey (vertebrates) thus making less frequent foraging trips to chicks.

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## CLIMATE CHANGE HAS ALTERED THE PREDATION RISK OF PASSERINES DURING AUTUMN MIGRATION

Presented by **Aleksi Lehikoinen**

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Climate change has been shown to cause phenological changes. These changes are not necessarily similar between species and may cause mismatches between prey and predators. The Eurasian sparrowhawk (*Accipiter nisus*), the main predator of passerines in Northern Europe, has advanced its autumn migration dates by about ten days over the past 30 years. However, it is not known whether sparrowhawks are tracking the migration times of their prey or if the advanced departure of sparrowhawks has led to changes in predation pressure of migrating passerines. Based on median departure dates of 41 passerines, I found that early migrating passerines tend to advance and late migrating species delay their departure, but none of the species have advanced their departure as much as the sparrowhawks. This has led to a situation of increased predation pressure of early migrating long-distance migrants (LDM) and has decreased the predation of later departing, short-distance migrants (SDM). These findings highlight the growing list of problems of declining LDM populations caused by climate change. Autumn migration of SDM, the species and populations which are doing better, is, on the other hand, becoming increasingly safer. These results also demonstrate that the autumn phenology of passerines shows a very conservative response to climate change.

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## LONG-TERM CHANGES OF BODY SIZE AND CONDITION INDICES IN PASSERINE BIRDS

Presented by **Esa Lehtikoinen**

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Change of climate and habitats available for birds have caused different pressures for change in birds. Our understanding of these connections has increased concerning phenology, distributions and population trends in the last fifteen years. Very few studies have concentrated on trait changes within populations, mainly perhaps because of scanty availability of long-term repeatable data. The senior author has been measuring passerines and studying moult since 1969 in the Turku area, SW-Finland. Tens of amateur ringers have participated in both projects in different periods. Currently the biometrical data base includes ca. 245 000 records and the moult data base (initiated by Prof. Haukioja) ca. 30 000 records for postnuptial moult. To be useful, data quality assurance is needed. Because several persons are needed to complete the field work and continue it through generations, there is an increased level of heterogeneity in measurements. We describe the ways by which repeatability of measurements and estimates have been done within and between groups of ringers in our project. Two basic ways to do this within a group of ringers are (1) organised special repeatability tests and (2) blind tests with subsets of data on same individuals. The two types are not equally useful for psychological reasons. Therefore, we recommend the first type of test for beginners with frequent feedback. The second alternative is important for those already working actively in measuring projects. All heterogeneity cannot be controlled by repeatability tests. Therefore the remaining heterogeneity between observers needs inclusion of observer ID in the analysis models. We show in this presentation the present stage of quality assurance in our project. We also present some first examples of changes of body size and condition indices in sedentary and short-distance migrant species.

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## **EFFECT OF FOREST DRAINAGE ON THE SIZE OF CAPERCAILLIE (*TETRAO UROGALLUS*) LEKS IN ESTONIA: A KEY ATTRIBUTE FOR LONG-TERM HABITAT LOSS**

Presented by **Meelis Leivits**

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We analyzed the net length of drainage ditches that are present at 1 km radius buffer zones of Capercaillie lekking sites. Drainage ditches were extracted from the Estonian Basic Map (2010) and mostly belong to various forest drainage systems. Inventories of Capercaillie (*Tetrao urogallus*) leks were carried out in 2009–2010. The sample included about 2/3 of all known leks in Estonia. A total of 255 persistent leks were analyzed. The scatter plot representing Capercaillie counts and net lengths of ditches showed an asymptotic relationship. While averaging net length by size of leks and comparing it with lek size, a strong negative correlation ( $r_s = -0.62$ ,  $p < 0.01$ ) was found. The obtained mean net length showed a linear response to lek size. By fitting a linear model, we could estimate that with an average increase about 0.5 km in net length of ditches, the lek size will decrease by 1 cock. As Capercaillie habitats in Estonia suffer from the consequences of intense forest drainage, it is obvious that the obtained results are in good concordance with local trends of Capercaillie abundance. Owing to drainage, forest productivity has exceeded the tolerance limits of Capercaillie, thus making the habitat unsuitable for the species. Therefore we suggest that current population declines of Capercaillie can be viewed as a long-term effect of forest drainage.

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## NATURAL VARIATION IN STRESS RESPONSE INFLUENCES POST-STRESS PARENTAL EFFORT IN MALE HOUSE SPARROWS

Presented by **Adam Z. Lendvai**

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Resource allocation between current and future reproduction is thought to be mediated by the steroid hormone, corticosterone (CORT) in birds, but the causal relationship between naturally occurring CORT levels and parental behaviour is rarely studied. We observed the chick provisioning behaviour (feeding rate) of male house sparrows (*Passer domesticus*) both before and after they were subjected to a standard capture-handling stress. We investigated the relationships between CORT levels, pre- and post-stress feeding rate, while we statistically controlled for a number of other variables using a multivariate regression method, the path analysis. We found that males' baseline feeding rate predicted the body mass of the nestlings, indicating that male parental care is directly linked to fitness. CORT levels were not explained by baseline feeding rate, but both baseline and stress-induced CORT levels had a negative influence on the males' post-stress feeding behaviour. Moreover, males with large bib size had a stronger stress response and lower post-stress feeding rate than small bibbed males. These results indicate parental effort may be regulated in a complex manner, with CORT mediating the life-history trade-off between current reproduction and survival. However, different resolutions of this trade-off were apparent only following the stress, therefore the ability to modulate the stress response and maintain parental care in stressful situations may be important in life-history evolution.

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## MEAN-VARIANCE RELATIONSHIPS IN OVERDISPERSED BIRD COUNT DATA

Presented by **Andreas Lindén**

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Counts are among the most common types of data used in ornithological research, for instance in studies on population dynamics, spatial occurrence and patterns of migration. In models used to describe a theoretical expectation — regression models, ANOVA, etc. — the exact choice of how the stochasticity in count data is modelled has apparent consequences for statistical inference and prediction uncertainty. Data typically show more variation than implied by the Poisson distribution, which is a commonly used starting point. Such overdispersion can be accounted for in various ways, including quasi-Poisson and negative binomial modelling, or random effects. However, these differ in their assumptions about the mean-variance relationship, i.e. the relationship between the regression expectation and the residual variance. Using bird migration as an example, we present hypothetical scenarios of how overdispersion can arise due to sampling, flocking behaviour, environmental variability or combinations of these. In our scenarios, sampling error causes linear and quadratic mean–variance relationships, while environmental stochasticity causes quadratic ones. Flocking behaviour with fixed flock size or a constant distribution of flock sizes induce linear mean–variance relationships in the data, but if flock size is proportional to the expected number of birds the relationship is quadratic. In situations with several sources of overdispersion present, the possibility of more complex mean-variance relationships should be considered. To illustrate, we apply a flexible parameterization of the negative binomial distribution with two overdispersion parameters to describe autumn migration phenology of woodlarks (*Lullula arborea*) at the Hanko bird observatory, Finland. This offers one approach to parametrically model more complex types of overdispersion, with straightforward maximum likelihood or Bayesian methods.

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## THE STRENUOUS FIRST YEAR OF THE CAPERCAILLIE MALE; ECOLOGICAL ENERGETICS AND GROWTH PATTERNS

Presented by **Harto Lindén**

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The capercaillie (*Tetrao urogallus*) has the most pronounced sexual size dimorphism among birds. The rapid growth of males, associated with energetic stress, might work in favor of the observed high mortality rate in male chicks and juveniles. Newly hatched chicks, and even young juveniles, rely primarily on behavioral thermoregulation, i.e. brooding under the hen. In cold and especially wet and rainy conditions chicks have only limited time for feeding, and fulfillment of energy requirements may become difficult. The most rapid development of thermoregulatory capacity occurs at the age from 4–5 days to about 3 weeks. According to gravimetric experiments male chicks consume up to 2.5 times more energy in naturally cold aviary conditions compared with optimal, laboratory conditions. Sexes have totally different growth patterns, the growth strategies deviate between the sexes more than normally between bird genera. The most outstanding deviation may be found in the dissected body components of male chicks, which are predictably larger than those of females with one exception: the breast muscles of cocks are relatively small, even slightly smaller than those of young hen chicks. Breast muscles are needed for thermoregulation, but also for predator avoidance. Hens proved to manage more successfully in flight/escape experiments probably due to large pectoral muscles and low wing load. Males allocate their growth energy more to legs and running, and females to pectorals and flying. Male chicks seemed to respond to low temperatures by increasing their energy consumption much more than females. In cold summers males have to bargain over their weight gain, and they reach a low asymptotic weight in autumn. A lightweight juvenile cock has a negative starting point for winter survival.

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## DO FLYCATCHERS COPY AND REJECT BEHAVIOUR OF TITS WITH HIGH AND LOW CLUTCH SIZE?

Presented by **Olli Loukola**

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Recent studies imply that migratory pied flycatchers (*Ficedula hypoleuca*) can copy or reject the behavioural traits of their competitors, resident tits (*Parus* spp.), associated with good or poor fitness correlates, respectively. Such a selective social learning may aid animals in making optimal decisions. We do not know, however, whether flycatchers also use other cues, such as the phenotype of tits. Here, we explicitly test whether pied flycatchers use an important determinant of fitness, the clutch size, as a basis of decision-making by manipulating the clutch sizes of naturally breeding tits. We experimentally tested whether pied flycatcher choice between two new, neutral behavioural traits (nest-site choice between alternative geometric symbols) is affected by observing the apparent nest-site choice and fitness (clutch size: 5 or 13 eggs) of tits. Our results suggest the quantity of eggs affected flycatcher choices: the trait (geometric symbol) associated with low clutch size was rejected while the trait associated with high clutch size was preferred. This result demonstrates that interspecific social learning can be an adaptive strategy whereby good and poor behaviours can be adopted and rejected, respectively. Our finding also implies that the observed convergence and divergence of traits of co-existing species may partly be due to interspecific social learning.

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## **SHORT-TERM EFFECTS OF RECENT LAND USE CHANGES IN EASTERN AUSTRIA ON BIRD ASSEMBLAGES IN A HUMAN-DOMINATED LANDSCAPE**

Presented by **Barbara Lukasch**

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To study effects of short-term land-use changes on birds in a predominantly agriculturally used landscape in Northeastern Austria, birds were surveyed in 22 circular study areas with a diameter of 1 km in 2005 and 2009. Because of the abolition to obligate set-aside land from 2008, it was suspected that the amount of set-aside land would be reduced dramatically. Consequently, a loss of biodiversity was expected, particularly in farmland birds. Results show that the amount of set-aside land indeed decreased significantly between 2005 and 2009 from 15.05% to 9.69% (mean proportion of fallows per study area). However, total numbers of recorded species were similar in 2005 and 2009 (85 and 87 species), farmland birds were rePresented by 20 species in both years. Absolute and relative abundances of species in 2005 and 2009 were highly correlated. No difference in the proportion of increasing and decreasing species was found between farmland and other bird species. Species richness of all birds species was positively related to habitat diversity, while an increasing amount of cropland had negative effects. Although a significant decline of set-aside land was recorded, no related significant changes of the bird assamblages could be detected. However, the amount of set-aside land in these landscapes was already high (compared to other areas in Austria) before the amendment of the law and still relatively high after it. Therefore, perhaps the minor changes in the extent of set-aside land were below the threshold to find detectable effects on bird assemblages.

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## **PREDICTING FUTURE RANGES AND ASSESSING VULNERABILITY FOR BREEDING BIRDS IN SWITZERLAND AS A CONSEQUENCE OF CLIMATE AND LAND USE CHANGE**

Presented by **Ramona Maggini**

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Climate change is affecting biodiversity worldwide and forces species to either “move, adapt or die”. Project ClimBird, developed at the Swiss Ornithological Institute, aims at assessing how the forecasted changes in climate but also in land use will modify the distribution of breeding birds in Switzerland and at identifying the most vulnerable species so as to efficiently inform authorities of the seriousness of the threat and to prioritize conservation programs. The current distribution was modelled using an ensemble of modelling techniques (GAM, BRT, MARS), several bioclimatic, topographic and land use-related predictors and data from different in-house sources (monitoring, atlas, ornithological databases). The modelled distributions were then projected for the 21st century according to combined scenarios of climate and land use change. Results clearly show that the greatest species turnover is expected for the alpine region and more specifically for the Eastern Alps. A first vulnerability index was defined using the modelled distributional areas, the likely recruitment rate for Swiss populations from the surrounding European countries and the trends of Swiss populations. The ranking of species according to this index suggests that most vulnerable species will be species with particular habitat requirements and alpine species for which Switzerland has a key responsibility in the European alpine landscape.

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## EGG-SHELL SPECKLES IN GREAT TITS: TESTING THE STRUCTURAL-FUNCTION HYPOTHESIS

Presented by **Marko Mägi**

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The function of egg-shell pigmentation has long been the subject of much speculation. Yet, no clear answer has been found to explain the function of such pigmentation in hole-breeding passerines, some of which lay white eggs with reddish spots. In this study, we tested the structural-function hypothesis of egg-shell pigmentation. According to this hypothesis, birds use pigments for strengthening the egg-shell in response to calcium (Ca) shortage. A Ca-provisioning experiment was carried out in great tits breeding in Ca-poor coniferous and Ca-rich deciduous forests. Unlike egg size and egg-shell thickness, which were relatively lower in Ca-poor habitat, egg-shell maculation did not differ between habitats. Ca-supplemented birds laid eggs with darker and larger spots than birds in the control group, which contradicts the predictions of the structural-function hypothesis. The thickness of egg-shells was not related to shell maculation. Experimentally increasing the number of eggs laid in the Ca-poor habitat resulted in the last-laid eggs being smaller in size; however, there was no effect on shell pigmentation. To our knowledge this is first time that the structural role of egg-shell pigments has been tested experimentally. However, we found no support for this hypothesis.

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## **FEMALE BLUE TIT ORNAMENTATION AND THE TEST OF THE MALE DIFFERENTIAL ALLOCATION**

Presented by **Katharina Mahr**

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Differential allocation hypothesis (DAH) predicts that individuals will invest in parental care to the offspring of the current reproduction according to their own and their current mate's quality. This applies to females in most cases, but also to males at least in cases in which female quality is crucial for offspring survival and the male's parental investment is high. Male differential allocation may at least partly explain why females of several species are ornamented. However, male differential allocation has rarely been tested, with a discrepancy of the results. We conducted a field experiment to test whether male blue tits (*Parus caeruleus*) allocate their parental effort in relation to female ornament (ultraviolet colorations on the crown), as predicted by the DAH. We reduced the UV reflectance in a sample of females and compared the parental care of their males with the paternal care of males paired to sham-manipulated control females. We found significant interaction effects between treatment and original female UV colouration. In particular, stronger was the reduction in the female UV ornamentation smaller was the male contribution to parental care. To our knowledge, this is one of the first studies that provide support for male differential allocation in response to female ornamentation.

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## WHY FEEDING FREQUENCY IS NOT A RELIABLE MEASURE OF THE QUALITY OF PARENTAL CARE IN BIRDS

Presented by **Raivo Mänd**

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Feeding frequency is often used as a practical measure of the quality of parental care in birds. However, our studies with wild great tits and pied flycatchers in a heterogeneous woodland area in Estonia revealed that the offspring that were fed with higher rates had lower quality (in great tits), or there was no quality difference (in pied flycatchers), compared with the offspring that were fed at lower rates. Further investigation revealed that higher feeding rates often were associated with lower proportions or smaller mean size of high-quality food items among prey delivered to nestlings. These findings confirm that relatively high nestling feeding rates in birds may sometimes reflect the low quality of available food, rather than the quality of parental care or an abundance of food in the environment. Therefore, one should caution the conclusions about the quality of parental care made on the basis of feeding frequency only, without knowing the actual amount and quality of food delivered in each case.

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## THE RESPONSE OF THE GREY HERON (*ARDEA CINEREA*) TO CHANGES IN PREY ABUNDANCE

Presented by **Brygida Manikowska-Ślepowrońska**

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Changes in prey communities (e.g., invasion of a new species) give an opportunity to study the response of predators. Here, we study the response of grey herons (*Ardea cinerea*) breeding in the Gulf of Gdańsk area (Southern Baltic Sea, Poland) to changes in abundance of a newly introduced fish, round goby (*Neogobius melanostomus*). The diet of the grey heron (investigated on the basis of pellet and regurgitated food analyses) differed between 2000–2002 (rapid increase and expansion of the round goby population) and 2008–2009 (population stabilization, decline in fishery catches). The abundance and biomass of the round goby decreased from 95% and >99% in 2000–2002 to 56% and 38% in 2008–2009, respectively. Energy-rich salmonids (mainly the sea trout *Salmo trutta morpha trutta*), not recorded in the diet of grey herons in 2000–2002, was an important component of the diet in 2008–2009, comprising 42% of biomass. The abundance of small-sized fish (mainly the three-spined stickleback *Gasterosteus aculeatus*) was significantly higher in 2008–2009 (37%) than in 2000–2002 (9%). This suggests that in 2008–2009, grey herons adapted to the lower availability of the round goby by prey switching to other available fish species — abundant but small-sized three-spined sticklebacks and less abundant but more profitable salmonids. Comparison of fish and mammal composition suggests that in 2008–2009, grey herons exploited more diverse foraging areas (dry habitats, woods, garden ponds) than in 2000–2002.

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## IMPACT OF HIGH SHORELINE VEGETATION ON THE QUALITY OF COASTAL MEADOWS FOR BREEDING WADERS

Presented by **Rutt Männaste**

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Boreal Baltic coastal meadows are among the most threatened habitats in Europe, most valuable, e.g., as breeding sites for the Southern Dunlin (*Calidris alpina schinzii*), Ruff (*Philomachus pugnax*) and Black-tailed Godwit (*Limosa limosa*). Among the expert suggestions for restoration and management of this habitat, removal of reed and other high vegetation from the shoreline is widely recommended. It is argued that reed beds along the shoreline make an area less attractive for breeding waders with regard to feeding and predation, but there has not been substantial research on the topic. In this study, we explore the impact of different states of high vegetation along the shoreline on breeding waders.

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## ACUTE GLUCOCORTICOID ADMINISTRATION SUPPRESSES FEATHER GROWTH IN GREENFINCHES

Presented by **Marju Männiste**

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Elevation of glucocorticoid (GC) hormone levels is an integral part of stress response (as well as its termination) and immunomodulation. These hormones are also responsible for mobilizing energy stores by stimulation of gluconeogenesis and inhibition of protein synthesis. Elevation of glucocorticoids is thus incompatible with other protein-demanding processes like moult. Previous studies have shown that chronic elevation of GC hormones suppresses feather growth. Here, we asked whether a similar effect also occurs in the case of acute GC elevation, mimicking an effect of a single episode of stress. We also asked whether such a potential somatic cost is of comparable magnitude to that induced by immune activation and if dietary supplementation of carotenoids alleviates these effects. We performed an experiment on captive wild-caught greenfinches (*Carduelis chloris*) injecting carotenoid-supplemented and un-supplemented birds with either phytohaemagglutinin (PHA) or dexamethasone (DEX) in a factorial design. To assess the possible somatic impacts of these manipulations, we removed one of the outermost tail feathers before the experiment and measured the mass of the replacement feather grown in captivity. Immunostimulation by PHA and carotenoid supplementation did not affect feather growth. Single injection of a synthetic GC hormone DEX (1 mg/kg, a dose set to mimic natural stress response) significantly suppressed the growth of replacement feathers. This suggests that a single encounter with an acute stressor can induce long-term somatic costs with a potential impact on fitness.

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## TERRITORY CHARACTERS AFFECTING THE TERRITORY CHOICE AND BREEDING SUCCESS OF THE PIED FLYCATCHER

Presented by **Elina Mäntylä**

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Even though the pied flycatcher (*Ficedula hypoleuca*) is one of the most studied bird species it is not yet known what kind of territories they prefer and in what kind of territories their breeding success is best. We tried to answer these questions with our experiment. We had nest-boxes in two different types of forests in south-western Finland. The lush forest was dominated by oaks and other deciduous trees. The more barren forest had pine as the main tree species with spruces and birches also common. The forests were only ca. 20 km distance from each other. We had established 27 and 29 territories, respectively, for the pied flycatchers in those forests by placing nest-boxes before the arrival of these migratory birds. From the surroundings of the nest-boxes we calculated several factors of both the characteristics of the forest and abundance of arthropods. We defined the forest type, measured the volume of wood, estimated the amount of bushes and counted the number of deciduous trees. We counted different arthropods from the air, ground and trees. In the oak forest, we examined the territory choice of the females and in the pine forest that of the males. In both forests we observed the breeding success. We analysed the data with model selection method (AICc) and here are some preliminary results. Males chose first territories which had more ground-dwelling arthropods, and deciduous trees. Females preferred open territories with more flying insects and ants. The earliest laying dates were on open territories with more flying insects and leaf defoliators. Most eggs were on territories with most food, i.e., any kind of arthropods. Nestlings were in best condition at open territories and also the amount of flying insects was important. Territories which had plenty of ants, but not that much other ground-dwelling arthropods, had more fledglings. In summary, we can say that plenty of food seems to be the most important character of the best pied flycatcher territories.

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## ANNUAL CHANGES IN PTILOCHRONOLOGY SUGGEST BREEDING ORIGINS OF WINTERING BLUETHROATS

Presented by **Mikhail Markovets**

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We studied wintering ecology of bluethroats (*Luscinia svecica*) during 2003—2007 in Eilat, Israel (29.33N, 34.57E). We used ptilochronology to evaluate the relative annual differences in growth bar width, i.e., their nutritional condition. In 2003, migrants showed no significant difference between sex and age groups. During autumn passage, the mean daily growth rate significantly declined with date — later birds had increasingly narrower growth bars ( $rS=-0.238$ ;  $p=0.0002$ ). A possible reason is that birds that suffered from reduced nutrition when growing their rectrices in the summer, migrate at the end of the passage season. During the four study years, the mean daily feather growth rate varied significantly in wintering bluethroats ( $F_{3,75}=17,09$ ;  $p<0.001$ ). Moreover, it varied in the same individuals recaptured in different winters. We hypothesise that feather growth rate is related to weather parameters in the moulting (breeding) areas in bluethroats. We found a significant positive relationship between feather growth rate and mean temperature in May in the Russian plain and NW Kazakhstan (12 sites). This region is within the breeding range of two subspecies of the bluethroat (*L. s. volgae*, *L. s. pallidogularis*) that are known to winter in Eilat.

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## TOWARDS TO THE EAST-EUROPEAN AND SIBERIAN CHIFFCHAFFS (*PHYLLOSCOPUS COLLYBITA ABIETINUS* — *PH.(C.) TRISTIS*): GEOGRAPHICAL DISTRIBUTION, PHENOMENON OF MIXED SINGING AND NEW EVIDENCES OF HYBRIDISATION IN EUROPE?

Presented by **Irina Marova**

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The zone of sympatry between Siberian (*tristis*) and East-European (*abietinus*) Chiffchaffs extends for over 1500 km from Southern Ural to Archangelsk region of Russia. Two Chiffchaff forms have some morphological differences and their songs are clearly different. In the sympatry zone many birds with the mixed song and “bilingual” are known. The hybridization between *tristis* and *abietinus* in the Southern Ural was proved recently (Marova et al. 2009). In this study we confirm the presence of hybridization in Archangelsk region — the most northwestern part of the zone of sympatry. Only 19 males had the same phenotype and haplotype, and by 29 males the mismatch between phenotype and haplotype was found. We compared the level of hybridization and distribution of males with different phenotypes, dialects and haplotypes in Arkhangelsk region and in the most south-eastern (Southern Ural) area of sympatry zone. In the Southern Ural we found clear border in distribution of Siberian Chiffchaffs phenotype. This border coincides with a mountain ridge Zilmerdak and match with border of mixed deciduous and coniferous forests. Over 60% of birds with *abietinus* phenotype inhabit territory to the west of this ridge. We suppose that this ecological boundary prevent further distribution of *tristis* to the west in this region. On the contrary such border of phenotype distribution was not found in Arkhangelsk region. Chiffchaffs with different phenotypes were distributed equally throughout the area (Komarava, Shipilina, 2010). Distribution of vocal indexes corresponds to distribution of phenotypes in the whole studied area of hybridization.

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## **THE USE OF RADAR TO ESTIMATE THE POTENTIAL IMPACT OF WIND TURBINES ON BIRD MIGRATION IN THE MOUNTAINOUS AREAS OF SWITZERLAND**

Presented by **Valère Martin**

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For years, wind farms have been implemented along the windy coastlines and more and more also offshore. With the increased political and economical stimulation of wind power, various providers have started to explore potential sites for wind farms in the mountainous areas of Switzerland. Best winds are expected either along high ridges or on mountain passes. Unfortunately, migratory birds are channelled and concentrated within topographical structures in a similar way as the winds. In these mountainous areas migratory birds do not have the same freedom of overflying or circumventing wind turbines as it might be the case for many wind farms in the flat areas along the coasts. Recently, dozens of projects were launched in Switzerland to construct wind farms also at sites of important bird migration concentrations. In order to assess impacts on birds, data about the temporal and spatial pattern of bird migration are needed. Based on two examples, we demonstrate how radar measurements can provide the information needed to quantify the potential collision risk for diurnal and nocturnal migrants. At two different locations selected for wind farm projects in Switzerland, the autumn migration period in 2010 was simultaneously investigated by means of “fixbeam” radars. Migration traffic rates were calculated for the relevant height intervals and time periods. The importance of those sites for bird migration is assessed and the theoretical background of fixed-beam radar with methodological advantages and drawbacks are discussed.

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## UNDERSTANDING AVIAN COLLISIONS: A BIRDS' EYE VIEW

Presented by **Graham Martin**

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Collisions of flying birds with prominent structures which intrude into the open airspace (power lines, fences, communication masts, wind turbines and buildings) are relatively common and can occur under conditions of both high and low visibility. A human view of the problems posed by these obstacles is generally unhelpful since birds live in quite different visual worlds to ourselves. Furthermore, each bird species has only a restricted range of flight speeds that can be used to adjust their rate of gain of visual information as the sensory challenges of the environment increase; they cannot readily slow down just because visibility decreases. In flight, many bird species turn their heads to look down, either with the binocular field or with the lateral part of an eye's visual field. This results in certain species being at least temporarily blind in the direction of travel. Even if birds are looking ahead, they may fail to see an obstacle since they may not predict obstructions; perceptually they have no "prior" for human artefacts such as buildings, power wires or wind turbines. Furthermore, frontal vision may not be high resolution vision and birds probably employ lateral, not frontal, vision for the detection of conspecifics, foraging opportunities and predators. It is argued that to reduce collisions with known hazards, something placed upon the ground may be more important than something placed on the obstacle itself. Foraging patches, conspecific models or alerting sounds placed a suitable distance from the hazard may be an effective way of reducing collisions in certain locations. However, there is unlikely to be a single effective way to reduce collisions for multiple species at any one site.

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## **THE SOONER IN AFRICA, THE BETTER IN EUROPE. LINKING MALARIA, MOULT SPEED AND REPRODUCTIVE SUCCESS IN A MIGRATORY BIRD**

Presented by **Alfonso Marzal**

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Annual periodicity provokes seasonal changes in environmental conditions of temperate areas to which animals must adapt in order to reproduce and survive. Migration is a response to such environmental hazards in search of mild ecological conditions like warmer temperatures and more food availability. In consequence, migratory individuals spend different periods of their annual cycle in widely separated and ecologically disparate locations. Since feathers are constantly exposed to degrading agents, birds should replace them regularly. Moulting has energetic and aerodynamic implications because during this process individuals have a reduction in thermoregulation and flight performance. In addition, migratory birds arriving earlier to breeding quarters can boost their reproductive success. Therefore, a fast moult could reduce this unfavourable period and increase the reproductive success. Here, we analyzed if malaria infection affected the speed of moult in their African wintering quarters and if these effects have long term consequences in breeding success in Europe. We showed that infected house martins moulted their rectrix feathers significantly slower than uninfected ones, arrived later to their breeding quarters and had lower reproductive success. Moreover, prevalence of infection and moult speed significantly predicted reproductive success. These findings show that events and conditions (e.g., malaria infection) in one part of the world affect population in another, which may have important consequences for the ecology and evolution of migratory birds.

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## IDENTIFICATION OF PUTATIVE WINTERING AREAS AND ECOLOGICAL DETERMINANTS OF POPULATION DYNAMICS OF THE COMMON HOUSE MARTIN (*DELICHON URBICUM*) AND THE COMMON SWIFT (*APUS APUS*) BREEDING IN NORTHERN ITALY

Presented by **Dario Massimino**

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The identification of the causes of population decline in migratory birds implies assessing the relative influence of environmental changes in the breeding and wintering grounds on population dynamics. This is problematic when the wintering areas of specific populations are unknown. Here, we first identified the putative wintering areas of Common House Martin (*Delichon urbicum*) and Common Swift (*Apus apus*) populations breeding in Northern Italy as those areas, within the wintering ranges of these species, where winter Normalized Difference Vegetation Index (NDVI) best predicted annual variation in population indices observed in the breeding grounds. We controlled for the potentially confounding effect of rainfall in the breeding grounds during the previous year, that may affect reproductive success, the North Atlantic Oscillation index, that may account for climatic conditions faced by birds during migration, and the linear and squared term of year, that accounted for non-linear population trends. The areas so identified ranged from Guinea to Nigeria for the Common House Martin, and were located in southern Ghana for the Common Swift. We then regressed annual population indices on mean NDVI values in the putative wintering areas and on the other variables, and used Bayesian Model Averaging and Hierarchical Partitioning of variance to assess their relative contribution to population dynamics. We re-ran all the analyses using NDVI values at different spatial scales, and consistently found that Common House Martin was mainly affected by spring rainfall and NDVI while Common Swift was mainly affected by NDVI variation in the wintering grounds. Although these results should be further validated, currently they are the only hypotheses on the wintering grounds of Italian populations of these species, as no Common House Martin or Common Swift ringed in Italy has ever been recovered or recaptured in their wintering ranges.

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## THE FLEXIBILITY OF NEST-SITE SELECTION AND WAYS TO FASTEN NESTS AS AN ADAPTATION TO VARIABLE ENVIRONMENTAL CONDITIONS IN SYLVIA WARBLERS

Presented by **Maria Matantseva**

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Breeding success is considerably determined by breeding site selection. Such a selection is performed at three levels: habitat, territory, and nesting site, with the latter including selection of a substrate (e.g., a plant) and its part as a support for the future nest (e.g., a branch). Usually environmental conditions vary in different parts of a vast species range. For instance, habitat structure may differ at the central and periphery parts of it. We studied nest-site selection in widely distributed *Sylvia* warblers (the blackcap *Sylvia atricapilla*, the garden warbler *S. borin*, the whitethroat *S. communis*, and the lesser whitethroat *S. curruca*) at the central (the Courish Spit of the Baltic Sea) and the northern periphery (Karelia, Russia) parts of their ranges. In presence of the most convenient substrates birds selected them at both locations. The way of nest fastening was stereotyped in such cases. However, under high population density and/or shortage of the most suitable nesting places, birds could expand the spectrum of substrates. Diversity of substrates and lack of possibility to use “typical” ways to fasten nests on uncommon substrates led birds to do it in different, sometimes “atypical” ways. The key prerequisite for the substrate choice was an arrangement of branches (twigs, stems, etc.) allowing reliable fastening and masking of a nest. We could infer that *Sylvia* warblers were rather flexible in their behaviour relating to nest-site selection and nest fastening ways. That allowed them to breed under conditions strongly variable in time and space. Described flexibility in *Sylvia* warblers’ habitat selection and breeding behaviour together with the flexibility in territorial behaviour previously discussed let birds face various conditions, including dramatic changes in environment due to human activity, and adapt to them in a fast and effective manner.

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## TIMING OF BREEDING AND BREEDING SUCCESS IN RELATION TO MICROHABITAT PHENOLOGY IN GREAT TITS

Presented by **Jana Matrková**

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Phenological mismatch may have a considerable effect on bird performance. The potential demographic consequences of shifts in resource availability due to global climatic change have been widely discussed. In this study, we examined this issue on a finer scale: at a territory level. In great tits, breeding success is to a great extent determined by the ability of parents to match the period of highest nestling food demand to a relatively short period of peak caterpillar abundance. The peak caterpillar abundance is strongly dependent on timing of bud burst. The study was conducted in a deciduous forest with variable composition of tree species with different phenology, resulting in high microhabitat variability in food availability. We assessed the phenological stage of individual territory by monitoring bud burst timing, and compared it to the timing of breeding in the territory. Then we related the degree of phenological mismatch to breeding success. In this contribution, we aim to address the following questions: To what extent is the timing of breeding related to phenology at the territory level? What are the consequences of phenological mismatch on breeding performance? This study will provide an answer to the question of fine-scale timing of breeding in a heterogeneous habitat in a small songbird and its consequences for breeding performance.

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## REVIEW OF THE MUTE SWAN MIGRATION AND ECOLOGICAL STUDIES IN RIGA (LATVIA), 1988—2011

Presented by **Ruslans Matrozis**

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From 1988 to 2003, monitoring of wintering Mute Swans (*Cygnus olor*), ringing and recovery of swans was carried out in the environs of Riga (400 km<sup>2</sup>), but from the beginning of 2004, these activities have been continued during the whole year. A total of ca. 1900 swans were ringed and generated ca. 29 000 recoveries (from 1 to 400 recoveries for 1545 swans), using a “one day in one place recovery” method. In Riga, 114 swans were observed that had been ringed in other countries, and 27, which had been ringed in Latvia outside the study area. The collected material gives various information on Mute Swan movements, ecology, migration and other life cycle events, such as long-distance migration during the winter months (1988—2010, 20 recoveries, from 104 km to 874 km), regular changes of wintering places in different winter seasons, the phenology of spring migration in the study area (2004—2010, from March 2 to March 24, on average on March 13), the dynamics of breeding and wintering swans. This information reveals the population structure of this species (2006—2009, on average): 53% males and 47% females; 17% 1<sup>st</sup>-year birds, 11% 2<sup>nd</sup>-year, and 72% of older birds; 74% single birds, 18% paired, and only 8% breeding birds. Very interesting information on changes of breeding partners became available. It was also possible to gather information on longevity in this species. From all ringed swans, which had been observed in the study area, including those which were ringed in other places, only 30.3% were recovered at least 3 years after ringing; 97% of them (n=349) were observed after 8 years, and only 3% (n=11) reported later. The longest time periods between ringing and last recovery were 10, 12 and 15 years. Information on 101 swans found dead (about 19% of all ringed individuals) was collected during the study.

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## ISLAND LIFE AND IMMUNE FUNCTION: COMBINING EXPERIMENTAL AND COMPARATIVE APPROACHES TO GAIN NEW INSIGHTS INTO IMMUNE EVOLUTION

Presented by **Kevin Matson**

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Continents and isolated islands may present their avian residents with different disease-related selection pressures. Thus, these birds and their immune systems may follow different evolutionary trajectories. We compared continental and island populations of Eastern bluebirds (*Sialia sialis*) to investigate how island life shapes immune function and how immune function relates to growth and development. To do this, we integrated experimental manipulations into the comparative framework and evaluated the treatment by location interactions. Instead of using typical immune challenges, which ostensibly induce responses and force trade-offs, we manipulated immune function in nestlings through (1) immune enhancement and (2) nest sanitation treatments. We carried out immune enhancement by supplementing nestlings with lysozyme. Lysozyme, an antibacterial protein found in eggs and plasma, hydrolyzes cell-wall peptidoglycan, making Gram+ bacteria particularly susceptible. Immune enhancement was expected to increase defense without increasing costs. On a more limited basis, we also manipulated rearing environment, with a focus on nest sanitation, by cleaning nest boxes. Research on domestic poultry shows that improved animal housing sanitation results in increased chick growth. Improved nest sanitation was expected to minimize the energetic costs of the low-grade and systemic inflammation caused by the antigenic milieu. We collected and analyzed plasma samples to establish the degree to which our treatments impacted immune indices; we recorded body and feather measurements to determine the effects of treatments on nestling growth and development; and we quantified feeding rates to identify any changes in parental behavior in response to nestling condition. Preliminary results are mixed in terms of how our treatments affected nestling immunity, growth and development. The results highlight some challenges associated with immunological studies of altricial chicks.

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## **BIRDS ON THE MOVE: CAN WE INFER DISPERSAL AT LARGER SCALES FROM LOCAL MOVEMENT DATA?**

Presented by **Erik Matthysen**

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Information on dispersal is often biased towards short-distance movements, largely due to methodological constraints. Nevertheless, dispersal at small scales is not necessarily driven by the same factors at larger scales. In addition, different steps involved in the dispersal process (leaving—transfer—settling) are likely to be influenced by different factors. In this talk, I will review different approaches to study dispersal and discuss to what extent they can be extrapolated to larger-distance movements. On one hand there is the statistical, pattern-based approach where dispersal data are fit to a distribution and then extrapolated to larger scales. A different, process-oriented approach is to study mechanisms underlying dispersal movements, and using behavioural movement models to extend these to larger scales. The presentation will address a number of questions such as: to what extent are small-scale dispersal data biased, and if so, how can we possibly correct for them? What is the evidence for dispersal as a “special” behaviour, and what causes its variation? And what is the role of individual variation in dispersal behaviour? I will illustrate these questions with data on our own work and that of others, primarily on forest birds, and with particular attention to the influence of landscape connectivity on dispersal.

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## SPATIO-TEMPORAL COLLISION RISK AND AVOIDANCE IN WHITE-TAILED EAGLES

Presented by **Roel May**

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Energy from renewable sources has become increasingly important as part of energy policies worldwide. Energy and environmental management authorities, and the energy industry, have stressed the need for additional knowledge about environmental impacts of wind turbines. Impacts may be due to direct collision mortality caused by wind turbines, which in turn may be mediated by avoidance behaviour. Since 2005, 38 white-tailed eagles (*Haliaeetus albicilla*) have collided with wind turbines at the Smøla onshore wind-power plant in central Norway. Here we aim to elucidate the extent of collision risk and avoidance in eagles on Smøla. Based on vantage point data the expected collision risk, and associated correction factor, was estimated using the so-called Band-model. Although this factor often is thought to be related to displacement and avoidance; we have shown that this is not the case on Smøla. As this model does not yet include effects of avoidance, we further assessed avoidance behaviour in white-tailed eagles using both GPS and radar data. Probability of avoidance as a function of distance from wind turbines was assessed using discrete choice models based on eagle movements from avian radar employed within the wind-power plant. Although the proximity to wind turbines mediated eagle movements, the avoidance rates of single wind turbines were limited compared to earlier published rates. We therefore propose a method which makes use of the data delivered by the birds themselves, through the use of three-dimensional GPS satellite telemetry data from 27 sub-adult eagles equipped with backpack transmitters. We constructed a statistical simulation model using Brownian bridge methodology for estimating collision risk rates. Eagles showed clear seasonal and spatial patterns in collision risk rates. Our results may provide industry and management authorities with new tools for assessing the extent of collision risks of wind energy structures.

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## **NEST CONSTRUCTION COSTS AND CLUTCH SIZE IN THE PIED FLYCATCHER (*FICEDULA HYPOLEUCA*) — PRELIMINARY DATA**

Presented by **Tomasz Mazgajski**

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The phase of nest building is usually neglected in the analysis of reproduction costs in birds. However, if the female is the main or only nest builder, the investment she makes at this nesting stage may affect her reproductive performance at later stages. Here, the effects of nest construction costs were followed at egg laying in the Pied Flycatcher, a species in which nests are almost exclusively built by females. Females which invest more in nest building were expected to lay fewer eggs. The investment in nest construction was assessed with nest mass measured shortly after fledging of young. Contrary to expectations, nest mass positively correlated with clutch size. This result suggests that in the Pied Flycatcher, nest size, similarly to egg colour, may be used as a signal of female quality.

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## **DOES DARKNESS LIMIT HOLE SELECTION BY GREAT TITS (*PARUS MAJOR*)?**

Presented by **Marta Maziarz**

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The main cause of nest loss and mortality of forest birds is predation, and predation avoidance constitutes a major factor shaping their nest site selection. Nesting in holes was found to be an effective anti-predator solution. However, using holes requires from birds abilities to cope with problems non-existent in open nests, such as low light intensity. There is probably a trade-off between predation risk and light conditions. Breeding far from the entrance in holes with small openings, would protect adults and their broods against larger predators, but could create problems with seeing and feeding nestlings due to insufficient illumination. We explore this idea observing Great Tits breeding in a primeval forest (Białowieża National Park, Poland). We check how light intensities in Great Tits' nests correspond to depths and entrance sizes of their holes. To the best of our knowledge, these are the first measurements of light intensity in tree holes ever made.

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## BIRDS NESTING ON ELECTRICITY POLES: WHY IT OCCURS AND WHAT CAN BE DONE

Presented by **Guillam McIvor**

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Power cuts caused by nests of hooded crows (*Corvus cornix*) on electricity poles cost the power company in northern Scotland over £250 000 annually. With nesting possible on any of several thousand poles, establishing which factors predict the particular poles chosen by nesting birds would allow effective management of this problem (i.e., a solution that does not mean killing the crows). We compared sites where crows built nests on power poles with “control” sites without crow nests, to determine which of a range of features lead to pole nesting. Nests on poles were more likely at sites of high human habitation and where ravens (*Corvus corax*), a potential nest predator, were relatively uncommon, but food availability had no effect. Control sites contained more alternative nest sites than did sites with pole nests, being both closer to cliffs and having a greater density of trees. Trees within control sites were higher and were likely to be coniferous than were those at pole-nest sites, and contained more nests accordingly. We also tested the effectiveness of an apparent nest-building deterrent, the firefly diverter. Fireflies did not deter rebuilding, but date of removal and stage of nest construction did, with rebuilding being less likely the later nests were removed, and nests removed mid-construction being more likely to be rebuilt than those removed when building had only just started, or was nearly finished/complete. We suggest that power cuts caused by crow nests on power poles are more effectively reduced by appropriately timing nest removal and, perhaps, better managed by insulation of live wires than by the installation of deterrents.

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## GEOLOCATORS AND STABLE-HYDROGEN ISOTOPE ANALYSIS REVEAL THE INFLUENCE OF REPRODUCTIVE SUCCESS AND MOULT ON AUTUMN MIGRATION STRATEGY IN A SONGBIRD

Presented by **Emily A. McKinnon**

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High reproductive success may force long-distance migratory songbirds to overlap post-breeding moult and autumn migration, which could delay or slow autumn migration. These life history trade-offs can be studied for the first time using miniature light-level geolocators combined with stable-hydrogen isotope analysis of feathers. Our previous work on Wood Thrushes (*Hylocichla mustelina*) illustrated that high reproductive success delays moult and in this study we examine (1) The influence of reproductive success on moult location (at breeding site or further south) and (2) The relationship between moult-migration and autumn migration strategy (speed, stopover duration, migration distance and winter arrival). Reproductive success was obtained in a north-eastern USA population and birds were subsequently tracked with geolocators. We also obtained geolocator data from Wood Thrush wintering in Belize and Costa Rica. From each Wood Thrush, we sampled feathers spanning the moult sequence (primary, secondary, tertial, and retrix). Ratios of stable-hydrogen isotopes in feathers from early to late in the moult sequence were analyzed to determine, using a probability assignment method, the latitude where each feather was moulted. Initial results indicate that >15% of birds with high reproductive success moulted at least some feathers south of the breeding grounds, compared to <5% of birds with low reproductive success. We predict that females, and birds breeding at more northern latitudes, will be more likely to exhibit molt-migration overlap and prolonged autumn stopovers.

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## TIMING OF PROSPECTING ON NESTING OPPORTUNITIES

Presented by **Christoph Meier**

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Informed dispersal should be favored over unconditional dispersal since it might minimize the cost of failure at the individual level. For migratory birds, collecting information might be time constrained because successful breeding already requires a lot of time. Most time for prospecting might be left after the breeding season. Indeed, evidence suggests that birds gather information at this time of the season to base on it their dispersal decision in the next year. However, late in the season, information will be less available. Offspring which could indicate the success of conspecifics have fledged already, the environment resembles less the conditions at the breeding season, and juveniles have lost already the guidance of the parents to explore the environment. I conducted a field experiment to pin point the timing of prospecting in the Collared Flycatcher and to study how information might influence the dispersal decision of the birds in the following year. These birds are obligatory hole-breeders and thus likely to rely on the information on available nest-holes and should thus also prospect on this information. I manipulated the density of available artificial nest-holes in 18 wood lots starting at different stages during the breeding season: (1) when feeding started, (2) when fledging started, and compare this with wood lots where no special information on whole density was provided. My main hypothesis is that birds which did not find enough holes while prospecting increased their dispersal distance and dispersal rate, and that males returned earlier from their winter quarter due to their expectation of more intensive competition on the limited box. My analysis may also show if there are differences in the timing of prospecting between age classes and sexes. I will discuss how the timing of prospecting also has implications for the schedule of migration and how it improves our insight in the decisions involved in natal and breeding dispersal.

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## DOES HATCHING DATE AFFECT THE TIMING OF DEPARTURE IN PARTIAL MIGRANTS?

Presented by **Kalle Meller**

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Global warming has been shown to advance the timing of breeding in birds, but the effect of hatching date on the timing of subsequent autumn migration of the young is still largely unknown. We analysed how hatching date affects the timing of migration in seven partial migratory species: four single-brooded birds of prey (Northern Goshawk *Accipiter gentilis*, Eurasian Sparrowhawk *Accipiter nisus*, Tawny Owl *Strix aluco*, Tengmalm's Owl *Aegolius funereus*) and three potentially multi-brooded passerines (Coal Tit *Parus ater*, Blue Tit *Parus caeruleus*, Great Tit *Parus major*). Birds ringed as nestlings and later recovered at the Hanko Bird Observatory, SW Finland, during the following autumn migration were included in the analyses. Early hatching did not lead to early migration in any of these relatively late migrating species, but late hatched birds migrated later in Blue and Coal Tits. The effect was mainly caused by markedly late hatched birds which were presumably from second clutches or renestings. Our results suggest that the length of autumn migration season may increase in the future, at least in multi-brooded species, since global warming advances the beginning of breeding and prolongs breeding season thus improving opportunities for renesting and second clutches.

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## **NESTING CONDITIONS OF THE GREAT SPOTTED WOODPECKER (*DENDROCOPOS MAJOR* L, 1758) IN A SUBURBAN WOODLAND PARK**

Presented by **Evgeny Melnikov**

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Suburban woodland parks are an important part of the urbanized landscape. Exploring park birds' ecology is important for estimating anthropogenic influences and predicting ecosystem changes. The great spotted woodpecker is the most widespread and abundant species of woodpeckers in the suburban woodland park "Kumysnaya polyana" which is to be a protected natural area of the Saratov region. Data were collected in 2010; we found 14 nesting holes of the woodpecker; 7 holes were situated in ravines and 7 on the watershed plateau. Plots of 20 by 20 meters around each nesting hole was used for studying woodpeckers' nesting characteristics. All trees on the plots were divided by diameter and state. The height and orientation of nesting holes were measured. It was shown that the great spotted woodpecker uses nesting trees with diameters not less than 20 cm. The part of trees with diameters more than 20 cm is 48.1% at all ravine sites and 42.2% on the plateau. In ravines, only aspens were used nesting trees; in 5 cases, the trees were in poor condition. English oak, birch, small-leaved lime and aspen were used as nesting trees on plateau. The condition of 3 trees was estimated as weakly damaged. There is no strong difference between the height of holes above the ground in ravines and on the plateau. The holes in ravines are oriented to the South and South-East, and holes on the plateau to the West, South-West and North-West. The proportion of tree species used for nesting is  $15.2 \pm 13.4\%$  in ravines and  $28 \pm 22.7\%$  on the plateau. The ravines of suburban the woodland park are under less anthropogenic influence than the plateau. Thus, our next study will be looking at differences between woodpeckers' habitat use. In particular, the distribution of nests will be studied.

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## TRACKING THE INTERCONTINENTAL MIGRATIONS OF EURASIAN HOBBIES (*FALCO SUBBUTEO*) USING 5 G SATELLITE TRANSMITTERS

Presented by **Bernd Meyburg**

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The Hobby breeds across Europe and Asia and is a long-distance, trans-equatorial migrant. European birds winter in central and southern Africa. For most long-distance migrants, ring-recoveries from Africa are far too few to properly explain the patterns and strategies associated with migration. Very little is known about the Hobby's migration. Only a small number of birds are observed at the well-known bottlenecks. A total of 5720 Hobbies were ringed in ten European countries between 1909 and 1998, of which 203 (3.5%) were subsequently recovered, although none south of the Sahara Desert. We are aware of just two ring-recoveries after 1998 for this falcon south of the Sahara. In 2008—2010, we marked 13 German adult Hobbies with 5 g satellite transmitters. All birds migrated to central and southern Africa and wintered mainly in Angola and Zambia. The flight paths plotted were far apart across much of Africa, the maximum east-west separation being over 2000 km. One contributing factor to the routes chosen by the falcons could be the migration tracks of Barn Swallows, House Martins, Common Swifts and other important prey species. The fastest flight speeds on migration were recorded in spring 2010 in Mali and Morocco where 1243 km were covered in two days. Migration across the Sahara took 4 to 4.5 days on each migration. The African equatorial rainforest appears to be a significant ecological barrier. There, migration was noticeably rapid with distances of up to 580 km flown per day — also partly at night. Migration at night was recorded repeatedly while crossing the Sahara and rainforest areas, but also in the Mediterranean. The first tracked bird covered a total distance of at least 9025 km between identified night roosts during wintering. In 2009, this bird spent half the year in the wintering area, a third on the breeding grounds and the remaining 18% of the time on migration, i.e., 65% of its time in Africa and 35% in Europe.

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## **ON THE BIOLOGY OF THE HONEY BUZZARD (*PERNIS APIVORUS*) — SOME RESULTS REVEALED BY SATELLITE TELEMETRY**

Presented by **Christiane Meyburg**

Christiane Meyburg, Bernd-U. Meyburg, Fridtjof Ziesemer,  
Hans Dieter Martens

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European Honey Buzzards are long distance migrants. Little is known about their migration. Between 2001 and 2010, we fitted nine German adults (six males and three females) with solar powered satellite transmitters (PTTs) weighing 18—22 g. In the last two years, 3 male birds were fitted with GPS transmitters which also transmits data on flight height, speed and direction. A female was caught again after three years and fitted with a new transmitter. A male was also retrapped after two years but the transmitter was not replaced as it was still in good working order. We were able to record up to six complete autumn and spring migration routes of individual birds. For two of the years, both members of a pair could be studied. They migrated separately and wintered far away from each other. All birds migrated to West and Central Africa. Four Honey Buzzards spent the winter in Nigeria and one each in Gabon, Guinea, Cameroon, the Congo and Liberia. Male No. 52033 wintered furthest south (2°22'S, 12°42'E) in Congo (Brazzaville). Of those birds that had been tracked more than once to their winter quarters it could be established that they returned to the same areas. Data on flight height and speed became available for the first time on autumn migration. Male No. 52033 reached its highest flight altitude over the Sahara at 1703 m ASL at a flight speed of 60 km/h. The fastest flight speeds (72 und 76 km/h) were also recorded here. Speeds between 60 and 70 km/h were recorded on seven occasions. The first precise record of a home range in the wintering area, based on more than 100 GPS fixes, was recorded. The home range of male No. 95771 in north-west Cameroon was only 3.1 km<sup>2</sup> in size. The home range size in the breeding area in northern Germany was established for several males, e.g., male No. 95771 had a home range of 17.4 km<sup>2</sup> (MCP 95%) based on 643 GPS fixes.

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## **ANALYSING SURVIVAL WHEN BIRDS LIVE LONGER THAN THEIR RING: A CASE STUDY ON GRIFFON VULTURES IN FRANCE**

Presented by **Jean-Baptiste Mihoub**

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Quantifying survival can be particularly challenging in long-lived birds since they are more likely to lose their marking over time. Nevertheless, the recent development of capture-recapture modelling offers opportunities to handle such issues. We focused on estimating survival in griffon vultures (*Gyps fulvus*) from two populations in southern France (native in the Pyrenees and reintroduced in the Causses) where individuals were marked before fledging with both metal and two types of plastic rings (coloured or coded, used for long distance identification). Because of fight at feeding events, vultures can break and loose both types of rings. All this yields strong heterogeneity in resighting rates. However, thanks to recaptures of adult birds and resighting of metal rings from a hide, ring loss can be estimated for the Causses population. Assuming equal rates of rings loss between populations, resulting ring-loss rates from the Causses can applied to the Pyrenean population. Recoveries of dead birds were available in both populations. Using a mixture of live-recapture and dead-recovery data from long-term monitoring (29 years and 17 years in reintroduced and native populations, respectively), we resorted to a multistates (i.e., alive or dead states) and multi-events (i.e., probabilities of loss and resighting) modelling framework. Loss of plastic rings amounted 15% in colour rings and 8% in coded rings, while metal rings were most persistent, being lost at a rate <1%. Survival rates progressively increased with age, from 66% to end up at  $95\% \pm 0.013$  in adults (>4 year-old) in the Causses without variation in time, except for juveniles that varied with population density. In the Pyrenees, both immatures and adults were high and varied additively with time (means from  $93.4\% \pm 0.14$  in yearling to  $97.65\% \pm 0.02$  in adults).

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## NESTING OF TUFTED DUCK (*AYTHYA FULIGULA*) IN ASSOCIATION WITH LARIDAE

Presented by **Anatoliy Mikhantyev**

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Field research was conducted on Krotovaya Lyaga Lake (southwestern Siberia). *Larus cachinnans* and *Sterna hirundo* sometimes nested on the lake in small colonies. Tufted ducks preferred to nest with *Laridae* because of the protection from egg-predation. Fate was determined for 238 tufted duck nests within common tern colonies, for 185 tufted duck nests within yellow-legged gull colonies, and for 513 tufted duck nests outside colonies. Most duck nest destruction was due to avian egg-predators on the lake. Abandonment by the female was one of the main factors responsible for duck-nest failure in dense nesting within colonies as a result of competition for nest sites. When tufted ducks nested within colonies of *L. cachinnans*, reproductive success was  $1.75 \pm 0.8$  ducklings per breeding attempt, and did not differ significantly from reproductive success ( $1.4 \pm 1.6$ ) outside *Larus* colonies during the same season. Tufted ducks' reproductive success was  $4.8 \pm 0.8$  ducklings per breeding attempt within colonies of *S. hirundo*. It was significantly higher than reproductive success ( $1.8 \pm 1.3$ ) outside *Sterna* colonies during the same season. The reason of such variation lies in complete coincidence in the timing of reproduction of tufted ducks and common terns, and in the lack of such coincidence with the timing of reproduction in yellow-legged gulls. Our study on the association of tufted ducks with terns and gulls indicates that there might be advantages and disadvantages to being near a colony. Nesting of *A. fuligula* in association with *S. hirundo* can be regarded as an adaptive strategy, while in association with *L. cachinnans* as maladaptive.

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## FIRST BREEDING RECORD OF THE LESSER KESTREL (*FALCO NAUMANNI*) IN CROATIA AFTER MORE THAN 40 YEARS

Presented by **Krešimir Mikulić**

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The Lesser Kestrel, a globally endangered species, suffered a dramatic population decline during the second half of the 20th century and went extinct in many countries of Central and Southeast Europe. In Croatia, the last breeding of the Lesser Kestrel was recorded in the 1960ies on the Istrian Peninsula. Since then, only sporadic observations of migrating birds have been made. Recently, in 2008 and 2009, consecutive records of small flocks of Lesser Kestrels at Velebit Mountain pastures indicated a cryptic colony in its vicinity. In 2010, one colony of at least 20 pairs was discovered on the island of Rab. The birds were nesting on the ground under rocks and in limestone block crevices. It can be speculated whether the colony has originated from Southern Italy (Apulia) where the Lesser Kestrel population is increasing or from the southern Balkans (F.Y.R. Macedonia, Greece) where the populations are stable or decreasing. The recent range expansion of the Lesser Kestrel indicates a potential recovery of this endangered species in parts of its distribution area.

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## DIET OF (EUROPEAN) GREAT CORMORANTS (*PHALACROCORAX CARBO SINENSIS*) IN LATVIA

Presented by **Kārlis Millers**

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The first research on Great Cormorant diet in Latvia was carried out in 2009 at four different lakes. Pellets were collected at the costal lake of Kaņieris and at three inland lakes — Rāzna, Ežezers and Rušons. Colonies were attended twice per breeding season. Research on cormorant diet continued also in 2010. According to results from 2009, a total of 797 objects of 19 fish species were analysed. The most common species were Bleak (*Alburnus alburnus*) (n=227), Perch (*Perca fluviatilis*) (n=133) and Eelpout (*Zoarces viviparus*) (n=156). The medium length of fish was 17.4 cm. The longest was Eel (*Anguilla anguilla*) with 62 cm, the shortest the Three-spined Stickleback (*Gasterosteus aculeatus*) with 4 cm. The heaviest fish was Tench (*Tinca tinca*) with 629 g, the lightest the Three-spined Stickleback with 3 g. In general, the main part of cormorant diet consists of Tench: 34.43%. In the Lake of Kaņieris the main part of the diet was Eelpout (37%), at Rāzna Perch (48,38%), and Tench at Ežezers (58,73%) and at Rušons (34,50%). Estimated mass eaten by cormorants during the breeding season in the studied colonies was approx. 50.7 t.

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## FOOD PREDICTABILITY AND PROSPECTION BEHAVIOUR OF GRIFFON VULTURES: FIRST RESULTS FROM GPS TELEMETRY

Presented by **Sophie Monsarrat**

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Scavenger raptors have always provided men with an essential service by eliminating carrions and reducing sanitary risks related to it. In the 20th century, vulture populations declined worldwide in parallel of modifications of pastoral practices and persecutions. In southern France (Grands Causses area), griffon vultures (*Gyps fulvus*) were reintroduced in 1980. As part of this reintroduction, supplementary feeding stations were established and provisioned by carrions collected in nearby farms. These feeding stations induce changes in food predictability and may have an impact on vultures' foraging behaviour. In the wild, where food is both spatially and temporally unpredictable, Griffon vultures use social foraging strategies. In particular, the attraction of feeding conspecifics by local enhancement increases their search efficiency. However, questions about the importance of personal and social cues in the prospection behaviour, i.e. before a carrion is discovered, remain. Three hypotheses prevail: (1) vultures disperse at random with the constraint of topographical features that create ascending currents necessary for soaring flight; (2) vultures use personal knowledge of food availability and visit in priority places with high probability of finding carrions; (3) vultures forage in an actively formed network, being regularly interspersed and keeping observing the behaviour of other flying vultures, in order to aggregate quickly when a carrion is found. The actual situation in the Grands Causses, with its network of feeding stations and randomly distributed carrions, enables us to test these hypotheses of prospection. In June 2010, 42 Griffon vulture were equipped with GPS tags, allowing detailed tracking of foraging routes thanks to a fix interval of <10 min. We present the first results about home ranges, path analysis and the individual and temporal repeatability of foraging trips and their implication in terms of management of food resources using feeding stations.

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## PARALLEL CONSERVATION STRATEGIES OF OSPREY (*PANDION HALIAETUS*) IN THE CENTRAL MEDITERRANEAN BASIN

Presented by **Flavio Monti**

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The osprey (*Pandion haliaetus*) deserves sound conservation measures in the Central Mediterranean area, where this raptor species is present with less than 100 breeding pairs. Two conservation strategies were carried out in recent years. In Corsica, where the species was on the brink of extinction during the 1970s, the implementation of direct management actions such as the creation of the Scandola Marine Protected Area, environmental improvements and strict conservation laws, allowed the population to gradually recolonize several ancient breeding sites. In Central Italy (Tuscany), a reintroduction programme started in 2006. Between 2006 and 2010, 33 young ospreys were translocated from Corsica to the Maremma Regional Park and were released by means of the hacking technique. Here, we present data on post-fledging behaviour of ospreys during the first five years of reintroduction. In 2008 and 2009, home range sizes were 502 ha and 58 ha, respectively. Ospreys showed a high overlap rate (98%) in their home ranges and a marked gregarism during the overall pre-dispersal phase. Dispersal started on average 54 days from the release, when ospreys were about 80—100 days old. In addition, we report details about the first breeding attempts, which appear promising for the future establishment of a self-sustainable population. At present, we are building artificial nests and monitoring networks in the islands of Tuscany Archipelago, to support potential future connections between Corsican and Tuscan populations.

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## **CAN TRANS-SAHARAN MIGRANTS ADAPT TO CLIMATE CHANGE BY WINTERING NORTH OF THE SAHARA?**

Presented by **Michelangelo Morganti**

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As a consequence of the global increase in ambient temperature, migratory birds are exposed to new selection regimes, favouring a shortening of migration distance and an earlier arrival at the breeding grounds. The potential for adjusting to rapidly changing environmental conditions, however, is likely to vary among species: long-distance migrants are expected to have low phenotypic plasticity, because of their rigid, genetically controlled life-cycles. Moreover, in these species the potential for shifting wintering ranges towards breeding ranges is likely to be constrained due to large ecological barriers located between breeding and wintering areas (e.g., Mediterranean Sea and Sahara). To test these predictions, we compiled all published winter observations of 83 species of trans-Saharan migrants in Iberia and Morocco, yielding a total of about 5500 observations. In addition, we analyzed all ringing data available for these species from Spain during winter. Our results show that wintering north of the Sahara is a common phenomenon among trans-Saharan migrants and presently found in almost every species. However, in contrast to non-passerines, most passerines species do not regularly winter in the area. In agreement with the expected adaptive response to climate change, wintering north of the Sahara has significantly increased during the last 30 years, though the increase has been lower for passerines than for non-passerines. Moreover, we could demonstrate a significant northward shift of the median wintering latitude in species that have established wintering populations north of the Sahara. Our results support the idea that for trans-Saharan migrants, wintering north of the Sahara may be an important mechanism for adapting to rapidly changing environmental conditions. Yet, a rigid control of migration, as found in most passerines, may constrain the adjustment of migratory behaviour to environmental changes due to a lack of behavioural flexibility.

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## PRELIMINARY MOLECULAR INVESTIGATION AND CHARACTERIZATION OF SUBSPECIES IN THE STONE CURLEW (*BURHINUS OEDICNEMUS* L.)

Presented by **Alessia Mori**

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The stone curlew *Burhinus oedicnemus* (Linnaeus 1758) is a species of conservation concern in Europe, with an overall declining trend throughout most of its native distribution in this continent. Actually, Europe hosts between a quarter and a half of the global breeding population, which is mainly distributed in Iberia, France, Russia, Turkey and Italy. According to morphological studies, the species is polytypic, with six subspecies. The Mediterranean populations are considered belonging to two forms, namely the nominate subspecies (western populations: Spain, France, continental Italy) and *saharae* (North Africa, Cyprus, Turkey, Greece and smaller Mediterranean islands), although no clear-cut boundary between *saharae* and nominate *oedicnemus* can be identified. While genetics may offer important information for conservation and management plans, up to now no molecular studies have been carried out to delineate subspecies' ranges of the stone curlew. To clarify if the present-day subspecies designations or population boundaries are supported by genetic data, we investigated the levels of molecular differentiation using two gene mtDNA fragments, Cytochrome b and NADH dehydrogenase 2. Sequences from the two genes were analyzed from Italy (Sicily and Taro River Regional Park, PR), Tunisia and Greece (Crete and Rhodes), covering *oedicnemus* and *saharae* subspecies, and from Canary Islands (Fuerteventura and Gran Canaria), *insularum* and *distinctus* subspecies. The mtDNA data did not support current boundary limits neither between the first two above mentioned subspecies, nor between the two Canary Island ones. In contrast, there was more genetic distance among Tunisian samples and all the other studied populations. Surprisingly, Greek and Canary samples versus Italian populations showed less levels of divergences. While preliminary, our data suggest the need of an in depth genetic investigation of the species to shed some light on its complex taxonomy and phylogeography.

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## PLASTICITY IN INCUBATION BEHAVIOUR UNDER EXPERIMENTALLY INCREASED NEST PREDATION RISK

Presented by **Chiara Morosinotto**

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Nest predation is attributed as the main cause of nest failures in many bird species. During incubation, parents can adopt different behavioural strategies to reduce the probability of nest detection. In this study we used an innovative method that allows us to increase the long-term perception of pied flycatchers (*Ficedula hypoleuca*) nest predation risk during incubation phase. We settled control and treatment nest-boxes for breeding pied flycatchers. Treatment boxes appear normal during habitat choice and nest building but a panel is removed during second week of incubation revealing an enlarged, double in size, entrance hole. Control boxes, in contrast, have a small entrance hole both before and after the front panel removal. Three days after the front panel removal, all nests were recorded with a digital camera and incubation behaviours (nest attentiveness, vigilance in box and close to the nest) were scored. Females breeding in treatment boxes prolonged nest attentiveness and increased vigilance when inside nest box in comparison to control nests. In addition both parents reduced the time spent close to the nest (at nest box entrance hole or roof) when breeding in treatment boxes. These results provide experimental evidence of plasticity in antipredator behaviours. Parent flycatchers appeared to perceive increased long-term nest predation risk as a result of our treatment and increased nest attentiveness and vigilance to reduce the probability of nest predation.

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## SEASONAL CHANGES IN TESTOSTERONE AND ITS EFFECTS ON SINGING BEHAVIOUR AND TERRITORIAL AGGRESSION IN THE BLACK REDSTART (*PHOENICURUS OCHRUROS*)

Presented by **Kim Geraldine Mortega**

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In many bird species of temperate zones, singing of males is restricted to the breeding season. Male black redstarts, however, sing and defend territories during autumn as well. Interestingly, their testosterone levels are only elevated during the breeding season. Furthermore, plasma testosterone levels of black redstarts do not increase during territorial conflicts neither in spring nor in autumn. We therefore investigated the seasonal effects of testosterone on spontaneous and territorial singing behaviour both during the breeding season and during autumn. Male black redstarts were implanted either with control pellets or with an androgen receptor blocker and an aromatase inhibitor to block the action of androgens and estrogens. Three and ten days after implantation we recorded spontaneous song and conducted a simulated territorial intrusion by placing a stuffed decoy into the centre of their territories and playing back song. In spring, experimental males show a significant modulation of specific song characteristics as song and pause duration during spontaneous singing and simulated territorial intrusions. In autumn, however, we did not find any differences in the singing behaviour between both groups. Our results imply that direct effects of circulating testosterone on song behaviour are more important during the breeding season. In autumn, however, testosterone may act rather indirectly via estrogen, and originate from nongonadal resources.

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## THE HISTORY AND THE REASONS FOR NEW BIRD SPECIES' SETTLEMENT IN THE SOUTH-EASTERN TAIGA REGION IN WEST SIBERIA

Presented by **Sergey Moskvitin**

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During last 120 years of regular faunistic studies in taiga region of Western Siberia, 24 new species invaded to this region and settled here. 20 species became common breeders. Two sets of active settling were observed with 35—45 years interval. This may indicate a kind of century cycle synchronization. A similar expansion type of settling was observed in 8 species. Here an hypothetical model of exponential growth of birds' number regarding their ecological specificity is proposed. The logistic type of further development is considered in respect to population regulatory mechanisms and individual and group features of the system members. The causes of differences in naturalization between invaders are also examined. The author supposes that it is not correct to explain invasions and non-natural habitat occupation by the adequate reaction of birds to temperature and foraging (etc) conditions. It also cannot be explained by the “historical memory” of the time when these species could inhabit this territory. Such widespread approach shades the relevancy of study of the unique properties of highly organized systems of animals and particularly birds where internal features of the species may play an important role.

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## SELECTING BIRD SPECIES OF SPECIAL CONCERN IN A NATIONAL PARK

Presented by **Esther Mostert**

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South African National Parks (SANParks) manages 20 national parks, comprising about 3% of South Africa's total area. One component of their Biodiversity Monitoring Programme deals with Species of Special Concern. This programme encompasses all taxa, not only birds, which is the focus of this presentation. Our objective is to devise a method to identify and prioritise bird species of special concern for monitoring and conservation action within each SANPark. The approach has broader application across protected areas, different taxa and globally. We used Multi-Criteria Decision Analysis (MCDA), a discipline which supports decision makers who have to consider a number of criteria simultaneously. Within MCDA, we used the "value-function approach". This method supports the mapping of non-linear preference functions. This is unlike most evaluation methods which assume linearity of these functions - an assumption which research has shown is often ill founded. These "value functions" were developed by consensus in a facilitated workshop. The workshop selected four criteria to prioritise bird Species of Special Concern for SANParks: (1) IUCN threat status, from the Red Data Book. (2) Core range, defined as the proportion of grid cells within the park in which the species occurred at reporting rates above the median reporting rate for the species, determined from Southern African Bird Atlas Project (SABAP) data. This measures whether the park supports viable populations of the species. (3) Endemism and range restriction within South Africa, defined as the number of grid cells within South Africa in which the species occurred at substantial reporting rates. Species with restricted ranges were weighted higher than species with larger ranges. (4) Taxonomic value, defined in terms of the numbers of species in an order, family and genus. Non-linear value functions were developed for each criterion, and these were weighted and summed to produce a final score for each species.

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## STRESS ASSOCIATED WITH HABITAT QUALITY AND GROUP LIVING IN RAVENS

Presented by **Thomas Mueller**

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Many long-lived avian species adopt life strategies that involve a gregarious way of life at juvenile and sub-adult stages and territoriality during adulthood. However, the potential associated costs of these life styles, such as stress, are poorly understood. Likewise the effects of habitat quality on stress are not well understood. We examined the effects of group living, habitat quality, sex, and parasite load on the baseline concentration of faecal stress hormone (corticosterone) metabolites in a wild population of common ravens (*Corvus corax*). Corticosterone concentrations were significantly higher in non-breeding gregarious ravens than in territorial adults. Among territorial birds, males showed higher stress levels than their mates. We did not find any affect of habitat quality on hormone levels. Our results suggest a key role of the social context in the stress profiles of the two population fractions, and that group living may be more energetically demanding than maintaining a territory. These findings have implications for understanding hormonal mechanisms under different life styles and may inspire further research on the link between hormone levels and selective pressures modulating gregarious and territorial strategies in long-lived birds.

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## **DOES MOTHER REALLY KNOW BEST? WHY ARE YOLK HORMONE CONCENTRATIONS SO VARIABLE WITHIN AND BETWEEN AVIAN SPECIES**

Presented by **Martina Muller**

Martina Muller, Ton Groothuis

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Two decades ago, avian egg yolks were discovered to contain substantial amounts of maternal androgens. Since then, many studies have described variation in these concentrations at three levels: among species, among clutches of the same species, and within clutches of the same species. At the first level, several comparative studies have found interesting correlations between average clutch yolk hormone concentrations and various life-history traits, although interpreting the results has some difficulties. Moreover, several studies at the second level have shown that avian mothers adjust yolk hormone contents in response to current breeding conditions such as food availability or colony density, suggesting that using species averages may be somewhat unreliable. It is often suggested that this within-species variation at the clutch level may set the optimal developmental trajectories for offspring in preparation for a particular rearing environment, but more evidence is needed here. Moreover, at the third level, yolk hormones have been shown to vary systematically across laying sequence in many species but in different patterns. This has motivated the hypothesis that within-clutch variation acts to compensate or enhance the competitive asymmetries among siblings caused by hatching asynchrony. This hypothesis seems to be generally accepted but its support is currently not fully convincing. We will critically discuss the support from the literature for the main adaptive explanations for variation in yolk hormone concentrations on these three levels and suggest avenues for further research.

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## **FAUNA AND BIRD POPULATION OF NATURAL AND ANTHROPOGENIC LANDSCAPES IN THE NORTHEAST OF THE EUROPEAN TUNDRA**

Presented by **Gleb Nakul**

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In this report that is based on data on abundance and distribution of more than 130 bird species collected in the European North-East of Russia and from literature sources. Field observations were carried out in the Bolshezemelskaya and in the East of Malozemelskaya tundra from 1988 to 2010. About 60 habitats were investigated following water routes (1127 km) and on foot (300 km). The analysis of the main changes in fauna and bird communities of the Northeast region in connection with various forms of human activities were performed differently. The degree of the habitat destruction and the trouble factors are connected with the process of urbanization and in also with the exploitation of oil and gas fields. Passeriformes and Charadriiformes, and less Anseriformes and Falconiformes, dominated in natural landscapes. The number of other orders was insignificant. A decline of the species diversity was noticed with an increase of anthropogenic activities (from natural to urban). Reduction of the species density of arctic (on average from 60% to 3%) and Siberian (from 39% to 5%) regions are observed, whereas the number widespread species are increasing (from 12 to 55). Observations showed that current biodiversity and avifauna changes at the Eastern European tundra are defined by geographic location and associated with climate change and anthropogenic impact on natural dynamics.

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## SEASONAL DYNAMICS OF REPRODUCTIVE STRATEGIES AND DISEASE IN TROPICAL GRASSLAND BIRDS LIVING IN HABITATS THREATENED BY LAND USE CHANGE

Presented by **Henry Ndithia**

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Reproduction is a component of life-history strategies in birds. Reproduction is regulated by different environmental conditions that influence the physiological adaptations of birds. We seek to understand the causes and consequences of variation in reproductive strategies of tropical birds and their consequences for population dynamics. This knowledge is essential for nature conservation, with alterations in land use, global climate change, associated changes in food availability and nesting sites in addition to emerging diseases.

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## SECONDARY CONTACT ZONE OF LARGE WHITE-HEADED GULLS IN EUROPEAN RUSSIA

Presented by **Grzegorz Neubauer**

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Large white headed gulls constitute a well-diversified group of taxa, in which hybridization is relatively frequent compared to other waterbirds. Their recent origin and interspecific gene flow after speciation are most likely the factors responsible for weak genetic differentiation compared to clear-cut phenotypic differences between taxa. The eastern part of European lowlands has recently been colonized by few large gull taxa, expanding from the north (herring gull, *Larus argentatus* and Heuglin's gull, *L. [fuscus] heuglini*), south (caspien gull, *L. cachinnans*) and south-east ('steppe gull', *L. [cachinnans/fuscus] barabensis*). In 2008—2010, we have visited several breeding colonies of large gulls in the central part of European Russia to recognize current distribution of pheno- and genotypes in this zone of contact, two to three generations after colonization. Plumage of adult gulls was characterized by standardized indices (describing the wing-tip pattern and the paleness of grey to black upperparts) from digital photographs. We also investigated polymorphisms in 9 nuclear microsatellite loci and a fragment of a mtDNA. By plumage, herring- or caspien-like gulls dominated in the northern and southern localities, respectively. Single Heuglin's gulls were present at northern localities, while individuals resembling 'steppe gulls' bred in each of visited colonies, being much more numerous in the southernmost locality. This pattern suggests that these birds represent a recent invader to Europe from SW Siberian breeding grounds and are not Heuglin's x Caspien hybrids. At the same time, the study documents an explosive expansion of caspien gull northwards in the eastern part of range (the species has recently reached the latitude of 56°N) and the easternmost known breeding of herring gull (47°E).

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## THE EFFECTS OF PASTURE MANAGEMENT AND STRUCTURE ON FARMLAND BIRD COMMUNITIES IN BULGARIA

Presented by **Stoyan Nikolov**

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Semi-natural grasslands are among the farming systems of highest conservation value and concern, as they are diverse and species rich and, at the same time, provide agricultural benefits through stock grazing and haymaking. Currently, these habitats created under traditional agricultural practices are significantly reduced in area throughout Europe because of two parallel processes: land-use intensification and abandonment. We investigated the effects of semi-natural grassland management and structure on farmland bird communities in upland and lowland traditional pastures in Bulgaria. The point-count method was applied at 223 plots in intensive, extensive and abandoned pastures during the breeding seasons of 2008—2009. A total of 3357 observations of birds from 61 species were recorded. The results showed that habitat complexity, management and landscape position influenced bird community structure and species occurrence within the pastures. The main environmental gradients accounting for bird community pattern were related to vegetation succession and land productivity. Extensive pastures sheltered more species rich and diverse bird communities than either abandoned or intensive pastures. We conclude that to assure high levels of avian diversity, habitat complexity within pastures should be maintained through extensive grazing and that a small proportion of shrubs within pastures may be beneficial for farmland birds. Finally, this study provided evidence that agri-environment schemes should not be directly extrapolated from one country or region to another without having been tested first, because within the same management, differences in structural habitat characteristics may exist due to landscape and socio-economic characteristics of the region. As an alternative, sustainable management of pastures could be achieved by a higher flexibility of agri-environment schemes at a national level.

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**BIRD SECRET REVEALED: COURTSHIP-DISPLAY IN MASKED SHRIKE (*LANIUS NUBICUS*)**Presented by **Boris Nikolov**

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The Masked Shrike *Lanius nubicus* is the least studied species among the European shrikes due to its cryptic and arboreal habits, as well as restricted range. Hence, its courtship-display is still poorly known. To our knowledge, no description of species' courtship-display exists in the scientific literature. Here, I present data on the duration and quality of courtship-displays in male Masked Shrikes, based on video-recordings and direct observations in southern Bulgaria. The Masked Shrike's courtship-display involves bows (head in line with the body and often facing away), accompanied by wing-shivering and advertising song; the whole ritual started on a (usually exposed) branch and, in most cases, continued "on the move" while birds were stepping down the same or another branch. Additional information is provided about display-flights, as well as singing activity, which was found to decrease significantly from May to July. Courtship-display in birds is an important clue in establishing phylogenetic relationships. The newly described data for the Masked Shrike are discussed in the light of the relevant information for the other members of the family of true shrikes.

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## EARLY GROWTH, METABOLISM AND OXIDATIVE STRESS

Presented by **Johan Nilsson**

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Reactive oxygen species (ROS) are highly reactive molecules, mainly produced during the normal cellular metabolism. These molecules can cause considerable damage to the cell by attacking important biomolecules such as DNA, protein and lipids. Under normal conditions, the negative effects of ROS are balanced by antioxidants. Should however the antioxidants fail to neutralize all the produced ROS, the individual might be exposed to oxidative stress — a process which is believed to be an important mediator of life history trade-offs. Since most of the ROS are produced during the cellular metabolism, it has been hypothesised that periods of increased energetic demands, as e.g. the nestling growth period, also should lead to increased risk of oxidative damage. In this study, we explore how early growth and metabolism affects individual susceptibility to oxidative stress in wild marsh tits (*Poecile palustris*). We show that nestlings reared in enlarged broods have lower defences against oxidative stress, compared to those reared in reduced broods. Interestingly, this was only true during the early growth period. Later in the growth period, the nestlings in enlarged broods had increased their antioxidant defences to the same levels as nestlings reared in reduced broods. Despite the fact that oxidative status seems to be dependent on growth conditions, we found no relationship between metabolic rate and either antioxidant status or oxidative damage. We conclude that the defences against ROS are challenged during the early growth period when nestling growth rate peaks, but only for nestlings experiencing strong competition. Furthermore, these effects seem to be independent from individual metabolic rate.

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## BODY TEMPERATURE REGULATION AS A WAY TO SAVE ENERGY

Presented by **Jan-Åke Nilsson**

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Small birds spending the winter at temperate latitudes have to cope with short foraging days, reduced food availability and an increased cost of thermoregulation due to a high surface area to volume ratio and high body temperatures (passerine average 42.5°C). However, such birds may substantially reduce metabolic demands and consequently daily foraging needs by actively down-regulate their body temperature during the night. We show that the degree of such lowered body temperature depends on both short- and long-term environmental cues, and by performing an experiment we show that the propensity to enter hypothermia is dependent on food availability in blue tits. Also, tropical birds face a challenge to sustain their body temperature, this time to avoid detrimental overheating. We show that, like birds in cold environments, birds in hot environments do not sustain their body temperature within a narrow range. Instead, small birds in the tropics let their core body temperature increase up to 46.5°C. Thus, the physiology of birds may be able to operate over a temperature range of at least 10°C without entering a state of non-responsiveness.

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## FROM FUNCTIONAL AND AGGREGATIVE RESPONSE TO STOPOVER SITE USE IN MIGRATORY SWANS

Presented by **Bart Nolet**

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Large birds with flapping flight refuel at stopover sites to complete their migratory journey. In principle, it should be possible to calculate the total time birds can spend per patch from their functional response (i.e., intake rate as a function of food density). One prerequisite is that food depletion is the dominant mechanism of competition. However, in the field there are likely to be additional factors modulating the functional response. We investigated whether cumulative numbers of Bewick's swans (*Cygnus bewickii*) staging at a shallow lake could be explained from their functional response. We used independently derived functional responses of swans digging for tubers of fennel pondweed on different foraging substrates: sandy and clayey sediment, and in shallow and deep water. Giving-up tuber biomass densities varied with foraging substrate, but, as expected from the marginal value theorem, quitting net energy intake rates were equal. Moreover, the aggregative response (i.e., total foraging time per area) was in quantitative agreement with the set of functional responses derived for the different foraging substrates. Scaling up to the whole lake revealed that the annual variation in staging numbers could be understood from the functional response (i.e., food density) after taking sediment type and, especially, water depth into account. These results suggest that the functional response can be key to predict bird abundance when the environment changes.

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## ECOIMMUNOLOGICAL CORRELATES OF REST-PHASE HYPOTHERMIA IN WINTERING BIRDS

Presented by **Andreas Nord**

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Resident birds in the temperate region experience a pronounced seasonal variation in the energetic requirements for body temperature regulation. To cover this energetic cost during winter, when the time available for foraging is reduced and food resources are scarce and less predictable, many birds routinely use rest-phase hypothermia (a controlled reduction in body temperature during the inactive phase) to conserve energy. One of the suggested costs of a reduced nocturnal body temperature includes detrimental effects on the immune system. In particular, little is known about the possible use of fever as a response to infection<sup>1</sup>, since an elevated body temperature would increase the temperature gradient between the body and the ambient environment, thereby substantially increasing the energetic cost of thermoregulation. Here, we report results from a suite of novel experiments, in which we have manipulated various parts of the avian immune system and recorded the subsequent change in body temperature in free ranging birds during winter. Results indicate that rest-phase hypothermia and immune activity are mutually exclusive activities, but the nature of this relationship seems to differ depending on the type of immune response investigated. These findings shed additional light on the processes involved in avian energy management and thus offer important insights into the wintering strategies of high latitude birds.

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## **ARTIFICIAL NIGHT LIGHT VS. URBAN NOISE — DRIVERS OF THE SHIFT IN DAWN SONG IN URBAN DWELLING EUROPEAN BLACKBIRDS**

Presented by **Anja Nordt**

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The year 2007 marked a new era in civilisation since more than half of the worldwide human population now lives in urban settlements. With the ongoing spread of urban areas over the last decades, hazards associated with urbanisation have increased dramatically and pose challenges for urban living organism. Light pollution, the pollution of naturally dark skies by artificial light, has intensified without regard to its potential impacts on the environment, although the disorientation of birds during migration due to intensive illumination of high buildings (e.g., light houses) is a well-known phenomenon. Furthermore, especially songbirds adjust their behaviour to the rhythm of night and day, e.g., time their dawn song in response to changing light intensities. Investigations revealed that passerines tend to start their dawn song significantly earlier in cities compared to birds breeding in rural areas. This shift was often seen to be a consequence of artificial night light affecting the melatonin cycle and thus the circadian rhythm. However, daytime noise in urban areas was also demonstrated to cause nocturnal song activity since ambient urban noise interferes with the spreading of acoustic information by territorial songbirds. To avoid direct interference birds shift their song activity to time slots with quieter conditions — the night and early morning before the onset of urban activity. Our investigations aim to clarify whether urban noise or artificial night light causes urban dwelling blackbirds to start their dawn song. The study was supported by the German Federal Ministry of Education and Research (033L038E) and a travel grand of Helmholtz Interdisciplinary Graduate School for Environmental Research.

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## DO THE ENVIRONMENTAL CONDITIONS IN WINTERING AREAS DETERMINE THE LONG-TERM VARIABILITY OF METRIC TRAITS IN SEDGE WARBLER (*ACROCEPHALUS SCHOENOAENUS*) POPULATIONS?

Presented by **Jacek J. Nowakowski**

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Thyroid function is reduced during periods of starvation, probably due to inhibition of production of thyrotropin in the pituitary, thereby affecting the proper conduct of moulting birds. The study tested the hypothesis, assuming that the adverse trophic conditions in Africa can affect the growth of contour feathers during moulting, and their variation between years may influence the differentiation between the seasons of value of increases the wing, tail and allula length. Material were measured 104 long-term retraps, caught as breeding birds in the Biebrza river valley in 1989—1999. The size of increases / changes of wing, tail and allula length and body mass between first and second calendar year of birds in different seasons were compared. In the seasons 1990/91, 1994/95, 1996/97 and 1998/99, increases in these traits were significantly higher than in seasons 1995/96 and 1997/98 (multivariate test:  $P < 0.05$ ). The length of wing and tail negatively correlated with air temperature, rainfall, humidity and Sielianinov hydrothermal index for the area of west and central Africa. Generally, if over wintering birds in Africa are very low rainfall, low humidity or high temperature, which characterizing the drought and probably limitations on the food availability, to the breeding places returns the birds with longer wing and tail. It was found that in years when the wing and tail length increases, there is also the largest exchange of individuals and the high intensity of selection index value. The observed long-term variability of metric traits in Sedge Warbler cannot be explained by the growth of contour feathers during subsequent moults.

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## HOME RANGE OF THE GREATER SPOTTED EAGLE IN THE NORTH-WESTERN DISTRIBUTION LIMIT AS REVEALED BY GPS-TELEMETRY

Presented by **Ain Nurmla**

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The Greater Spotted Eagle (*Aquila clanga*) is a globally vulnerable bird species whose breeding biology is poorly studied. We equipped four adult Greater Spotted Eagles (two females and two males) with 45-gram solar-powered Argos/GPS PTT transmitter and analysed the dynamics of home range size and usage during breeding season in Estonia, where the species inhabits mosaic landscape of wet forests and seminatural grasslands. First results suggest that home range increases during the breeding season and the increase is more pronounced in females who use larger territory at the end of the breeding season. Also the selection of hunting biotopes changes in time and it could be attributed to the dynamics of vegetation growth and agricultural activities.

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## **BIRD COMMUNITIES OF NATIVE AND PLANTATION FORESTS IN IRELAND: CAN PLANTATION FOREST BENEFIT BIRD COMMUNITIES?**

Presented by **John O'Halloran**

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Commercial forestry is of concern for bird conservation throughout much of Europe where forest-specialists in semi-natural forests may be at risk from habitat degradation or disturbance associated with timber production. In Ireland, forestry operates in a landscape which has been historically extensively deforested and few forest specialist birds persist. Here the forest industry has the potential to impact on bird conservation in both positive and negative ways. A long-term study was conducted on bird communities during the BIOFOREST and FORESTBIO projects. Point counts and Distance software were used to generate data on bird communities in range of forest types in Ireland between 2001 and 2009. Bird assemblages in managed forests (chronosequences of monocultures and mixed tree plantations), semi-natural woodlands, and open habitats were investigated. Semi-natural oak and ash woodlands had higher bird species richness than mature commercial plantations of Sitka spruce. In plantations bird assemblages were dependant on growth stage and forest structure and bird densities, including those of migrant bird species, were higher in second rotation than first rotation forests. Bird communities were positively affected by the inclusion of native tree species in plantation mixes, but the magnitude of the observed effect was small. Bird communities were related to vegetation structure, particularly shrub and understorey layers in forests. While opportunities for Irish forest plantations to provide habitat for forest specialist birds are limited, targeted management can enhance the diversity of bird species. Furthermore, the Hen Harrier, a rare species of raptor in Ireland, breeds in afforested conifer landscapes where careful management can be used to ensure the survival of this species. The findings of this research indicate that forest management for the benefit of birds should take place primarily on the stand-scale and focus on increasing structural diversity of forests.

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## DIVERGENCE OF SOCIAL BEHAVIOUR IN THREE CRYPTIC WARBLER SPECIES

Presented by **Alexey Opaev**

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The social behaviour of three reed-warblers [Great Reed Warbler (*Acrocephalus arundinaceus*), Oriental Reed Warbler (*A. orientalis*) and Clamorous Reed Warbler (*A. stentoreus*)] has been studied in a comparative perspective. The extent of divergence in two main components of the social behavior (territorial behaviour and structure of interaction between mates) appeared to be different. The territorial behaviour is largely similar between Great Reed and Oriental Reed Warblers. In these species, territories are actively defended and thus rarely overlap. In the Clamorous Reed Warbler, a true territorial behaviour is absent, so that neighbouring home ranges may overlap. With regard to features of mate interactions, these are completely different in the Great Reed Warbler. In this species, females are the least tolerant towards approaches by males. Here, interactions between mates are more strained and short as compared to those in the other two species. The widely accepted hypothesis of habitat characteristics determining social behaviour is critically discussed. It is shown that the patterns of social behaviour in the “*A. arundinaceus*” complex do not fit this evolutionary hypothesis well. Rather, results support the idea of stochastic factors operating during the process.

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## POPULATION STUDIES ON MIGRATORY WARBLERS — APPLICATION OF ORIENTATION CAGE TESTS

Presented by **Agnieszka Ożarowska**

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Orientation cage tests as a method can be applied in various studies on bird migration, e.g., species/population migration patterns at both large and local geographical scales or at the species/population level. Here, I present the results of the study with a different aspect — population dynamics of the migratory species and application of orientation test data in such analyses. A distinct decline was observed in number of Palaearctic trans-Saharan migrants. The *Sylvia* warblers were one of the groups showing the most dramatic changes in last century. While the decline is still observed in birds migrating along the western Palaearctic flyway, the long-term studies on the Polish Baltic coast indicated increasing trend in most common warblers: *Sylvia atricapilla*, *Sylvia borin*, *Sylvia curruca* and *Sylvia communis* from the 90s of the last century onwards. The study focused on the Blackcap as the most common species and showing complex migration patterns. Biometric characteristic of caught blackcaps indicated that these could be the short-distance migrants showing the population number increase. To test this hypothesis we analysed the orientation test results of blackcaps tested on the Polish Baltic coast. As short- and long-distance blackcaps migrating through the southern Baltic coast differ in both breeding grounds they originate from and wintering grounds they head to, we also expected population-specific differentiation with respect to migratory directions.

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## CAN GRAZING MANAGEMENT CREATE ECOLOGICAL TRAPS FOR WADERS BREEDING ON COASTAL MEADOWS?

Presented by **Veli-Matti Pakanen**

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Ecological traps, habitats that cannot sustain viable populations but are still preferred by animals, often have an anthropogenic origin. Understanding and recognising such non-ideal habitat selection is vital for planning and executing sound conservation measures. Grazing is currently widely used to create and maintain open and short vegetated shore meadows preferred by waders. Grazing, however, exposes nests to trampling. Thus, breeding waders are at risk of choosing meadows with high grazing pressure (HG) over meadows with lower or no grazing pressure (LG) and suffer from higher trampling rates. We examined whether extensively grazed meadows resulting in short sward structured habitat can act as ecological traps. We studied a metapopulation of the endangered Baltic southern dunlin that is managed by cattle grazing. We measured habitat preference and estimated complete habitat specific demography. Using observed movement rates between habitats we show that 70% of first time breeders preferred HG over LG. In adults, 6 out of 8 movements were directed towards HG. Results from a stochastic reneating model suggested that local recruitment is lower in HG habitat if grazing is started too early and with a too high grazing pressure. Apparent adult survival rates were higher at HG. Because mortality of waders occurs most likely at non-breeding sites, this may indicate higher site fidelity, and thus support the higher preference of HG. Our results indicate that the southern dunlin prefers meadows with a high grazing pressure, which therefore have the potential to act as ecological traps. As a consequence, livestock management practises for coastal meadows should give more emphasis on the evaluation of stocking rates and the timing of grazing.

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## EARLY EVENING ACTIVITY IN A NOCTURNAL SONGBIRD MIGRANT: COMPASS CALIBRATION ACTIVITY?

Presented by **Alexander Pakhomov**

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Every year many species of birds migrate from their nesting regions to wintering places and vice versa. In order to find their way they use at least three types of compasses (magnetic, stellar and solar), which means that the compasses must be calibrated and have a certain hierarchy. We aimed to determine whether Palaearctic migrants have two periods of nocturnal migratory activity, one related to compass calibration and the other one to migratory flight itself. Orientation experiments were carried out at Rybachy (Kaliningrad region, Russia) in early August — late September, 2010. The garden warbler (*Sylvia borin*) and the European robin (*Erithacus rubecula*) were tested. We used Emlen funnels and infrared monochrome cameras. The registration of migratory activity started 15–20 min before sunset and lasted for 4 h in the case of the garden warbler and for 5–12 h in the case of the European robin. We acquired 53 and 102 h of video for the garden warbler and the European robin, respectively. We distinguished 4 types of locomotor activity for the garden warbler, namely jumps, flushes, cage crawling and head rotation. European robins showed 3 types of locomotor activity (no cage crawling). The video was divided into 5 min long intervals. With 16x speedup we registered presence/absence of each type of locomotor activity during these intervals. We also determined the direction in 8 sectors for jumps and flushes. For the garden warbler we revealed two periods of activity separated by a quiescent period. The average direction of jumps and flushes for both periods of activity showed no significant difference. European robins showed no quiescent period, but they are very active during the first hour after sunset. Thus, garden warblers and European robins may have a period of activity after sunset which is not directly related to migratory flight and could possibly be related to compass calibration. This work was supported by grant #04-10-00208-a from RFBR.

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## SOME ISSUES ON THE CONSERVATION OF BLACK STORKS IN UKRAINE

Presented by **Oleksandr Panchuk**

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The Black Stork (*Ciconia nigra*) is a rare species listed in the Red Data Book of Ukraine, as well as the Bern, Bonn and Washington Conventions. To protect this species, it is recommended to create protection areas around the nests about 200 m in diameter around them, where human activities are prohibited. Unfortunately, the latest regular nationwide survey of the Black Stork population revealed lack of conservation of this species in practice. The deaths caused directly by people are rare. However, during intensive log cutting the nests and forest areas around them are destroyed. About 70% of nests are reported to be destroyed due to log cutting and only 30% due to natural factors. This happens for several reasons: (i) Lack of environmental education in the forestry sector. Most of the people involved in forestry do not understand why and how the Black Stork should be protected. (ii) The companies in this industrial sector are not interested in nest protection and creation of protective areas around them as the birds usually nest in the mature woodland, which is the most valuable for log cutting. (iii) Environmental authorities provide poor control over the law enforcement with respect to the Red Data Book species. We recommend the following solutions to these problems: organize educational training for the forestry staff to inform them about the biology of *Ciconia nigra* and explain the reasons and methods of species conservation; to conduct workshops on artificial nests and other biotechnical structures. It is necessary to involve the forestry enterprises in the nests protection activities, for example, through financial incentives from the state. Environmental authorities must monitor and annually inspect every known nest and punish their destruction.

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## WHAT IS COSY FOR WATERBIRDS? HABITAT CHOICE ALONG AN URBANIZED SHORELINE OF A LAKE ECOSYSTEM

Presented by **Katalin Pap**

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Although urban areas have been preferentially built near either marine or freshwater shorelines, the ecological effects of development on these ecosystems are poorly known. The aim of this study was to determine (1) how the spatial distribution of waterbirds is affected by shoreline urbanization, and (2) to assess which other habitat characteristics, either local (water level, extent of reed beds and mussel density) or landscape-level (distance to other wetlands and to household waste depots) have additional effects on their distribution. We used general linear models to analyse the distribution of 11 common species along 47 shoreline sections of Lake Balaton during two migration periods with low and high water levels. We found that the abundance of Common Pochard and Eurasian Coots significantly decreased with urbanization, and most other diving species showed similar trends. On the other hand, the abundance of Black-headed Gulls and Great-crested Grebes increased with urbanization, and gulls were particularly abundant close to waste depots. The abundance of Mallard, Mute Swans, Black-headed and Caspian Gulls increased with decreasing reed bed extent, whereas mussel density had significant positive effects on the abundance of Common Pochard, Tufted Ducks, Common Goldeneyes and Eurasian Coots. Furthermore in six species abundance increased with proximity to nearby wetlands. Most of the above effects differed between low and high water level periods. We conclude that, as in terrestrial habitats, urbanization is an important factor affecting the distribution of wetland birds. We discuss why diving birds may be sensitive to disturbances experienced near intensively used shorelines.

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## SEASONALITY IN COCCIDIAN PARASITISM AND IMMUNE FUNCTION IN THE HOUSE SPARROW: NATURAL COVARIATION OR JUST COINCIDENCE?

Presented by **Peter Laszlo Pap**

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Seasonality in immune functions of wild-living animals is increasingly recognized as an adaptation to changing environmental conditions, reflecting the actual constraints between an effective defence against periodically emerging diseases and the sex specific cost of maintaining an effective immune function. Studies on birds indicate that the seasonal variation in immune function is the rule rather than the exception, however, studies on seasonality of immune investment are contradictory. There are several reasons that may account for the seasonality of immune function, but a significant role has been attributed to differential selection exerted on males and females by the seasonally emerging parasites seems to be important. According to this, the “parasite exposure” hypothesis predicts that immunocompetence should increase during the breeding season in temperate birds, when the risk of infection is high. We tested this hypothesis by monitoring the intensity of coccidian infestation in male and female house sparrows during a whole annual cycle. Concurrently, we measured the immunological response of the infested and control (deparasitized) birds. The difference in response, measured through various immunological variables characterizing primarily the constitutive immune function, between experimental groups of males and females are discussed in light of our current knowledge on the adaptive response of sedentary birds to the seasonally changing parasite pressure.

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## PROSPECTORS COMBINE SOCIAL AND ENVIRONMENTAL INFORMATION TO IMPROVE HABITAT SELECTION IN THE SUBSEQUENT YEAR

Presented by **Tomas Pärt**

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Habitats have profound effects on individual fitness. Prospecting future breeding sites by using public information may improve the choice of habitat. We used long-term data on prospecting and breeding site selection in the short-lived northern wheatear (*Oenanthe oenanthe*) and show prospectors use a combination of social (i.e., local density and breeding success of conspecifics) and environmental cues (i.e., vegetation height) when selecting a prospecting site (i.e., a site covering 1–4 breeding territories). Prospecting behaviour was directly linked to the choice of next years breeding territory: almost 80% of surviving prospectors bred at their prospecting site in the following year. However, fidelity to the prospected site was strongly dependent on whether the original territory owner of the same sex had died or moved. Prospecting individuals did a good choice as they selected sites with a high probability of future breeding success. Our results give several new insights to the process of informed habitat selection. We suggest that: (i) the use of multiple cues reduces the negative impact of stochasticity on the reliability of social cues at small spatial scales (e.g., territories) and (ii) the use of conspecific attraction (i.e., the preference for breeding aggregations) is selectively advantageous because individuals are more likely to find a vacancy in an aggregation as compared to a solitary site.

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## SMALL AND LARGE LOCAL POPULATIONS IN THE REED BUNTING: CURSE OR BLESSING FOR SPECIES CONSERVATION?

Presented by **Gilberto Pasinelli**

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Many organisms persist in populations that are spatially structured by human-induced loss and fragmentation of their native habitats. Despite this, the demographic contributions of local populations to a population network and to the growth rate of such a network are still largely unexplored. Using data on individually marked young and adult female reed buntings (*Emberiza schoeniclus*) from 21 local populations studied over six years in northeastern Switzerland, we examined the source-sink status of small and large local populations with recently developed metrics. We hypothesized that including emigration to the population network (the Cr metric, Runge et al. 2006) would classify more local populations as sources than when only focusing on the ability of local populations to maintain themselves (the Rr metric). We further tested the hypothesis that the relative contribution of small and large local populations to the population network does not differ. The inclusion of emigration to the population network resulted in significantly higher values than when only considering the contribution of local populations to themselves, the difference between the metrics averaging 25%. Despite this, most local populations in our study turned out to be sinks (Cr values <1), suggesting substantial immigration is required for maintaining local populations as well as the entire population network (growth rate of network always <1). Both large and small local populations contributed equally to the population network. We conclude that (a) source-sink status of local populations is more comprehensively described by metrics including emigration (such as Cr) than by metrics focusing on processes within local populations (such as Rr), (b) the network of local populations studied here is not viable without immigration, and (c) small local populations can be as valuable as large local populations in their contribution to a population network.

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## **EFFECTS OF ENVIRONMENTAL CHANGES IN SURVIVAL AND POPULATION TRENDS IN URAL OWL (*STRIX URALENSIS*) AND TAWNY OWL (*STRIX ALUCO*) IN SOUTHERN FINLAND**

Presented by **Diego Pavon Jordán**

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Climate change challenges many species to cope with a rapidly changing world. At present, we have little understanding about how population dynamics will respond to such changes. Although the study of cyclic populations have been widely covered, studies assessing the link between climate-driven processes and rodents — predator dynamics have so far been lacking. In that sense, there is a poor understanding on the role of the environment in these dynamics. Particularly, it has been shown that, in southern Finland, the vole cycle faded and was absent during a 3—5 year period in the mid 1990s. After that period the vole cycle started again. Ural and tawny owl are highly affected by changes in the vole cycle since these small mammals are an important food resource during breeding and rearing of the chicks and the number of breeding pairs and fledglings varies according to the phase of the vole cycle. In this particular case, there is a strong dependence of the owls' survival with their environment, affected mainly by voles cycle. Besides, the intensification of the forestry, which has been critical in the last decade, might have also affected the dynamics of the owl's community in southern Finland, since they are strict forest-dwelling raptors. We have performed mark-release-recapture analysis for both species of owls with individual-based data since 1986 onwards. We have found, surprisingly, interesting differences in the variables affecting the survival of the species. The fact that each species is affected by changes in the environment in different ways, might explain the different trends observed in their population (i.e., Ural owl is declining whereas tawny owl is increasing). Thus, the predictability of the vole cycle and the residency of the owls in their territories make the situation very interesting to see how the different strategies in such systems work in an evolutionary context.

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## THE ROLE OF RAPTORS AS INDICATORS OF ENVIRONMENTAL CHANGES IN THE ALPINE REGION

Presented by **Paolo Pedrini**

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Mountains are amongst the most fragile environments in the world. They are a repository of biodiversity, water and other ecosystem services and their influence exceeds that of their geographical limits and extends to the surrounding lowlands. Raptors play an important role in alpine ecosystems as they are at the top of food webs, have a direct effect on prey communities, cover wide home-range areas and changes in their population structure may indicate environmental changes. In this talk, I will give an overview of the main effects of land-use changes on three raptor species that regularly occur in the Alpine region. I will present the results from a ten-year research program, aimed at understanding the biology and ecology of the Eagle Owl (*Bubo bubo*), the Scops Owl (*Otus scops*) and the Golden Eagle (*Aquila chrysaetos*) in the Italian Alps. There were marked intra-specific differences in the response to changes in land use, with the Eagle Owl being affected by urbanization at valley bottoms, the Scops Owl being affected by land abandonment and changes in agricultural practices and the Golden Eagle being affected by pasture abandonment at higher altitudes. The results show that, while the ecology of these three species is markedly different, taken together, they can be used for describing land-use changes occurring at different altitudinal ranges. I conclude that raptors can be valid indicators environmental change and highlight future directions for research on raptor populations in the alpine region.

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## LONG-TERM DEVELOPMENTS OF WADER POPULATIONS IN NATURAL HABITATS IN ESTONIA

Presented by **Hannes Pehlak**

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In recent decades, many European wader populations have declined. Habitat loss, degradation and increased predation are obviously the key factors in several cases. Estonia supports a substantial proportion of the European breeding populations of several wader species, e.g., a third of the Southern Dunlin (*Calidris alpina schinzii*) Baltic population. In order to obtain a better understanding of long-term dynamics in the numbers and distribution of breeding waders there, data from several monitoring schemes, inventories and a variety of other sources was assembled. National and habitat-level population indices and trends since 1950s were calculated for 11 species. The study focuses on the developments in three (semi-)natural habitat types: meadows, mires and islets. Several aspects of these processes have not been described by quantitative means before. The decline of wader populations at meadows and the parallel colonization of inland mires are among the most intriguing processes that have taken place in the Eastern Baltic region within the past sixty years.

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## LITTLE OWL (*ATHENE NOCTUA*): NUCLEAR AND MITOCHONDRIAL DNA ANALYSIS REVEALS DIVERGENCE OF SOUTHWESTERN AND CENTRAL EUROPEAN SUBSPECIES

Presented by **Irene Pellegrino**

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We utilized mitochondrial and nuclear DNA to study the phylogeography of little owls (*Athene noctua*) across Europe. Data from 326 individuals distributed among 22 sites were used to assess geographical distribution of the European subspecies, i.e., the widely accepted *vidalii*, *noctua* and *indigena*, and the questioned *sarda*-species. On the basis of the sequences of two mtDNA markers (CRI D-Loop 494 bp and COI 679 bp), we found a major difference between a first haplogroup, distributed in the North-West (from Iberia to Denmark and Czech Republic) and three other clades, distributed in the South-Eastern part of the study area. In particular we found a second group distributed in the Balkans and a third located in Sardinia, while in Italy there was a mixture between a fourth haplogroup of South-Italy and both the North-West and the Balkan clades. All individuals sampled in Sardinian differed clearly from other haplogroups. The combined analyses of the 13 nuclear microsatellite loci corroborated these results. Both mitochondrial and nuclear markers showed that interaction across contact zones generate a mixture of genotypes not only in Italy, but also in Central Europe. The apparent position of the contact zones differs substantially from the subspecies distribution reported in literature. DNA data are consistent with the phylogeographic hypothesis that this species survived the Pleistocene glaciations in three major refugia located in Iberia, South Italy, and the Balkans. Expansion patterns indicate that little owls from the Iberian refugium were the predominant source of postglacial colonization of northern Europe, while expansion out of South-Italy and Balkans had more limited effects.

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## WINTER DIET OF TAWNY OWLS (*STRIX ALUCO* L., 1758) FROM LETEA FOREST (DANUBE DELTA, ROMANIA)

Presented by **Viorel Pocora**

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This study contains data of 1937 prey items found in the winter diet of tawny owls (*Strix aluco*) pellets from Letea Forest (Danube Delta, Romania) in the periods November 2006 to February 2007, and November 2007 to February 2008. The data confirm the presence of small mammals, rodents in particular, as the main prey of *Strix aluco*. We identified 11 species of rodents, 3 insectivores and 2 species of birds. From all identified individuals (1937 individuals), 99.22% are rodents, 0.61% insectivores and 0.15% birds. Of the rodents, the most frequent species was *Micromys minutus* with 47.70% followed by *Microtus arvalis* with 27.26% from the total of captured individuals. The captured insectivores were *Crocidura leucodon*, *Crocidura suaveolens* and *Sorex araneus* and of birds *Turdus merula* (2 specimens) and *Fringilla coelebs* (1 specimen) were captured. In the first year, there 898 individuals were identified, the most frequent species was *Micromys minutus* (61.35%), and in the second year there 1039 individuals were identified and the most frequently captured species was *Microtus arvalis* (39.74%). Of all identified small mammal species, 96.01% were represented by adult specimens and 3.98% were sub-adults.

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## **BLOOD PARASITES AFFECT REPRODUCTIVE INVESTMENTS IN BLUE TITS (*CYANISTES CAERULEUS*)**

Presented by **Edyta Podmokła**

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Haemosporidian infections are widespread among wild birds and have become a popular model system for understanding host-parasite co-evolution. Parasites usually impose fitness costs by reducing survival, fecundity, or mating success. Even in the absence of fecundity costs, reduced probability of survival of infected host negatively affects its reproductive value, as the future chances of reproduction become low. Thus, an optimal strategy should lead to increased current reproductive investments. Here, we studied whether the infection status is associated with reproductive investments in blue tits. The magnitude of investment was assessed with the measures of offspring quality: body mass, tarsus length and cell-mediated immune response. We found that infection status of the parents affected offspring performance. In cases where both parents are infected with blood parasites, offspring have higher body mass, tarsus length and cell-mediated immune response. Our study suggests that parasite infection can be used as a signal of reduced future viability and thus induce the terminal investment strategy. Overall, these results demonstrate that avian malaria infections can have significant effects on hosts' fitness and may thus constitute an important selection force affecting life-history strategies in wild birds.

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## CLUTCH COLOUR CHARACTERISTICS AS SIGNAL OF FEMALE QUALITY

Presented by **Miroslav Polacek**

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Main pigments responsible for egg-shell colouration in birds are biliverdine and protoporphyrine. The first is responsible for blue-green tint, the second for brownish colour. Both of these pigments are related to antioxidant capacity and their incorporation into egg shells is potentially costly for laying female. Therefore, some clutch-colour characteristics can possibly serve as a signal of female quality to males. This hypothesis was investigated mainly on species laying blue-green eggs. We found support for this hypothesis in a tree sparrow (*Passer montanus*), a species laying eggs with brown spots. Data were collected during the breeding season 2010 in Lower Austria. We found a positive correlation between average clutch colouration and average clutch volume. However, not only could absolute egg colouration signal female quality, but also intraclutch colour variability. In a previous study, intraclutch colour variability in great reed warblers correlated negatively with female condition. In this study, common cuckoos parasitized hosts of better quality with higher probability. The authors proposed intraclutch colour variability as possible signal for brood parasites to choose the proper host. Thus, we can expect that low intraclutch variability could reflect the ability of laying females to maintain stable egg colouration also in other bird species. We found that tree sparrow females with lower intraclutch colour variability had significantly longer wings. The number of fleas was also significantly lower in nests where clutch colouration was more stable. Prevalence of ectoparasites could reflect strength of female and/or chick immune system. In conclusion, our results support the idea that egg-shell pigmentations (protoporphyrine based pigmentation) and intraclutch colour variability could inform the male about female quality.

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## **ANTI-PREDATOR BEHAVIOUR OF BARRED WARBLER (*SYLVIA NISORIA*) AND RED-BACKED SHRIKE (*LANIUS COLLURIO*) DURING THE BREEDING SEASON**

Presented by **Marcin Polak**

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Anti-predator behaviour is widespread in birds, because nest predation is a major factor limiting reproductive success. Predation has played a central role in the evolution of nesting strategies, and nest defence can be critically important in breeding success. I carried out field experiments on two passerine birds: the Barred Warbler (*Sylvia nisoria*) and the Red-backed Shrike (*Lanius collurio*). The protective nesting association between these two species was described by many ornithologists. However, we have poor knowledge about the true nature of the relationships between associates. I examined whether the Barred Warblers and the Red-backed Shrikes (i) distinguish between predator and a non-predator species in their defensive response and (ii) respond differently to an avian predator. Decoys of known nest predator (a stuffed model of the Hooded Crow *Corvus cornix*) and a non-predatory control species (a stuffed model of the Green Woodpecker *Picus viridis*) were used to examine the type and relative intensity of parental response. I measured behavioural responsiveness by recording aggressive behaviour towards each model during the nestling period of both studied species. The Barred Warblers and the Red-backed Shrikes showed considerable variation in their response. Males of both species were more aggressive than females towards the stuffed decoys. The Barred Warblers defended their own territories more vigorously than the Red-backed Shrikes. These results provide evidence that these birds are able to distinguish between predator and a non-predator species.

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## LARGE SCALE PROSPECTING AND BREEDING COLONY SELECTION IN THE KITTIWAKE

Presented by **Aurore Ponchon**

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The use of information on habitat quality by individuals has the potential to greatly affect the dynamics of their distribution in the environment and thus the responses of populations to environmental changes. Most detailed studies on breeding habitat selection processes have nevertheless been limited to species or study sites where individuals can be directly observed and recognized while prospecting during specific periods of the year and at specific sites. For instance, the use of information conveyed by conspecifics through their presence or their breeding performance has been experimentally shown to affect dispersal and recruitment decisions at fine spatial scales (less than 10 kilometres), but the role that such processes may play at larger scales is much less clear. Recent development of biotelemetry devices opens new possibilities to track individual prospecting movements at various spatio-temporal scales, which opens important perspectives in the framework of breeding habitat selection. We review how experimental approaches using such tools have the potential to address key questions about the role of individual behaviour in population dynamics. We illustrate this by presenting results of an on-going experimental study of prospecting strategies in the colonial black-legged kittiwake, a study which relies on the combination of GPS and satellite tracking in order to track movements at hierarchy of spatial scales.

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## DIFFERENTIAL MIGRATION BY THE SEXES IN EURASIAN SKYLARKS (*ALAUDA ARVENSIS*) AND THE “DOMINANCE HYPOTHESIS”: A MULTI-SPATIAL SCALE ASSESSMENT

Presented by **Thibaut Powolny**

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A common form of sexual segregation in migratory birds is differential migration wherein males usually spend the winter further north than females. One of the most generic hypotheses to explain this pattern is the dominance hypothesis which states that when individuals compete for limited food resources, the dominant sex (usually males) would exclude the subordinate one (females). The Skylark is a common migrant that spends the winter in French farmlands. In the current study, we studied differential migration in this species and tested whether this pattern could be related to the dominance hypothesis. We used a multi-scale approach: at large spatial scale, we assessed the sex-ratio composition of wintering populations along a latitudinal gradient in France. At a local scale, we used radio-tracking to compare habitat use of males and females wintering in the same locality. At the micro-scale, we experimentally tested for sexual competition on foraging patches by manipulating group sex-ratio and evaluating subsequent foraging behaviour of captive birds. We found evidence for a differential migration strategy in skylark populations with a male-biased sex-ratio decreasing towards southern latitudes in France. However, in local areas where both sexes coexisted, such a marked spatial segregation was not apparent because radio-tagged males and females used similar foraging and roosting sites. Moreover, at the micro-scale, experiments did not reveal sexual competition for access to resources since food intake and time-budget were independent from group sex ratio. Overall, our findings suggest no clear evidence that the differential migration observed in the Skylark could be explained by the dominance hypothesis. Attention is given to alternative hypotheses such as the body size hypothesis since sexual size dimorphism in this species might imply sexual differences in physiological abilities to cope with environmental constraints at northern latitudes.

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## ECOLOGICAL CONTEXT AND INFORMATION USE IN CONSPECIFIC BROOD PARASITISM

Presented by **Hannu Pöysä**

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Conspecific brood parasitism (CBP) is an alternative reproductive tactic common in birds. Early hypotheses proposed to explain the occurrence of CBP considered nest depredation as an important determination of CBP in both evolutionary and ecological time; spreading eggs among nests should increase the likelihood that at least some eggs will escape predation and produce offspring, known as the “risk spreading” hypothesis. Later theoretical work has shown, however, that risk spreading does not bring about major selective advantages in CBP. While random risk spreading does not provide selective advantage, informed risk spreading, whereby parasites are able to assess nest predation risk and lay accordingly, does. Considering that breeding birds have a remarkable capacity to assess and respond to changes in nest predation risk, as witnessed in several studies, it is surprising that the potential role of nest predation in explaining CBP has been neglected, until very recently. I will briefly review studies demonstrating connection between nest predation and CBP, using the common goldeneye (*Bucephala clangula*) as a model species. Experimentally induced parasitic laying has revealed that parasitic goldeneye females discriminate between risky and safe nest sites, both when selecting the laying neighbourhood and the target nest within a neighbourhood. This ability appears to be based on the information about nest success gathered by prospecting females the year before the actual parasitic laying. These findings indicate, first, that parasites do not lay randomly but use information on site quality when selecting target nests and, second, that nest depredation may play an important role in explaining the evolution and occurrence of CBP.

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## IS POLYGYNY COSTLY FOR FEMALES BECAUSE OF SHARED MALE ASSISTANCE IN ANTIPARASITIC NEST DEFENCE?

Presented by **Milica Požgayová**

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The polygyny threshold model assumes that there is a cost of polygyny for females paired simultaneously with the same male, because of the shared paternal care. We investigated how polygynous males allocate their investments in antiparasitic nest defence between their two females. As a model species we chose the facultatively polygynous great reed warbler (*Acrocephalus arundinaceus*) — an important cuckoo (*Cuculus canorus*) host with fine-tuned defence strategies against brood parasitism. Four days after clutch initiation, we exposed cuckoo taxidermic mounts at primary and secondary nests of 16 polygynous males. Behavioural responses of both mates were analyzed by PCA and the first principal components were used as measures of aggression within the GLMM and GLM framework. We found that the tested males allocated their parental investment between their females equally: they defended primary nests with the same intensity as the secondary ones. Nest defence by primary and secondary females did not differ either. Our results suggest that shared male assistance in nest defence against intruders at the egg stage (here: brood parasite) does not contribute to the cost of polygyny imposed on great reed warbler females mated to the same male.

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## NEST SUCCESS AND PREDATORS OF SKY LARK (*ALAUDA ARVENSIS*) AND LAPWING (*VANELLUS VANELLUS*) NESTS IN ARABLE FIELDS IN THE CZECH REPUBLIC

Presented by **Libor Praus**

Libor Praus, Karel Weidinger

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Populations of farmland birds have declined at a slower rate in central and eastern Europe compared with western Europe. Contrary to the well-documented population trends, data on breeding success and nest predators in central and eastern Europe are almost lacking. We monitored Skylark (n=116) and Lapwing (n=9) nests by means of continuous video surveillance to determine nest fates and predators in large arable fields (mainly Maize, Sugar Beet and Opium Poppy) in the Czech Republic, in 2009 and 2010. The 74 documented predation events at Skylark nests were caused by: Marsh Harrier (16), Montagu's Harrier (16), Hooded Crow (13), Stone Marten (10), Red Fox (6), Wild Boar (5) Hedgehog (2), Common Raven (2), Eurasian Jackdaw (1), European Magpie (1), Domestic Cat (1) and an unidentified bird of prey (1). Two Lapwing nests were depredated by Red Fox. Daily predation rate was higher in Skylark (0.075; 95% CI: 0.057—0.095) than in Lapwing (0.011; 0.004—0.027) and did not vary consistently with distance from field edge or during the breeding season. The presentation will include additional data from 2011 and a discussion of conservation implications. (Supported by grant MSM 6198959212)

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## RELATION BETWEEN BIRD SPECIES RICHNESS AND REED BED CHARACTERISTICS AT CÂMPENEȘTI PONDS (NORTH-WEST ROMANIA)

Presented by **Liviu Razvan Pripon**

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Analyzing bird census data at Cămpenești ponds in September to December 2010, we noticed a difference between avifauna at each pond. At the same time, a difference between reed bed conformation of each pond became obvious. We investigated if avifauna can be influenced by reed bed conformation. Also we tried to find out what quantitative relationships exist between these factors. From all 77 species of birds identified at Cămpenești ponds, only a part is present in every pond. We excluded non-aquatic birds and we calculated the correlations between number of species and reed-bed parameters from each pond. These parameters were: length of the shore with reed, proportion of this length relative to the perimeter of the pond, reed bed thickness, length of water contact line of the reed bed and the degree of compaction. We found the strongest correlation between number of species and the length of the water contact line ( $r=0.83$ ). Another correlation was established with the proportion of shore with reed. This was lower but we noticed that the maximum number of species identified was at the pond with the biggest proportion (79%). The same occurred for the length of shore with reed. We conclude that a length of 1000 m is the most favourable and above this limit, bird species numbers are not that much influenced. In case of the other reed bed parameters, we found a correlation ( $r=0.45$ ) that indicates another type of relation: a Gaussian distribution of number of species. For reed bed thickness, in the local conditions of Cămpenești, we found a 68 meters optimum. We consider these data useful in wetland management, making sites of interest as favourable as possible for bird conservation. In reed bed conformation management we suggest maintaining a certain water level, a certain reed cutting process and allowing, in the non-breeding periods, domestic animals like buffalo, cows or horses, to enter the reed bed making them less compact.

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## WITHIN- AND AMONG-POPULATION DIFFERENCES IN THE ANNUAL CYCLE OF THREE IBERIAN BLACKCAP (*SYLVIA ATRICAPILLA*) POPULATIONS DIFFERING IN MIGRATORY BEHAVIOUR

Presented by **Francisco Pulido**

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Migratory behaviour is typically associated with a number of life-history adaptations which involve the organization and the timing of the life-cycle stages. In contrast to sedentary birds, migrants have more complex life-cycles, which typically comprise two migratory journeys, two moult cycles and reproduction. Moreover, migrants undergo complex physiological changes when switching from one life-cycle stage to another. This may involve changes in nutrition, metabolism and changes in body composition. While patterns of variation of single components of the migratory syndrome are well understood, it remains still unclear to what extent different traits of the syndrome are integrated, and if so, how this integration facilitates or hinders adjustment to changing environmental conditions. To understand phenotypic integration of behavioural and life-history traits associated with migration, we investigated variation and co-variation of these traits within and among three blackcap (*Sylvia atricapilla*) populations differing in migratory behaviour. In a common-garden experiment with 33 fledglings from a resident, a partially migratory and a completely migratory population, we monitored migratory behaviour, exploration, neophobia, dominance, food preference, body mass changes and moult during a complete year. Our results indicate that under favourable conditions, as presented in our experiments, among-population differences in migratory behaviour diminish. Yet, there are large, persistent among-individual differences in behaviour and in the co-variation of traits, suggesting a significant genetic component to phenotypic variation and co-variation, to the response to environmental variation and their interaction. Our approach will provide new insights into the integration of different components of the migratory syndrome and will allow predicting their potential for adjusting to changing environmental conditions by phenotypic plasticity and adaptive evolution.

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## CONSERVATION AND POPULATION STATUS OF THE EUROPEAN ROLLER IN LATVIA

Presented by **Edmunds Račinskis**

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The European Roller (*Coracias garrulus*) has been classified as Near Threatened by BirdLife International for the 2010 IUCN Red List, with the overall decreasing population trend. In Latvia, the breeding population of this species has fallen from perhaps several thousand pairs in the middle of 20th century to less than 30 known pairs by 2010. The first recent update on numbers and distribution of Rollers in Latvia was obtained in 1998. Disturbingly, only a few multi-pair breeding localities were found at the time. Conservation action planning and field efforts were started in 1999 and have been continued yearly since. Nest-boxes have been provided for Rollers at their main breeding locations. Additional site conservation efforts were made, to safeguard the breeding and foraging habitats, by establishing a Natura 2000 site at the main breeding location in Garkalne forest. Size and distribution of the core breeding population of Rollers has also been monitored. All found nests were inspected by repeated visits to follow the breeding productivity and ring nestlings (with colour rings since 2004). Consequently, ring-reading of breeding adults was started in 2005. Currently, only one breeding area with about 25 Roller pairs is known in Latvia. This population has been relatively stable or even slightly growing during the last decade. Most pairs use nest-boxes for breeding and have relatively good productivity, provided that nest-boxes are specially protected against predation. This poster presents data on the recent trends in number, distribution and breeding productivity of the last known breeding population of Rollers in Latvia (1999—2011). Techniques used for protecting nest-boxes against predators are also illustrated and evaluated.

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## HABITAT SUITABILITY AND POTENTIAL EXPANSION OF THE WHITE STORK (*CICONIA CICONIA*) BREEDING POPULATION IN SLOVENIA

Presented by **Andreja Radović**

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The breeding population of white storks (*Ciconia ciconia*) in Slovenia counted 201 breeding pairs in 2010, varying from 193—240 in 1999—2010. The purpose of this study was to quantify the suitability of the whole territory of Slovenia for sustaining a breeding population of white storks, drawing on knowledge of the present breeding distribution and forecasting potential further expansion of its breeding range. We used Ecological Niche Factor Analysis (ENFA) as implemented in the Biomaper software run from the R environment using the adehabitat package. All auxiliary maps were prepared using open source GIS software SAGA (System for Automated Geoscientific Analyses). According to the ecogeographical variables that we assumed to be important for spatial distribution of white storks and data of presence from the white stork census, we run ENFA in order to obtain habitat suitability index (hsi) for every pixel according to its suitability for white storks. The analysis was performed at 1 km resolution. The result of the ENFA is shown in asc grid maps containing information on habitat suitability value for every pixel ranging from 0—100. Marginality is mostly driven by presence of open habitats, missing of forest and lower values of precipitation. Specialisation is defined with mean slope and absolute height above the sea level followed by the amount of forest in the quadrature and precipitation. We tested significance of the obtained ENFA result with randomisation tests run 9999 time that proved significance of the detected niche ( $p < 1e-04$ ). Our analysis revealed areas where the current breeding range of the species could possibly expand to in case of further population growth. With this analysis we demonstrate the usefulness of already available datasets like Corine Land Cover (CLC), digital elevation data (DEM) and basic climate data analysed with free open-source software for providing additional information on bird species and their habitats.

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## ARRIVAL TIME CHANGES OF NORTH EUROPEAN BIRDS

Presented by **Kalle Rainio**

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I have studied climate effects on changes in avian phenology. Using north European time series data on the timing of avian spring migration starting from the beginning of the 20th century, I demonstrate advances in avian spring migration which I discuss in the context of global warming. First, I demonstrate that fluctuations in the dominant mode of climate variability in Europe, the North Atlantic oscillation (NAO), affect the timing of spring migration in birds. The effect is prominent especially in the early parts of each species' migratory population. Moreover, NAO affects birds of all taxonomic groups studied. The effect of NAO variability was similar also between birds wintering in different areas. I also studied whether climate affects the degree of protandry, the difference between the arrival time of males and females. Changes in protandry may lead to mismatch situations with other important aspects of the surrounding nature, e.g., food supplies, if both sexes do not respond at the same rate to the climate change. According to my findings, the four species studied show no temporal changes or climate effects in the degree of protandry. Further, I explore how the observed arrival time changes may have originated. This was done by comparing the timing of long-distance migrants at two points of their migration through Europe: Eilat, Israel, and southern Finland. The comparison indicates that the birds are able to speed up their migration in favourable conditions. Lastly, I studied whether the observed changes during the recent period of climate warming have been unique to that period, or if the observed changes are in fact typical and predictable responses to any kind of climate change. The results support the latter premise, showing similar responses to spring temperatures and NAO in two warming and one cooling periods of the 20th century.

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## **TAIL FLICKING IN BIRDS — REVIEW OF HYPOTHESES AND DIRECTIONS FOR FURTHER RESEARCH**

Presented by **Christoph Randler**

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A lot of bird species from a variety of taxa are reported to show characteristic movements of their tail whilst on the ground (often called tail flicking or wagging). Here, I focus on reviewing postulated functions of such behaviour. Most of these relate to communication, either with conspecifics, predators, or prey. In some cases, prey flicking may induce movement of the bird's prey that make the prey more vulnerable to capture. Alternatively, it may signal to a predator that the signaller has detected it, or that the signaller is particularly alert or otherwise difficult to catch. It may, on the other hand, be a signal to conspecifics: warning of predation risk, or advertising quality as a mate or social status, or aiding in flock cohesion. Further, it may be that this behaviour represents a cue rather than a signal, in that it benefits the receiver but not the signaller; or it may have a function unrelated to communication.

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## **CHANGES IN AVERAGE REPRODUCTIVE SUCCESS WITH AGE: A RESULT OF SURVIVAL SELECTION AND/OR AGE-RELATED CHANGES OF COMPETENCE AND REPRODUCTIVE EFFORT?**

Presented by **Kalev Rattiste**

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An individual's life history is a sequence of events, which eventually determine its contribution to the next generation. These events are affected by environmental factors, genetic make-up and decisions made by an individual and its breeding partner. Recognition of these determinants helps to understand not only short-term ecological changes and long-term evolutionary dynamics in a population, but also changes in reproductive success during individual's breeding career. A multitude of causes have been proposed to account for the last-named changes: (1) progressive appearance or disappearance of phenotypes (the selection and delayed breeding hypotheses); (2) age-related improvements of competence (the breeding experience and constraint hypotheses); and (3) optimization of reproductive effort (the restraint hypothesis). These hypotheses are not mutually exclusive and may act in concert to create an increase in performance with age within a cohort. In my talk, I will evaluate these explanations using long-term individual-based data on breeding success (recruitment rate) in common gull (*Larus canus*). I show that in presenescent gulls the terminal breeding event is exceptional in terms of breeding success and it cannot be used to characterize an individual's general quality. Moreover, omitting the last breeding year from the analysis results in the loss of the correlation between breeding success and survival. Furthermore, longitudinal analysis reveals that birds of different lifespan do not differ in their annual breeding success. I also analyse changes in egg weight with advancing age and show that these changes follow the same pattern as reproductive success does. In addition, I point out other aspects affecting recruitment rate, as changes in laying date, divorce rate and nest territory location. In summary, age-related improvements of competence and changes in reproductive effort are responsible for the increase in performance in presenescent common gulls.

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## TRACKING MIGRATORY SWANS AND GEESE IN RELATION TO OFFSHORE WIND FARM SITES

Presented by **Eileen Rees**

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Satellite-tracking Whooper Swan migration between the UK and Iceland was undertaken in 2009 and 2010 by WWT, in association with COWRIE Ltd and the Department of Energy and Climate Change, to provide data on their migration routes and flight heights in relation to current and proposed offshore windfarm sites. Windfarms are of concern for swans because their large size makes them less manoeuvrable than other birds, increasing the risk of collisions with turbines. Forty solar-powered GPS satellite tags were fitted to swans at wintering sites of international importance for the species in 2009, 10 to swans caught in Iceland in summer 2009, and 5 were redeployed in Britain in 2010. Twenty-five swans tracked from sites in western Britain in 2009 all migrated along the west coast and 95% departed the country over the Outer Hebrides, whereas 15 tracked from SE England were more likely to migrate along the east coast, with 73% passing over the Firth of Forth and 60% continuing via the Moray Firth to depart from north Scotland. Median flight height was 40m overland and 12–100m over water; altitude data recorded by the tags were accurate to  $\pm 22$ m. Almost half of the swans tracked over the East Irish Sea in spring 2009 crossed footprints of existing or proposed inshore windfarm sites, and 6 of 7 tracked in spring 2010 crossed at least 1 of 5 operational or potential coastal windfarms. Conversely, all swans tracked from SE England passed either across the land or within the inner areas of the Wash, avoiding overlap with windfarms off the East Anglia coast. Satellite data recorded for 3 goose populations (Svalbard Barnacle, Greenland White-fronted and Light-bellied Brent) were also analysed. Of 22 Barnacle Geese tracked across the North Sea, 12 (55%) passed across or within 1km of proposed windfarms in the North Sea on 34 occasions: 21 during spring migration and 13 in autumn. Migration patterns are described in relation to flight distances, time of day and weather conditions.

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## **PARENTAL CARE IN LESSER BLACK-BACKED GULLS (*LARUS FUSCUS*) IS STATE DEPENDENT**

Presented by **Anke Rehling**

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Parents should optimize resource allocation to their offspring with regard to maximal lifetime reproductive success. They are predicted to adjust their effort to variation in their own body condition and in species with biparental care also to variations in their partner's state and effort. In many sea birds, nest attendance time competes with foraging time and incubation is energetically costly. In this field study, female body condition in lesser black-backed gulls was experimentally reduced by inducing the laying of additional eggs resulting in a reduction of female parental care during incubation. Such state dependent changes may be mediated by changes in underlying hormonal states. Here, I looked at correlations of care share and prolactin. Conflict theory predicts that parents should only partially compensate for a reduction in their partner's parental care. However, in gulls, a minor reduction in nest attendance is likely to incur high costs due to predation pressure. Consequently, males showed complete compensation for the reduction in female parental care.

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## ABANDONED MILITARY TRAINING SITES ARE AN OVERLOOKED REFUGE FOR THREATENED BIRD SPECIES

Presented by **Jiri Reif**

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European landscapes are under pervasive attack of massive land use changes such as agricultural intensification, urbanization and land abandonment. They have resulted in population declines of birds living in open habitats. Despite our good understanding to the effects of these driving forces on bird populations, effective conservation actions are difficult to conduct as these forces are closely connected with socioeconomic developments in particular countries and thus almost impossible to reverse. It is hence necessary to conserve refuge sites with a limited influence of these negative factors. We surveyed birds in 42 abandoned military training sites (AMTS) in a central European country, the Czech Republic, and we found that these sites are valuable, and to date overlooked, refuges for bird conservation. Birds of high conservation concern and birds of open habitat (such as *Miliaria calandra*, *Saxicola torquata* or *Lullula arborea*) were more abundant in AMTS than predicted by their total population size in the Czech Republic. The most important characteristics predicting attractiveness of AMTS for birds of conservation concern were: low altitude, low proportion of forest/dense scrubland, high proportion of sparse scrubland/bare ground, and large area. Former military activity was beneficial for declining open habitat birds by maintaining intermediate disturbance levels, which are rarely found elsewhere in current landscapes. Due to the reduction of armed forces across Europe, AMTS provide a continental-wide network of high quality sites for bird conservation. Nevertheless, AMTS are under pressure of building activities, or their open habitats are being lost due to overgrowth through forest or dense scrubland.

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## LEK HABITAT OF CAPERCAILLIE IN LATVIA: CURRENT CONDITIONS AND IMPLICATIONS FOR CONSERVATION

Presented by **Jānis Reihmanis**

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The Capercaillie is a forest dwelling species whose range in Latvia during the 20th century has reduced twice and the once united distribution area has split into several isolated sub-populations. In order to assess the role of habitat alterations in changes of capercaillie distribution, we studied habitats of 28 leks and their surroundings in all subpopulations during 2003—2009. We measured habitat characteristics (ground layer and stand characteristics) in 10 m<sup>2</sup> circular sample plots. 302 sample plots were used by capercaillie, i.e., plots with signs of capercaillie presence. We measured the background information about the habitats in 6367 random plots of equal size. As additional data, we used GIS-mapped locations of 639 lekking and 1598 foraging sites of capercaillies of both sexes. Latvia holds one of the few remaining lowland populations of the Capercaillie in Europe (the studied leks were at 16—205 m a.s.l., or 72 m on average). 86.2% of leks were located in wet forests and adjacent raised bogs. Forest stands become suitable for lekking from ca. 50 years of age. However, most of the studied leks were situated in significantly older and more natural stands than surrounding forests. Lek habitat is best characterised by its naturalness: variation of basal area of oldgrowth trees, large-dimensional deadwood and spruce. Availability of the main food plant — the bilberry (*Vaccinium myrtillus*) depends on the age of stands. Extent of bilberry cover as well as all other most important lek characteristics are negatively affected by drainage. It causes increased stand density, increased height of ground vegetation, and reduces visibility at ground level, reduces cover of cottongrass (*Eriophorum* sp.), as well as the amount of large trees and deadwood. Based on these results we suggest recommendations for conservation of capercaillies and their lekking sites.

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## AGE-SPECIFIC CHANGE OF PROLACTIN AND CORTICOSTERONE LEVELS IN THE COMMON TERN

Presented by **Juliane Riechert**

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The influence of age or experience on survival or reproductive success in vertebrates is well known but physiological mechanisms are poorly understood. Monitoring hormone levels allows great insight into these mechanisms and reproductive strategies in long-lived individuals. Prolactin (PROL) and corticosterone (CORT) are two hormones involved in breeding decisions: high PROL levels are necessary for regulating breeding behaviour especially under stressful conditions whereas CORT could act as indicator of activity or stress. We analysed baseline PROL and CORT in Common Terns and related it to age and breeding experience of individuals. For this, we took blood samples of 346 birds 9–14 days after clutch completion between 2006 and 2010. Blood samples were obtained via blood-sucking bugs (*Dipetalogaster maximus*), a non-invasive method with negligible stress for the birds. PROL levels increased during the first breeding attempts of the early breeding career, more pronounced in males than in females. After a quite stable phase in middle-aged birds, it seemed to decrease in females but increase in males. In contrast, CORT showed no change in early life and only in males a slight increase in older birds was found. That could be related to higher energy expenditure for breeding activities or foraging. Low PROL levels during the first breeding attempts could indicate a reduced ability of the endocrine system to secrete the hormone. With advancing experience, hormone secretion improves along with increasing breeding success.

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## WOODPECKERS AS FOCAL SPECIES FOR FOREST CONSERVATION PLANNING

Presented by **Jean-Michel Roberge**

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Due to incomplete knowledge about the myriads of species, structures and processes in forest ecosystems, conservation planning must involve the use of shortcuts. One possibility is to use the requirements of focal species as a guide for setting conservation and restoration targets. Woodpeckers (Aves: Picidae) have been proposed as potential focal species because of their dependence on attributes that are negatively affected by forest management. Based on large-scale field studies, we evaluated the usefulness of woodpeckers as focal species for forest biodiversity conservation across regions in northern Europe. Woodpecker species richness was positively related to forest bird diversity, as was the occurrence of specialized woodpecker species such as the three-toed (*Picoides tridactylus*), middle spotted (*Dendrocopos medius*) and white-backed woodpeckers (*D. leucotos*). Presence of the white-backed woodpecker was also positively associated with species richness of red-listed deciduous-forest cryptogams. The occurrence of specialized woodpeckers was positively associated forest naturalness and conservation value. Based on the woodpeckers' requirements for different types of dead wood and large trees, we suggest tentative targets for management which are expected to benefit threatened species sharing the same forest types. Our studies, together with similar findings from North American forests, suggest that woodpeckers may be a useful focal group for the conservation of forest biodiversity.

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## PREDATION RISK, BODY RESERVES AND ENERGY EXPENDITURE IN DUCKS

Presented by **Jean-Patrice Robin**

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Predation is an important evolutionary factor that can affect behaviour and physiology of animals. When this risk is high, the starvation-predation risk trade-off predicts that body reserves (mainly body fat) should be decreased to reach a lower body mass to reduce the risk of predation. In fact, the level of fat reserves is viewed as a trade-off between both, the risks of starvation and of predation. We tested this prediction in the Mallard (*Anas platyrhynchos*). Three groups of birds were maintained in outdoor aviaries. To mimic predation, 2 groups were disturbed at different intensities with a radio-controlled car that was steered with high speed towards them, until they took-off. This procedure was repeated throughout each disturbance phase. Birds were disturbed one week in the morning in January: one group (G1), twice daily for 15 minutes and another one (G2) four times daily for 15 minutes. One control group was not disturbed. We examined the impact of these flights on energy expenditure, body mass loss and we determined how fat and protein masses were affected. Total energy expenditure and body composition determination were obtained by the doubly labelled water method. No difference in total energy expenditure between groups could be detected ( $p > 0.09$ ). Total body mass loss was significantly higher in both disturbed than in the control group ( $p < 0.0001$ ). This was mainly due to a significant decrease in the body lipid mass during disturbance sessions ( $p < 0.0001$ ). Thus, total energy expenditure was not affected; nevertheless, take-off flights are energetically costly. One possible explanation is that the effect of flights on energy expenditure may have been compensated by physiological or behavioural adjustments. However, our results on body reserve modulation during disturbance challenges allow verifying existing hypothesis. These results will be discussed in terms of body reserve management according to the predation-starvation risk trade-off.

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## HOW DOES CAVITY AVAILABILITY INFLUENCE COMMUNITY STRUCTURE OF SECONDARY CAVITY-NESTING BIRDS?

Presented by **Hugo Robles**

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Secondary cavity-nesting birds (SCN) are supposed to be limited by cavity availability, but mechanisms underlying the response of SCN community structure to cavity availability are poorly known. To improve our knowledge on these mechanisms, we examined SCN community structure in two oak forest types: (i) young forests, subjected to clear-cuttings and burns; and (ii) old forests, subjected to extensive traditional grazing and scarce firewood extraction by selective cutting. Young forests had considerably lower densities of cavities, SCN species and nests than old forests, indicating that a low availability of cavities may limit SCN assemblages in young forests. However, reproductive parameters of great and blue tits associated with the availability of food did not differ between both forest types, suggesting that food supply during the breeding season was not reduced in young forests. We then used a replicated before-after-control-impact design in which the availability of cavities was experimentally reduced and increased in forest plots that held substantial amount of cavities (i.e. some young forests lacking cavities were not included). Cavity-blocking and nest-box addition led to reduction and increase, respectively, of breeding densities of tits, which used less suitable cavities in blocking plots compared to control and nest-box addition plots. No effect of cavity manipulation was found for year-round territorial short-toed treecreepers and Eurasian nuthatches, which defend larger territories than tits and whose numbers are probably more influenced by territoriality than by nest-sites. Semicolonial spotless starlings, which often forage on pastures farther away from forests, were little affected by cavity manipulation, probably because starlings are more limited through reduced foraging opportunities. We conclude that community responses to the variation in cavity abundance may depend on foraging conditions and social structure of individual species.

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## **SPECIES DISTRIBUTION MODELLING IN ORNITHOLOGY: RECENT PROBLEMS, NOVEL SOLUTIONS AND FUTURE CHALLENGES**

Presented by **Dennis Rödder**

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In times of increasing availability of environmental and biodiversity data as well as computation capacities, correlative species distribution models (SDMs) are increasingly used in many research fields. SDMs allow an assessment of the potential distribution of a species by integrating information on the spatial distribution of a species with ecological data. Although SDMs have proven useful for many taxa, modelling the potential distribution of many bird species may be a special challenge since nomadic behaviours and/or seasonal migrations need to be considered. Herein, we highlight some of the promising applications of SDMs in various research fields such as conservation biogeography, evolutionary biology and biodiversity research. Furthermore, we provide solutions for possible “pit-falls” when modelling highly mobile, migratory species and outline promising fields for future studies.

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## EFFECTS OF GRASSLAND CHARACTERISTICS ON CHICK GROWTH IN A MEADOW BREEDING WADER

Presented by **Maja Roodbergen**

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Black-tailed godwits are declining in The Netherlands and in the rest of western Europe. Previous studies showed that population declines are mainly caused by agricultural intensification, amongst others by reducing chick survival. Low ground water tables and increased fertilizer use associated with agricultural intensification accelerate grass production, resulting in dense monotonous swards, while mowing removes cover and prey arthropods. To investigate how grassland characteristics affect chick growth and thus survival, an experiment was carried out on four different grassland types: (1) a reserve field with high ground water level and low fertilizer input, (2) an AES-field with low ground water level and low fertilizer input, (3) an intensively managed agricultural field with low ground water level and high fertilizer input, and (4) similar to 3, but mown c 3 weeks before the experiment. On each of the four field types, an enclosure with observation hut was constructed. Four randomly assigned chicks were released daily in each enclosure and their foraging behaviour was observed. The chicks were weighed before and after, and their faeces were collected after their stay in the enclosure. In addition, on each field arthropod abundance and biomass (in three size classes) were measured daily, and the vertical vegetation structure and biomass once in four days. We found that chick growth was highest on the AES-field and lowest on the cut, agricultural field, and increased with vertical vegetation structure and with abundance of large arthropods. Our results have important implications for management aimed at conservation of Black-tailed godwits.

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## **A — BRIEF — HISTORICAL ACCOUNT OF THE USE OF BIO-LOGGING IN MARINE STUDIES**

Presented by **Yan Ropert-Coudert**

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In the 1940's, Pers Scholander had the idea of attaching a capillary depth gauge on a freshly-harpooned whale to examine the diving ability of the cetacean. This is often regarded as the onset of what was going to be termed bio-logging 6 decades later. Indeed, from the simple tube filled up with a sugary solution of Scholander to the 14-channels, high frequency sampling unit designed by Rory Wilson, bio-logging has grown up to be a must-have tool for marine scientists willing to track and monitor their subject models in the vast realm of the oceans, down to abyssal depths. Although a handful of companies share the majority of the market, several manufacturers are now available. This contributed to decrease the cost of bio-loggers while stimulating the technical developments. Thanks to this, the number of marine species investigated has increased tremendously as miniaturization progresses and allowed researchers to instrument increasingly smaller species. If traditionally top predators that return regularly to land were favoured for practicality, there is a growing number of bio-logging studies on fish appearing in the literature. Following advances in miniaturization, devices have also grown in complexity, accommodating diversified sensors that have expanded the range of scientific disciplines concerned with bio-logging approach. The difficulty to retrieve the logger to access the data has recently pushed bio-logging developers to explore the duality of storing data in the memory of the devices before sending them at appropriate times, either via radio or via satellite, to fixed stations where they can be retrieved, hence combining telemetry and bio-logging into a single approach. During this talk I will present an historical account of the use of bio-logging in marine studies.

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## LANDSCAPE STRUCTURE, HUMAN DISTURBANCE AND CROP MANAGEMENT AFFECT STOPOVER SITE SELECTION BY MIGRATING GEESE — IS LESS INTENSIVE FARMLAND ALWAYS BENEFICIAL TO WILDLIFE?

Presented by **Zuzanna Rosin**

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It is well known that agricultural intensification has caused severe population declines in bird species breeding and wintering in farmlands. However, much less attention has been paid to migrating bird species that may benefit from intensive farming, but which also damage crops. Knowledge on their habitat selection is important from a conservation as well as an agro-economic point of view. Thus, we investigated habitat preferences of three common migrating goose species: White-fronted Goose (*Anser albifrons*), Bean Goose (*A. fabalis*) and Greylag Goose (*A. anser*) during autumn 2009 in Western Poland. We noted a total of 24 flocks of these species. Geese preferred large, elevated fields that were remote from forests and human settlements but were in the proximity of a lake. Geese selected maize stubbles and avoided winter cereals. They selected sites in landscapes with a lower diversity of crops. Flock size was negatively correlated with the proportion of pasture in a landscape but increased with field size, distance to forest and distance to a town. Our results are in contrast with the paradigm that less intensive farmland positively influences habitat use by birds during foraging. We advise the delayed ploughing of stubbles in order to create appropriate foraging habitats for geese and to minimize damage to cereal crops.

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## GLASS STRIKES — THE USE OF FLIGHT TUNNELS TO EVALUATE MITIGATION METHODS

Presented by **Martin Rössler**

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Glass structures in areas used by birds, such as noise protection walls or buildings surrounded by greeneries, are among the most severe human-related sources of bird mortality. The death toll may be reduced by efficient markings on the inconspicuous obstacles. To date, elegant “invisible” markings based on UV reflection are inefficient, while efficient markings are perceived by humans and thus only reluctantly accepted by architects and town planners. There is an urgent need for improved “acceptable” markings but few experimental studies have addressed this point. Despite the alarming total death toll, collisions per unit area are rare, so field studies are time-consuming. Furthermore, the variety of external influences requires high sample sizes for results to be meaningful and reproducible. Choice experiments in flight tunnels are more efficient and provide control over external influences and the behaviour of birds facing obstacles. However, the experiments are challenging to perform. The test panes must be naturally illuminated, specular reflections on the glass surface must be generated and the investigators need to determine the appropriate backgrounds. We shall discuss these questions in the light of our experience with our testing facilities, Flight Tunnel II (2006—2009) and Flight Tunnel III (from 2010). The latter enables the evaluation of markings that provide specular reflection and outdoor/indoor simulation by angling the glass and shading the background. Apart from these methodical issues, we shall outline the results of 35 experiments in Flight Tunnel II concerning, e.g., behaviour (vertical stripes are better than horizontal) and the significance of chromatic and achromatic contrast (chromatic cues are important, aposematic are not better than monochrome patterns) and shall also present observations that may refer to effects of optic flow processing (e.g., deficiencies of detecting fine grids).

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## **SEXUAL SELECTION TO SIGNAL RESISTANCE TO PARASITES OR TO THE FULL RANGE OF STRESSFUL FACTORS?**

Presented by **Alexandre Roulin**

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The evolution of secondary sexual characters is thought to have proceeded through the force of sexual selection. The usual situation is where females mate preferentially with showy males promoting the spread of genes coding for extravagant male ornaments. The adaptive function of mate choice has been debated over decades and the current consensus is that animals are choosy when mating because they derive direct and/or indirect fitness benefits from ornamented mates. Ornaments can advertise the ability to resist various sources of environmental stress factors including for instance parasites, lack of food, oxidative stress or predators. However, it remains unclear whether all, a few or only one of these ecological factors drive the evolution of sexually selected characters. Given that the expression of ornaments, as most other phenotypic traits, is under both genetic and environmental control, a key issue is whether an ornament signals resistance to many stressful factors because it is condition-dependent or because a gene pleiotropically regulates the ornament and its associated qualities. Such a gene could regulate hormones that modulate resistance to a variety of ecological factors. To illustrate this case I will present data on the signaling function of melanin-based coloration because its underlying genetic determinism is well known. Interestingly, the proopiomelanocortin gene is involved in melanogenesis and regulates many other phenotypic attributes including the modulation of glucocorticoid-dependent stress responses. This system offers an appropriate system to discuss the relative importance of a large range of ecological factors in the evolution of secondary sexual characters.

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## **NON-BAYESIAN ANALYSIS OF HIERARCHICAL MODELS FOR SAMPLING BIRD POPULATIONS**

Presented by **Andy Royle**

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Applications of Bayesian hierarchical modeling in ecology have exploded over the last dozen or so years, so much so that many ecologists regard hierarchical modeling as an activity that is exclusively Bayesian in its origins and implementation. In this paper we provide a general conceptual formulation of hierarchical modeling that stands independent of the statistical inference framework. We demonstrate likelihood-based analysis of a number of hierarchical models that have proved to be useful in avian population studies and surveys, including occupancy models, models of replicated point counts and counts based on various specialized protocols such as using multiple observers. We provide examples using the software “unmarked” which is available as an add-on library in the freely available software package R. Finally, we provide an application of likelihood analysis of a hierarchical distance sampling model in which distance sampling data are obtained at a sample of point count locations and the objective is to model spatial covariates on abundance or density.

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## RESULTS OF LONG-TERM RINGING OF HERRING GULLS IN THE REGION OF ST PETERSBURG, NW RUSSIA

Presented by **Anna Rychkova**

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The Herring Gull is abundant in the region of St Petersburg, NW Russia, during all the periods of the annual cycle of this species. It forms large breeding colonies on islands and along the coast of the Gulf of Finland of the Baltic Sea and Lake Ladoga. It also breeds on many smaller inland water bodies. Bachelor and migrating individuals of the Herring Gull are found in aggregations as well. Many such places of aggregation are present in the area of St Petersburg. It is obvious that such a numerous and synanthropic species that breeds in colonies would be a good object for individual marking and obtaining recoveries. Nevertheless, so far the Herring Gull has not been popular among ringers in this region, mainly because of inaccessibility of its breeding places on remote islands. Mass ringing of this species was started in 1990s, and from 2005 it was performed regularly. Before this time recoveries were mainly obtained from birds that were ringed outside the region of St Petersburg. Nestlings of the Herring Gull were ringed in breeding colonies on islands and archipelagos of the Gulf of Finland of the Baltic Sea. In 2005—2010, about 2000 Herring gulls were ringed and 138 recoveries were obtained. In 2009, sixty birds were marked with plastic colour rings. A total of 308 recoveries were registered in the study area. 143 recoveries were from birds ringed outside the St Petersburg region, namely: Finland (133), Estonia (6), Karelia, Russia (2), Sweden (1) and Poland (1). 168 recoveries were obtained from Herring Gulls, ringed in the St Petersburg region (only 27 of them were ringed before 2005). These recoveries were distributed as follows: Lithuania (62), Latvia (48), Finland (17), Germany (14), Poland (9), St Petersburg region, Russia (9), Denmark (4), Sweden (3) and Estonia (2). Using these data the spatial distribution of Herring Gulls in different periods of their annual cycle, speed and distance of movements, and the wintering site fidelity were analysed.

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## PLUMAGE BACTERIAL ASSEMBLAGES IN BREEDING WILD PASSERINES: RELATIONSHIPS WITH ECOLOGICAL FACTORS, BODY CONDITION AND BREEDING SUCCESS

Presented by **Pauli Saag**

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Microorganisms have been shown to play an important role in shaping the life-histories of animals. It has recently been suggested that feather-degrading bacteria influence the trade-off between parental effort and self-preening behavior in birds, and may therefore also affect their breeding success. However, so far, too little is known even about the natural patterns of variation in bacterial load on bird plumages. We studied wild breeding populations of great tits (*Parus major*) and pied flycatchers (*Ficedula hypoleuca*) to explore the species-, sex- and habitat-related variation of plumage bacteria and associations with body parameters and breeding success. Density and species richness of bacterial assemblages were studied using flow cytometry and ribosomal intergenic spacer analysis (RISA), respectively. The density of feather-degrading bacteria was higher in great tits than in pied flycatchers, while no significant between-species difference was found in the number of bacterial phylotypes per bird. In both species, bacterial loads were higher in females than in males. In great tits, the density of studied bacteria declined between the nest-building period and the first brood. The number of bacterial phylotypes per bird was higher in coniferous habitat, while bacterial densities were higher in deciduous habitat. Free-living bacterial density was positively correlated with female mass; conversely, there was a negative correlation between attached bacterial density and female mass during the period of peak reproductive effort. Higher density of attached bacteria in great tits' plumages was associated with smaller number of fledglings. In pied flycatchers, a negative correlation between parental body mass and the number of feather-degrading bacterial phylotypes was found. Thus, this study revealed that bacterial assemblages on the feathers of breeding birds are affected both by life history and ecological factors and are related to body condition.

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## IDENTIFYING MIGRATION ROUTES AND NON-BREEDING AREAS OF THE GLOBALLY THREATENED AQUATIC WARBLER USING LIGHT-LEVEL GEOLOCATORS

Presented by **Volker Salewski**

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The Aquatic Warbler is the only globally threatened passerine bird species of continental Europe. Once widespread in Palearctic fen mires, the global population decreased dramatically in the 20th century. The species is a migrant that spends the non-breeding season in sub-Saharan Africa. In 2007, an important non-breeding site was discovered in the area around the Djoudj National Park, northern Senegal. Although density estimates indicate that the area must hold a considerable proportion of the global population of the Aquatic Warbler during the non-breeding season, the area cannot be the sole winter quarter of the species. The decline of the Aquatic Warbler during the last century was to a large extent due to habitat destruction related to drainage and agricultural development on the breeding grounds. However, the loss of breeding habitats in Europe appears to have been paralleled by the loss of non-breeding habitat in Africa in recent decades. Knowledge of stopover sites and staging areas in Africa is needed in order to implement conservation strategies for the Aquatic Warbler during the non-breeding season. In July 2010, we equipped thirty male Aquatic Warblers with 0.6g geolocators in the Supoy mire in Ukraine. Here, we present the first results about migration routes and African staging areas of those Aquatic Warblers with geolocators that were recaptured in May 2011.

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## MIGRATION BEHAVIOUR OF BLYTH'S REED WARBLER (*ACROCEPHALUS DUMETORUM*) IN CENTRAL ASIA

Presented by **Veronika Samotskaya**

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Blyth's reed warbler is a common bird that had been an object for countless numbers of studies. However, it still remains one of the least studied warblers when we talk about migration behaviour. Blyth's reed warbler migration pathways are located in Central Asia, and there are publications where a possibility of nesting of this species in this region is mentioned. However, the latest research calls this supposition in question for nest findings in Middle Asia could have been mistakenly related to Blyth's reed warbler, but belong to other warbler species. In 2010, we studied Blyth's reed warblers in the vicinities of Dushanbe, Tadjikistan. To confirm the specific accessory, we sequenced 300 bp of Cyt-b (mit DNA) from blood samples. Our research showed that Blyth's reed warblers in Central Tadjikistan do short migration stops, on which they keep feeding territories and briskly communicate with each other. During our observations we have not noticed a female or found a nest. All the birds we saw were males. While feeding or communicating with each other, they were singing quite actively and their song was different from the one we had got used to hear in the northern part of the distribution where Blyth's reed warbler breeds. This song was mentioned before (Marova et al. 2010) as a "southern song" and the main differences between it and the common advertising song are described. The authors found it difficult to interpret because of the unknown status of recorded birds. Our research shows that the birds which sing this "southern song" are non-breeding males keeping territory during stop-overs on migration. In order to brighten up the functional meaning of this song, we did several playbacks demonstrating the "northern song" and the "southern song" to the birds and found out that they react only when hearing the "southern song" by moving close to the speaker. This song seems not to have a female-attraction function but is directed at male-male interactions.

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## **INFLUENCE OF HABITAT STRUCTURE, CLIMATIC AND HYDROLOGICAL CONDITIONS ON WHITE STORK (*CICONIA CICONIA*) BREEDING POPULATION PARAMETERS AT THE PRIPYAT RIVER FLOODPLAIN (SOUTHERN BELARUS)**

Presented by **Irina Samusenko**

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Breeding population parameters (breeding density and breeding success) of the White Stork were assessed in relation to habitat structure, climatic and hydrological conditions at the Pripyat River floodplain (southern Belarus). In 1999, mean density of breeding pairs was 37.0 per 100 km<sup>2</sup> on about 2000 km<sup>2</sup> area. The feeding habitats (n=363 observations) varied from different meadows and pastures (85%) to fields (7%) and small water bodies (8%). Birds preferred foraging on extensively used natural wet meadows (73% of all meadow types) to drained ones (27%). Breeding density was negatively correlated with coverage of woodland and shrub areas. It was positively correlated with areas with human settlements and open areas, especially barren land (wet meadows, fens) and dry land (meadows, fields). During the last decades, forest and shrub areas have increased while the number of human settlements and the rural population decreased. This resulted in redistribution of breeding pairs: storks moved from abandoned areas close to riverbeds to areas with active agriculture close to human settlements. Breeding success was documented on a 330 km<sup>2</sup> area in response to climate and hydrological variables of Pripyat River between 1991 and 2009. The average number of fledglings per breeding pair was not correlated with the number of breeding pairs. Brood size was significantly positively correlated with duration of spring flooding and spring water discharge rate in Pripyat River. An especially strong correlation of breeding success with water discharge rate in May was established, when the majority of chicks hatch. The proportion of unsuccessful pairs was negatively correlated with date of transition of daily average temperature through zero in spring. It positively correlated with average temperature in March and temperature deviation in relation to the spring norm. Thus, early spring and unstable weather conditions during the beginning of the breeding season negatively influenced breeding success.

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## THE EFFECT OF THE APPLICATION OF GEOLOCATORS ON BODY CONDITION, REPRODUCTION AND ANNUAL SURVIVAL IN THE BARN SWALLOW (*HIRUNDO RUSTICA*)

Presented by **Chiara Scandolara**

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In Europe, several populations of Barn Swallows (*Hirundo rustica*) have undergone demographic declines in the last decades. The specific causes and mechanisms of such negative trends remain largely unknown, partly because of lack of detailed knowledge of their ecology during migration and wintering. Recent technological advances, however, have now made it possible to identify the migratory routes and wintering areas of small migratory species like swallows using geolocators. The main goal of this research was to identify the migration routes and wintering areas of a declining population of Barn Swallows located in southern Switzerland by means of geolocators developed by the Swiss Ornithological Institute. In April–August 2010, all the nests (n=1480) in the study area (n=35 farms) were regularly visited to record breeding events. Breeding adults were captured, individually marked with colour rings and spots on breast and belly feathers, and their nest and brood was identified by direct observation. In July 2010, we applied the new lightweight geolocators (0.6–0.8 g) to 150 breeding adults (76 males, 74 females) in 10 colonies, while establishing a control group of 75 individuals from the same colonies that were just handled and released. Here we report on the effect of geolocators on survival from 2010 to 2011, reproduction in both 2010 (second/third broods only) and in 2011, and on body condition by comparison with the control group. This information is fundamental for any project aiming at studying migration by using these tags on small migratory birds.

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## THE ESTIMATION OF DEMOGRAPHIC PROCESSES IN LOCAL POPULATIONS USING INTEGRATED POPULATION MODELS

Presented by **Michael Schaub**

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The exchange of individuals among populations can have strong effects on the dynamics and survival of local populations. Yet, the estimation of immigration rates remains one of the greatest challenges for animal demographers. Little empirical knowledge exists about the effects of immigration on population dynamics. New integrated population models using a Bayesian framework enable simultaneous estimation of fecundity, survival and immigration, as well as population growth rate. We applied this novel analytical framework to the demography of two populations of long-distance migratory birds, hoopoe (*Upupa epops*) and wryneck (*Jynx torquilla*), which breed sympatrically in south-western Switzerland. During 2002–2010, the hoopoe population increased annually by 11%, while the wryneck population remained stable. Apparent juvenile and adult survival probability was nearly identical in both species, but fecundity and immigration were slightly higher in the hoopoe. Population growth rates of hoopoes were positively correlated juvenile survival, fecundity and immigration, while population growth rate of wrynecks was strongly correlated with immigration only. This indicates that demographic components impacting the arrival of new individuals were more important for population dynamics than demographic components affecting the loss of individuals. The finding that immigration is an important factor for the population growth rates of both species emphasizes the need for a broader perspective for population regulation, beyond the local population, calling for large scale conservation action.

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## TRACKING LONGEST SONGBIRD MIGRATION SUGGESTS A SELECTION PRESSURE TOWARDS A SPATIOTEMPORALLY SIMILAR MIGRATION STRATEGY

Presented by **Heiko Schmaljohann**

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Earth's ever-fluctuating environment is a strong selective force in the evolution of animals' annual cycles. In birds, it has formed different life-history stages: breeding, moult, migration, and wintering. Their temporal flexibility is, however, limited. We quantified the life-history stages of a small songbird breeding in Alaska but wintering in Africa, the northern wheatear (*Oenanthe oenanthe*), with light-level geolocators in a high spatiotemporal resolution due to the large longitude migration component. Migrants show an extreme high synchrony in the timing of all life history stages despite a total annual migratory distance of ~30 000 km. Similarities of the overall migration strategy including direction (not following great circle routes), migratory speed (fall: 150 km·day<sup>-1</sup>, spring: 250 km·day<sup>-1</sup>), selection of major stopover sites and wintering quarters within 400 km and onset of spring and autumn migration within a few days suggest a strong genetic basis on which the environment seems to have only little influence. This high spatiotemporal synchrony in the migration pattern of northern wheatears breeding in Alaska is in contrast to the highly variable migration pattern of a German northern wheatear breeding population wintering also in Africa. We hypothesize that selection pressure towards a strict annual cycle favours individuals mastering the extreme migration from Alaska to Africa within a spatiotemporally similar pattern.

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## CONTACT ZONE ON THE MOVE: IS RANGE EXPANSION IN MELODIOUS WARBLERS DRIVEN BY CLIMATE CHANGE OR BIOLOGICAL INTERACTION?

Presented by **Jean Secondi**

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Besides biological interactions and geographic barriers, climate factors shape the distribution of a given species, in which, commonly, a change in climatic conditions translates in a dislocation of the species range. Examples of simultaneous range shifts along direct contact zones of sister species were observed very scarcely, since adequate case studies are rather rare. One of the few good explored moving contact zones can be found in western central Europe between the Melodious Warbler (*Hippolais polyglotta*) and the Icterine Warbler (*H. icterina*). Since 2008, the intrinsic and extrinsic factors affecting the range expansion of the Melodious Warbler were investigated in a multidisciplinary approach. Based on occurrence data collected within the breeding ranges of both species, we model their potential distribution with respect to the climatic conditions occurring during the breeding period, when the species are present in the Western Palearctic. We found a large overlap in the potential distributions suggesting that interaction between the two species rather than a climatic differentiation in the realized distributions shaped the range borders. To validate this hypothesis, we applied two arrays of distribution models followed by range break tests along the contact zones on its past (1965—75) and its present locations (2000—2010). We crosswise projected the models onto both time slices to assess the effects of climate vs. biotic interaction. Our results provide concrete insights into the range dynamic along the interspecific contact zone.

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## WETLAND BIRD POPULATIONS IN THE SOUTH OF WESTERN SIBERIA, RUSSIA

Presented by **Marina Selivanova**

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The South of western Siberia is an important breeding area of waterfowl and other waterbirds because of the abundance of shallow wetlands. Water levels in these wetlands vary markedly among years. Increasingly wet conditions were in 1969—1972, 1985—1988, 1993—1995 and 2002—2003, and water levels were particularly low in 1975—1984, 1989—1992, 1998—2000, 2004—2008. Annual census of waterbirds by point-count methods were conducted in spring and in the end of summer on a specific study area (2550 km<sup>2</sup>; near 100 lakes). Seventy-one breeding waterbird species were recorded. Patterns in abundance and frequency varied considerably among species. Populations of some species have declined in recent decades, though some species (for example *Phalacrocorax carbo*, *Netta rufina*, *Oxyura leucocephala*, *Himantopus himantopus*) increased. Here, we discuss how species richness, abundance, seasonal dynamics and structure of waterbird communities varied in response to conditions of the wetlands on the study area.

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## SATELLITE GPS TRACKING AS A TOOL FOR BLACK STORK (*CICONIA NIGRA*) STUDIES

Presented by **Urmas Sellis**

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Satellite and GPS tracking is an attractive and useful tool for studying larger birds. Although frequently used, sample sizes per study remain low and data are often not published. Therefore, cooperation between tool users is a solution. For example, 20 individuals of black stork tagged in Flying Over Natura2000 project in different European countries produced great number of data about migration via both, eastern and western migration route, of birds breeding at the northern edge of the range up to the southern edge of breeding area. Five years ago, the GPS transmitter was a new technology and the well known Argos Satellite tag was a classic tool to use. Now the solar powered GPS transmitter is a real hit among researchers. GPS tags give us the possibility to investigate also minor scale movements, e.g., breeding range usage, incl. foraging activities. In Estonia, 20 (6 as fledglings) black storks were tagged to study foraging areas selection and the possible effect of forest melioration to decrease of black stork population. The six young tagged storks died on migration. Data about only 8 tagged adult storks were included into analyses. The average distance between foraging sites and the nest increased during the breeding season from ca. 5 km in spring to 15 km in the end of summer. In Estonia, black storks revisited more frequently flowing water with moderate flow, dept ca. 30 cm, width ca. 5 m, and sandy or gravelly floor. Storks seem to prefer straightened streams as foraging places. However, in dry year (2007), black storks preferred wild streams. Beside the studies on breeding areas, the same GPS tags give us the possibility to investigate migration, migration stopover sites, wintering sites, and even contamination origin of our round table session flagship species.

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## BEHAVIOURAL TRAIT COVARIES WITH IMMUNE RESPONSIVENESS IN A WILD PASSERINE

Presented by **Tuul Sepp**

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Behaviour and immune responses are controlled by the neuroendocrine system, which is thought to result in covariation between personality types and stress- and immune-associated diseases. However, the relationships between behaviour and immunity have been almost exclusively studied in domestic or laboratory animals whose behaviour has been systematically altered in the process of domestication. In contrast, almost nothing is known about the associations between behaviour and immune traits in wild animals. Here, we describe such an association in wild-caught greenfinches, passerine birds belonging to the model organisms of immunoecological research. When greenfinches are brought into captivity, some individuals damage their tail feathers against the cage walls due to excitement behaviour, while others retain their feathers in intact condition. We show that birds with intact tails, i.e., relatively “calm” individuals mounted stronger antibody response to a novel *Brucella abortus* antigen and their circulating phagocytes were capable of producing stronger oxidative burst in response to stimulation with bacterial lipopolysaccharide in vitro. As the behavioural trait was assessed 13–25 days before measuring immune responsiveness, our results demonstrate that individuals’ coping styles with captivity predicted how these individuals would respond to forthcoming immune challenges. This is novel evidence about covariation between immune responsiveness and a behavioural trait in a wild animal.

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## **SELECTIVE USE OF HETEROSPECIFIC PRESENCE, BEHAVIOUR AND PERFORMANCE IN DECISION-MAKING**

Presented by **Janne-Tuomas Seppänen**

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Birds may be able to use publicly observable presence, behaviour or performance of other individuals to make adaptive habitat choices. However, for this strategy to be better than the alternatives, the observer has to have not only the ability, but also opportunity, to be selective in its information use. We discuss the reasons why extending the strategy to presence, behavior or performance of ecologically similar heterospecifics could substantially increase both the frequency and quality of these opportunities, compared to conspecific setting. Furthermore, we describe a series of field experiments designed to test interspecific information use in cavity-nesting birds, which have revealed more complex selective information use than expected. By measuring the adoption of a novel, neutral, experimentally created apparent behavioural trait we have shown that Pied Flycatcher females can observe and utilize Great and Blue Tits in decision-making, but (1) are more likely to do so if arriving late, (2) are more likely to do so if the tit has high breeding performance, and most strikingly, (3) are able to avoid the observed behavior when the tit has low breeding performance. The last result in particular opens a new door in this field of research, because it now seems that selective information use happens at both ends of the continuum, further expanding the range of conditions where observing others can be adaptive.

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## STRONGER RESPONSE TO PREDATION RISK IN URBAN THAN RURAL HOUSE SPARROWS (*PASSER DOMESTICUS*)

Presented by **Gábor Seress**

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Predation is one of the most important ecological factors regulating population dynamics but it is unclear how predation changes with habitat urbanization. In this study we compared the risk-taking behavior of house sparrows (*Passer domesticus*) originating from urban and rural habitats to assess the difference in predation risk they had experienced in their habitats. We simulated predatory attacks for individually caged sparrows by moving dummies of their main predators, Eurasian sparrowhawk (*Accipiter nisus*) and domestic cat (*Felis catus*), and measured their risk taking as the latency to feed after the startle. We found that the risk taking of first-year young sparrows from both habitats tended to be similar and did not differ considerably between the sparrowhawk test and its control test (a box moving in the air). Compared to young, older birds of both habitats had similar latencies in the control test. However, the differences between older birds' reactions to the predator and control treatment differed between habitats: older urban birds responded by longer latencies to the sparrowhawk compared to its control treatment than older rural birds. We did not succeed in evoking anti-predatory response to the cat dummy as birds had similar latencies in the cat test and its control test (a box moving on the ground). Our results suggest that (1) birds' age, thus experience is an important factor of anti-predatory behavior in house sparrows and (2) among experienced individuals, urban sparrows are more sensitive to predation risk posed by the sparrowhawk than their rural conspecifics. The stronger response of urban sparrows implies that they are likely to be more exposed to predators (at least to sparrowhawks) than their rural conspecifics, which may have contributed to recent declines of urban house sparrow populations across Europe.

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## FEATHER COLOUR PATTERNS AND VISUAL EXPRESSION OF THE BADGE IN THE ROCK SPARROW

Presented by **Lorenzo Serra**

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Several studies have investigated the condition dependence of ornament feathers composed by melanin or carotenoid pigments, but little is known about ornament feathers which contain both. The Rock Sparrow (*Petronia petronia*) is a monomorphic species with a yellow throat patch that is a sexual signal. Throat patch feathers have a yellow tip (carotenoids), a depigmented middle area and a grey/black basal part (melanins). We experimentally manipulated the moult speed of two groups of rock sparrows by exposing them to differentially decreasing photoperiods and obtained one group of slow-moulting and one of fast-moulting birds, both balanced for sex. In a previous experiment, we demonstrated that this treatment reduced the expression of the badge (visible yellow area and spectral reflectance) in both sexes. Here we measured yellow, white and grey/black areas for each ornament feather and calculated the total area of the badge as the sum of the coloured areas of individual feathers. In both moulting groups, males had a greater yellow area than females. Similarly, slow moulting females showed a greater yellow area and a smaller grey/black area than fast moulting counterparts. We hypothesized that birds responded to a stressful environmental condition, e.g. rapid moult, by decreasing the yellow area in the ornament and concurrently by increasing the grey/black area. Fast-moulting males had ornament feathers with smaller yellow and larger melanin parts as fast-moulting females, but the number of badge feathers was larger than in slow moulting males. This suggests that fast moulting males partly compensated for the reduced quality of their ornamental feathers by increasing the number of feathers with carotenoid tips.

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## A MULTI-SCALE APPROACH TO WHITE STORK MIGRATION RESEARCH

Presented by **Judy Shamoun-Baranes**

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Over the last few decades, a wealth of data have been collected on white stork migration using a range of techniques such as visual observations, radar, ringing, tracking with gliders, satellite telemetry and GPS technology. Together these techniques can provide complementary data about migration from the individual to meta-population level, and have been used to study the influence of atmospheric dynamics on migration. However, integrating information collected at different scales, from different regions and conducting comparative analyses remains difficult. To try and integrate some of this knowledge and study the consequences of individual behavioural reactions to atmospheric conditions and the role of social interactions we developed Simsoar, an individual based model of soaring bird migration. Our model shows, for example, that under homogenous and good convective conditions, interaction between individuals results in quickly converging pathways at the small scale. Yet such models must be supported with data providing information at different spatial and temporal scales and a flexible GPS tracking system we have developed can fulfil this need. Our system can collect geographic locations and altitudes at different temporal rates from as often as every 3 seconds, as well as information on behaviour using a tri-axial accelerometer. The system design enables studying local movements with a great amount of detail as well as the migratory movements of the same individual. Through collaborative research we aim to study how instantaneous responses to ambient environmental conditions influences migration routes, timing and finally an individual's annual routine and breeding success. We strongly believe that collaborating and integrating information during the breeding season, en-route and in the wintering areas across multiple flyways will greatly benefit white stork conservation in a world that is changing quickly.

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## WHY AFRICA MATTERS: DISTRIBUTION AND HABITAT ASSOCIATIONS OF PALAEARCTIC-AFRICAN MIGRANT BIRDS IN WEST AFRICA

Presented by **Danaë Sheehan**

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Evidence suggests that Afro-Palaearctic migrant populations have declined in Britain and Europe in recent decades, often to a greater degree than resident or short-distance migrants, although this pattern is not universal and individual migrant species show contrasting patterns. As migratory bird populations may be affected by threats on the breeding grounds, wintering grounds or the stopover sites in between, they are vulnerable to the effects of environmental change on a wide geographical scale, making ascertaining the causes of their population changes very difficult. Potential drivers of migrant population declines are diverse and are spread across the migratory cycle. A recent RSPB review found that factors operating on the breeding grounds were important for a number of A-P migrants, but also uncovered persuasive evidence for factors operating on the non-breeding grounds. The available information for A-P migrants is biased towards conditions on the European breeding grounds, making it difficult to form robust conclusions regarding the relative importance of factors operating in different periods of the migratory cycle. The RSPB review identified that the highest research priority is to improve our understanding of the distribution and ecology of A-P migrants on their wintering and staging grounds, particularly undertaking basic research on the wintering ecology of migrants and on the effects habitat modification and change in Africa. New research work on A-P migrants and their habitats in west Africa, gathering data on a large temporal and spatial scale, has begun address this knowledge gap by quantifying seasonal patterns of distribution and habitat use and developing habitat association models that can be used to assess what environmental changes might be driving the observed declines.

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## UNRAVELLING THE EFFECTS OF TRANSLOCATION HISTORY VS POPULATION DECLINE ON A WIDESPREAD MIGRANT: THE CASE OF THE EUROPEAN WHITE STORK

Presented by **Jill Shephard**

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The White Stork has an extensive European breeding distribution and is notionally divided at the Elbe River in Germany to distinct migration pools with western individuals migrating across the Strait of Gibraltar to overwintering areas in the Sahel region in Africa, and eastern birds following a path through Istanbul to areas in southern Africa. Satellite tracking evidence suggests that individual birds, though highly vagile, show significant nest site philopatry and follow remarkably similar migration routes over many years. Significant country specific extinctions since the early 1900's have been countered by reintroduction programmes. However, significant concerns have been raised about the geographic origins of introduced stork and the effect this may have on individual biology, breeding success and genetic structure. Utilising a distributional wide sampling scheme we set out to characterize the distribution of genetic variation at the scale of the species range and between pre and post reintroduction populations. We were specifically interested in the identification of genetically differentiated migration pools, and the effects of random dispersal, migration ecology and translocation on current structure. Results showed very high levels of genetic diversity and suggest a significant level of genetic mixing at both temporal and geographic scales, with current diversity shaped by both bottlenecks and rapid demographic expansions. Additionally, there is strong evidence of highly divergent mitochondrial haplotypes that we suggest are refugial in origin. These data support the contention that extant migration pools do not have a genetic basis, and that the translocation of birds between pools as part of the reintroduction strategy has had little effect on levels of post reintroduction genetic variation.

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## CONCERNS REGARDING IMPACT RISK ASSESSMENT AND MANAGEMENT RECOMMENDATIONS FOR INVASIVE BIRDS

Presented by **Assaf Schwartz**

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Invasive species can be a major threat to biodiversity and the economy. Given the large number of introduced invasive species and the limited resources available, a rigorous assessment of the potential impact of these species is of vital importance for prioritizing management programs. Often, general scoring systems, in which certain criteria are used to assess the impact of an invader along several environmental and socio-economic categories, are applied to obtain a ranking of invaders. Recently, such risk assessments have been used to call for the eradication of several invasive bird species in Europe because of the environmental or economical threat they may pose. This is surprising, as recent reviews suggest that there is little evidence that invasive birds strongly impact biodiversity. In order to judge the value of general risk assessment scoring systems for invasive birds, we performed a careful analysis of the scientific literature on the five invasive bird species with the highest impact scores in Europe. We found that in the majority of cases, the evidence presented to support impact claims is weak, as it is generally not based on primary research but on anecdotal, local-scale observations. Moreover, invasive bird risk assessments tend to focus on negative interactions only, thereby ignoring potentially beneficial interactions between native and invasive species. We also note that it is crucial to take public opinion into account, as especially in urban areas, citizens may value the presence of certain alien birds. Integrating all these aspects into impact assessments is critical to develop relevant and achievable strategies against alien birds and for attaining biodiversity conservation goals, since ill-conceived calls for eradication could result in a public or decision-makers backlash.

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## ANTIOXIDANT MEASURES IN AVIAN BLOOD

Presented by **Elin Sild**

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The immune system protects an organism against infections by detection and destruction of parasites and pathogens. However, these processes come with a cost for the organism, for example in the form of oxidative stress, which is currently believed to play important roles in mediating trade-offs associated with life-history. Oxidative stress can be avoided or reduced with antioxidant molecules. Antioxidants come in a wide variety in both structure and function and make up a highly-regulated network, where the levels of some antioxidants may be in trade-offs with others, therefore it is very hard to assess organisms ability to counteract oxidative stress. Still in avian studies it is widely used practise to measure only few antioxidant compound or some general assay and then make conclusions about organisms general state of oxidative stress. Therefore, it is important to know how different assays and antioxidant levels correlate with each other. We show how different measures of total antioxidant capacity correlate with each other and blood levels of micro-molecular and enzymatic antioxidants in captive greenfinches.

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## INTRASPECIFIC AND INTER-ANNUAL SPATIAL PATTERNS OF BREEDING ACTIVITY IN A LEKKING GRASSLAND BIRD: A STUDY USING SATELLITE TELEMETRY

Presented by **João Paulo Silva**

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The lek is a rare mating system, where clustered male territories are visited by females with the single purpose of mating. The little bustard (*Tetrax tetrax*) is a grassland bird thought to breed in such a system. Our work was conducted at two priority conservation sites, within bustard areas of high breeding density in Alentejo, Portugal, during 2009 and 2010. In view of further insight of this species’ breeding system, we particularly aimed at understanding how males used space along the breeding season. Birds were tracked through satellite telemetry, recording approximately a GPS location every two hours. Home ranges were defined by 98% Minimum Convex Polygon (MCP), and within these areas, 50% Kernel calculated with Least Squares Cross Validation, was used to identify the core areas, corresponding to the nuclei of higher breeding activity. Overall 17 male breeding bustards were tracked: 5 birds for both years, 6 birds singly in 2009 and another 6 birds in 2010, summing 22 territories, as result of between 15 and 49 tracking days by season (with a mean of 267 locations per individual). The little bustard’s spatial pattern was found to vary greatly: five home ranges included at least two nuclei that were independent spatially and temporally, distanced between 3.6 and 62.3 km. The total number of nuclei used by each bustard varied between one and four, ranging in size from 0.18 to 21.07 ha. This result is likely to be related with different breeding strategies: some males concentrate their breeding activity at one particular small site along the whole season, while others occur in several sites, occupying a considerably larger area. All birds tracked for both years showed home range site fidelity, two of which also showed nuclei fidelity. Overall, data suggests that a variety of strategies can be adopted by the same individual or by different individuals between years or even within the same breeding season.

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## BIRD SOUNDS NEAR THE NEST: DO THE PARTNERS COMMUNICATE?

Presented by **Sergey Simonov**

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In general, specialists are familiar with the sound repertoire of birds near their nests. However, usually people pay attention to one type of such sound only — alarm signals, although there is no doubt that the spectrum of signals is not restricted to them. In field seasons 2007—2010 at the ornithological station “Mayachino” IB KRC RAS (Russia, Karelia), we tested the equipment for a long-time (more than 50 hours non-stop audio stream) sound recording with a small-sized microphones built into the nest construction. As model objects we chose some Sylviidae warblers: a blackcap warbler, a garden warbler, a whitethroat warbler and a lesser whitethroat warbler; also a willow warbler was under observation. In total, we have analyzed more than 900 hours of audio stream. We discovered a wide range of signals produced by both bird sexes during the whole nesting period. In most cases, we provided detailed characteristics of signals synchronizing the hidden visual observation with the long-time sound recording. For some species, we registered the female signals in response to songs and short signals of males. Sometimes willow warblers demonstrated the alternation of male’s and female’s signals while being near the nest (those signals looked like twittering). Males of the blackcap frequently used specific signals when they were near the nest with nestlings. Moreover, within the repertoire of the willow warbler we registered not only the generic sibilant signals but also the short sound “tchek” signals typical for the other genus — *Sylvia*. The question arising from these observations is: Do signals near the nest provide evidence for communication between reproductive partners? The possible answer will be discussed.

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## CHARACTERISTICS AND VARIATION OF TWO SONG VARIANTS IN THE SCARLET ROSEFINCH (*CARPODACUS ERYTHRINUS*)

Presented by **Katerina Sinezhuk**

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Adult male Scarlet Rosefinches (*Carpodacus erythrinus*) possess repertoires of two distinct song variants. The “long” variant consist of 6—7 elements and the “short” variant is half as long (on average 4 elements). In addition to structure disparity between these variants, there are essential differences in the patterns of individual and geographic variation. I studied vocal behaviour of Scarlet Rosefinches in the St Petersburg region, Poddubè village (10 banded males during the 2008 and 2010 breeding seasons) and in Kamchatka peninsula, Dolinovka village (8 banded males, 2009). I found that each adult male sings a single type of “short” and a single type of “long” variant. “Short” songs vary to some extent between males whereas “long” song types are usually common for all males within each studied locality. “Long” types differ significantly between St Petersburg region and Kamchatka. If males share the same “short” types, these, at first glance equal songs, vary individually, as show by a statistical discriminant analysis. Common “long” types also possess individual variation. There is also diurnal variation in birds’ use of two song variants, Scarlet Rosefinch males sing “short” songs during the morning peak of vocal activity and they use “long” songs mainly in the evening. First-year males (with dull female-like plumage) do not usually have the “long” variant in their repertoires; from 6 young males from both areas only one (from Kamchatka) displayed “long” songs at the end of breeding season. I suggest that two song variants in the Scarlet Finch’s repertoire could vary functionally. In particular “long” songs could encode a dialect identity. But to resolve this problem of different functions of two variants in the Scarlet Rosefinch’s song, additional investigations are necessary.

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## GEOGRAPHIC VARIATION OF SELECTION ON FIVE MALE PLUMAGE TRAITS IN THE PIED FLYCATCHER (*FICEDULA HYPOLEUCA*)

Presented by **Päivi Sirkiä**

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Local environmental and ecological conditions are commonly expected to result in local adaptations, but we have a relatively poor understanding of patterns of selection on phenotype across continent-wide spatial scales. In the pied flycatcher (*Ficedula hypoleuca*), male plumage colouration is highly variable both among and within populations. In addition to variation in melanin-based and structural colouration (UV), males have ornamental patches in forehead, wing and tail that vary greatly in size. For most of these traits, patterns of selection remain unknown throughout the breeding range. We collected standardised data on selection on male plumage colouration from 20 populations across the species' breeding range. We calculated standardised linear breeding date and fecundity selection estimates associated with male colouration traits. The selection estimates were further used to evaluate if there are consistent patterns in the selection on pied flycatcher male plumage colouration among populations. We studied if the selection pressure towards dark colouration and other male plumage traits strengthens with increasing distance to the sympatric area with the closely related collared flycatcher (*F. albicollis*) where selection is known to act towards brown dorsal colouration. In addition, we tested whether environmental factors, in this case the ones associated with latitude and longitude of the sampled populations, affect the selection acting on plumage colouration. We further determined the relationship between the observed phenotypic variation in plumage traits and selection on the traits and tested if selection with respect to two fitness components is reinforcing or divergent. As a result we gain better understanding on spatial variation of selection acting on phenotypic traits and factors that are maintaining the extensive variation in male colouration in the pied flycatcher.

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## **BIRDS FORAGE ON INVERTEBRATES ATTRACTED TO ROADS AND KILLED BY CARS**

Presented by **Piotr Skórka**

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Roads are a common element of human-modified landscapes nowadays. However, ecological effects of roads are poorly known and understood. We observed several passerine species (e.g., *Lanius collurio*, *Motacilla alba*, *Emberiza citrinella*, *Pica pica*, *Saxicola torquata*) that searched roads and road verges for dead insects and collected them. They also hunted live insects attracted to roads. We observed that the degree of the utilisation of roads as food resources by birds is positively related to the number of road kills. We believe that roads may be an ecological trap for birds, attracting them efficiently to find food resources but, simultaneously, exposing them to elevated collision risk with cars.

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## **SPATIAL STRUCTURE OF A COMMON GULL (*LARUS CANUS L.*) COLONY IN THE KAMA RIVER REGION OF THE URALS (RUSSIA)**

Presented by **Lydia Skryleva**

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This study was performed in a Common Gull colony (600 nesting pairs) on the Turinets island in the Kama reservoir (Urals, Russia; 58°40' N, 56°02' E). We studied fertility and morphological parameters of adult birds in the center and the periphery of the colony. In the centre of the colony 90% of nests contained 3 eggs; in 11% of nests the eggs were laid daily; in 89% of nests eggs were laid within 47 days. Eggs laid in the centre of the colony had larger yolk, egg white, and thicker shell. The mean mass of Common Gull eggs was 56.1 g (SD=5.2) in the center of the colony and 53.8 g (SD=4.5) in the periphery. In the birds nesting in the center of the colony, all size proxies (wing length, tarsus length, tail length) were significantly correlated, with wing length being the best size predictor. In the birds nesting in the periphery of the colony only the skeletal measurements (tarsus length, total body length) were significantly correlated. Strongly significant connection between body mass, wing apparatus and skeletal measurements was only found in the birds nesting in the centre of the colony. Our data suggests that mainly older birds nest in the center of the colony, whereas the periphery is occupied by younger individuals. Therefore, spatial structure of a Common Gull colony is manifested in differential productivity and is correlated with the morphology of adult individuals.

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## SOCIAL CONTEXT MODULATES SICKNESS BEHAVIOR

Presented by **Patricia Soares Castro Lopes**

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Sickness behavior constitutes an array of symptoms exhibited by an animal during the course of an infection. It is postulated to enable reallocation of finite energy resources to fight infection. Simultaneously, sickness behavior reduces other adaptive opportunities, such as mating. It could therefore be of adaptive value for animals to adjust their sickness behavior according to certain environmental circumstances or life-history stages. We tested whether social context affects the extent to which animals exhibit sickness behavior. As a model, we used a very gregarious passerine species, the zebra finch (*Taeniopygia guttata*). Sickness behavior can be transiently induced by an injection of lipopolysaccharides (LPS). We established 4 experimental treatments: LPS injected + Isolation, Control Injected + Isolation, LPS injected + Colony and LPS injected + Control. We collected data on behavior, mass and blood hormones. After an immune challenge, zebra finches kept in isolation markedly reduced their activity, in contrast to birds kept in a colony setting, hence demonstrating that social surroundings do modulate sickness behavior. These findings suggest an interesting trade-off: should animals invest in getting healthy or should they invest in appearing healthy?

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## **EGGSHELL BACTERIAL LOAD AND FOREIGN EGG RECOGNITION ABILITY OF HOSTS OF THE EUROPEAN CUCKOO. COMPARATIVE EVIDENCE OF COSTS ASSOCIATED WITH COGNITIVE PROFICIENCY OF BIRDS**

Presented by **Juan José Soler**

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Cognitive skills imply enormous advantages for animals, although there is considerable phylogenetic variation suggesting the existence of constraints affecting the evolution of cognitive proficiency. Phylogenetic constraints, but also energetic costs associated with brain size and cerebral activity may at least partially explain interspecific variation. Parasite-mediate selection may also contribute to the evolution of cognitive skills because parasites may affect development of the brain and learning ability. Here we tested this hypothesis in a comparative framework for birds using rate of feeding innovations (i.e. a measure of behavioral flexibility) and ability to detect foreign eggs in their nests (i.e. a measure of discriminatory ability) as proxies of cognitive skills. Eggshell bacterial loads, estimated for mesophilic and potentially pathogenic bacteria (i.e. *Enterococcus*, *Staphylococcus* and *Enterobacteriaceae*), were used as a surrogate of probability of contact with pathogenic bacteria. In accordance with the hypothesis we found that bird species with higher feeding innovation rates and rejection rates of experimental parasitic eggs had higher density of bacteria on their eggshells. These results suggest that both feeding innovation and ability to recognize foreign eggs are costly in terms of probability of bacterial infection. Furthermore, they highlight the importance of parasite-mediate selection in explaining the evolution of cognitive skills in animals in general and the evolution of antiparasitic defenses against brood parasites in particular.

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**THE WORLD MOST NORTHERN COLONY OF DALMATIAN PELICAN (*PELECANUS CRISPUS*) AND CORMORANT (*PHALACROCORAX CARBO*) IN THE LAKE SYSTEM SALTAIM-TENIS (NORTHERN FOREST-STEPPE OF OMSK REGION, WESTERN SIBERIA)**

Presented by **Sergei Soloviev**

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Dalmatian pelicans were captured several times in 1917 at the lakes in Omsk environs (Lavrov, 1925). Starting from the second half of the 20th century Cormorant and Dalmatian Pelican have been nesting on the lake Tennis (56°07' N, 71°45' E). In order to study the migration routes of Cormorants and Dalmatian Pelican, on August 10, 2006 on the island of the lake Tennis we captured and ringed 16 young cormorants, which were almost of the size of adult species but that had not fledged yet. Two found nests contained one-week old nestlings and eggs. As for the adult individuals, we recorded about 40 of them. On the same day we captured and ringed 14 young pelicans which were almost of the size of adult individual but that had not fledged yet. In total, we counted 16 unfledged young birds and 150 adult individuals on the same island. On August 10, 2010 on the island of the lake Tennis we captured and ringed 30 young individuals which were almost of the size of adult individual but that had not fledged yet. In total, we counted 80 unfledged young birds and 300 adult individuals on the lake. For further research of the migration of these species it is important to conduct telemetry studies.

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## HABITAT SELECTION OF THE MIDDLE SPOTTED WOODPECKER IN POLISH LOWLAND FORESTS BASED ON PREDICTIVE MAPPING APPROACH

Presented by **Krystyna Stachura-Skierczyńska**

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Predictive habitat models for focal species provide effective tools in conservation planning. Here we implement the maximum entropy (MaxEnt) approach to model the potential distribution of the middle spotted woodpecker *Dendrocopos medius* (MsW) in two managed Polish NATURA 2000 sites — Krotoszyn Oak Forest and Knyszyn Forest. According to previous studies, MsW prefers mature forests with large, rough-barked trees (mainly oaks). Such forests are often associated with high biological diversity. Consequently, MsW has been considered as an indicator of biologically valuable habitats, deserving particular attention with regard to their conservation and use. We investigated whether MsW occurrence similarly indicates potentially valuable habitats in case of two forests differing in species composition, stand structure and history of use. We used MsW locations from both studied areas, along with several environmental variables such as forest age, species composition and structure. For Krotoszyn Oak Forest the model strongly predicted the preference of MsW towards mature oak stands, which are common in this area. However, in the scarcity of such sites as in Knyszyn Forest, woodpeckers often selected the alternative habitat — wet, alder-dominated stands, rich in decaying wood. These sites were often inhabited by other rare woodpecker species, which suggests their outstanding biological value, comparing to the surrounding areas. We confirm that MsW can be a good predictor of mature, semi-natural and natural forest patches. However, its specific habitats may strongly differ regionally; therefore their potential value for biodiversity should be considered in terms of the whole studied landscape. Our study shows that predictive mapping, supplemented with ready-to-use forest inventory data can be valuable research tools in the ecology and conservation of specialized forest bird species.

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## SEA CROSSINGS BY SOARING AND GLIDING — ARE THERE THERMALS OVER THE SEA?

Presented by **Herbert Stark**

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Many raptors and other large birds like cranes and storks migrate mainly by soaring and gliding. It is well accepted that they make use of thermals from the ground, which restricts this flight behaviour to flights over land. Therefore, these migrants avoid large sea crossings and prefer to cross open water at narrow straits like Gibraltar and the Bosphorus. Nevertheless, there are various anecdotes of larger birds crossing the sea and gaining height by soaring above open water bodies. In this study we analysed numerous cases of soaring migrants, while crossing the Baltic Sea. Honey buzzards, Common buzzards and cranes have to cross the Baltic Sea twice a year in spring and autumn. Usually they switch from soaring and gliding over land to the much more energy consuming flight style of flapping over the sea. During several radar studies from 2005 to 2010 at the Baltic coastline (from Rügen to Fehmarn, spring and autumn migration) we occasionally tracked buzzards and cranes soaring and gliding over the water surface. These radar tracks allow to reconstruct detailed 3D flight paths and were confirmed by parallel visual observations to identify the species. We show how these species are soaring above the water surface and investigate which environmental factors may be responsible for the rising air. We discuss whether differences between water and air temperature might be responsible for the specific conditions, allowing these migrants to soar above the Baltic Sea. This would imply that sea crossing under such conditions might be less costly than assumed before.

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**SIMILAR, YET DIFFERENT: MIGRATION STRATEGIES OF THE REED  
(*ACROCEPHALUS SCIRPACEUS*) AND SEDGE (*A. SCHOENOBAENUS*) WARBLERS  
IN AUTUMN ON THEIR SOUTH-EASTERN FLYWAY**

Presented by **Katarzyna Stępniewska**

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The Reed and Sedge Warblers are closely related Palearctic habitat-specialists, connected with reed habitats. In autumn they leave their breeding grounds in Europe early and winter in sub-Saharan Africa. The knowledge of their migration strategies from the south-eastern flyway is still lacking. In this study I analyzed the data collected in autumn in different years between 2001 and 2008 at 17 stations belonging to the SEEN (South-East European Bird Migration Network), located in Poland, Ukraine, Turkey, Jordan and Egypt. Total numbers of caught birds, retraps and fat score were studied. Reed Warbler was more numerous than Sedge Warbler at most of the stations. Sedge Warbler had lower retrap rates almost everywhere. For Reed Warbler the mean fat score of ringed birds increased gradually from northern to southern latitudes. There was no such clear tendency for Sedge Warbler and the species had a very high mean fat score in north-east Turkey. This may indicate the place where Sedge Warblers start non-stop flight across a large geographical barrier — Mediterranean Sea, and probably afterwards through Sahara desert without refueling. Finally, this study points out the need for more detailed research on south-eastern flyway including other Palearctic migratory species.

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## **WHAT INFLUENCE DOES THE MIGRATORY STRATEGY OF THE SPECIES HAVE ON THE DIFFERENCES IN WING PARAMETERS BETWEEN JUVENILES AND ADULTS?**

Presented by **Krzysztof Stępniewski**

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The morphology of a bird's wing is the result of various selective pressures acting upon it; two of the most important are predator evasion and migration. Their impact is different depending on the age of the bird as well as its migration strategy. A bird should have wings that would allow it to minimize the risk of falling victim to a predator — and this risk is related to the experience of the individual connected with its age. In the same time, the wings should enable the bird to cover its migration distance with optimal energy expenditure. Both these pressures often promote different solutions and the final wing parameters are the trade-off between them. As a result, wing parameters of adult and juvenile birds may differ, and it can be presumed that these differences should depend on the migration strategy. This has already been proved for populations of the same species having different migration strategies. The aim of this study was to check if these relations occur on the interspecific level as well. I used the measurements of passerines belonging to 64 species, ringed at the Operation Baltic stations on the Polish Baltic coast in the years 1965—2005. The species were grouped in categories according to migration strategies (sedentary, short-distance and long-distance migrants) and various wing parameters were considered (wing length, pointedness and asymmetry). Different models given in the literature were evaluated and new models were proposed, which describe the influence of the migratory strategy on the wing parameters of the Passerines, considering the differences between adults and juveniles.

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## **WATER RAIL (*RALLUS AQUATICUS*) AND LITTLE CRAKE (*PORZANA PARVA*) SPATIAL AND TEMPORAL NICHE OVERLAP IN THE BREEDING SEASON**

Presented by **Alexandru Nicolae Stermin**

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Nowadays around a quarter of all rail species are globally threatened. Since 1600 at least sixteen species have become extinct. The little crane is a species that is vulnerable and a priority for conservation in Europe, listed on Appendix I on EU Wild Birds Directive, Appendix II on Bern Convention and Appendix II on Bonn Convention. Between April and August 2010 we located nests, measured the water depth and the density of vegetation at the nest site. Also we approximated the percentage occupied by cattail and reed around each nest and in all marsh vegetation of each wetland. Water rails started to build their nests in the period between May 1 and 5 and the little cranes built their nests starting from May 26 to 31, i.e. more than 25 days after the water rail. Analyzing the habitat preferences of these two species we observed that their niches overlap in terms of water depth and vegetation density. Water rails are territorial during the breeding season and are very aggressive with other bird species, thus we speculate that competition with water rails is one of the reasons implicated in little crane population decline, which should be taken into account in conservation programs for this species.

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## PREDICTING THE POTENTIAL DISTRIBUTION OF INVASIVE ESTRILDID FINCHES (ESTRILDIDAE)

Presented by **Darius Stiels**

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The ability to predict regions potentially suitable for invasion by alien species, which are hence at high risk, has become a core task for successful environmental management. Estrildid finches comprise a group of small tropical birds, which mainly inhabit open habitats like savannahs and wetlands. Many of them have been introduced into various parts of the world, where they have colonized diverse habitats, including agricultural areas. Herein, we assess the potential distribution of some of the most successful invasive granivorous passerines (i.e., members of the genera *Lonchura*, *Amandava* and *Estrilda*). Therefore, we use the software MAXENT, a machine learning algorithm that is widely used to predict potential distributions of non-native species. Models were derived from species occurrence records compiled from various sources. As the selection process of species records is known to influence results, our models were trained separately with records from the species' native range and from both invaded and native ranges. To compare these models, we use principle component analyses and subsequently linear discriminant analyses to test for niche similarities in ecological space. Preliminary results indicate species-specific differences, underlining the importance of the selection process of species records for modelling invasive species.

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## EGG PHENOTYPE AND GENETIC DIFFERENTIATION AMONG SYMPATRIC CUCKOO HOST RACES

Presented by **Bård G. Stokke**

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Generalist parasites may evolve host-specific races that each specialize on particular host species. Many such races originate from geographically structured populations where local adaptations to different host species drive the differentiation of distinct races. However, in sympatric populations where several host races coexist, gene flow could potentially disrupt such host-specific adaptations. We investigated egg trait and genetic differentiation among three sympatrically breeding host races of the brood-parasitic common cuckoo (*Cuculus canorus*). In this species, host-specific adaptations like egg mimicry are assumed to be controlled by females only, possibly via the female-specific W-chromosome, thereby avoiding that gene flow via males disrupts local adaptations. Thus, we would expect variable but generally poorer mimicry because of host switches or inter-gens gene flow via males if these also contribute to egg phenotypes. However, we found that egg phenotype matching for both background and spot colors as well as for egg size has been maintained in close sympatry despite the possibility for gene flow. Although males were more likely to have offspring in two different host species (43% versus 7%), they did not have significantly more descendants being raised outside their putative foster species than females (9% versus 2%). We found significant genetic differentiation for both biparentally inherited microsatellite DNA markers and maternally inherited mitochondrial DNA markers. Our results imply that males also may contribute to the evolution and maintenance of the different races, and hence that the genes responsible for egg phenotype may be found on autosomal chromosomes rather than the female-specific W-chromosome as previously assumed.

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## IMPACT OF FORESTRY ON BREEDING PERFORMANCE OF BLACK STORK AND IMPLICATIONS FOR CONSERVATION

Presented by **Māris Strazds**

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After re-gaining the independence in Latvia, intensity of forestry almost tripled. At the same time, the ratio of unproductive nests of the black stork (*Ciconia nigra*) increased significantly. This suggests a negative role of forestry. A special study was conducted in 2003—2005 to assess the impact of forestry. Additionally, we have analyzed reasons for the abandonment and translocation of 301 nests in 257 territories since 1979. We registered all forestry operations in the vicinity of nests (closer than 1 km) during each nest inspection. The time of the operations which did not occur during the inspection itself was estimated the nearest of one month. The proportion between successful and unsuccessful breeding differs significantly between years with and without disturbance. In years without disturbance, the probability of success was 0.718, dropping to just 0.184 in years with disturbance. The likelihood of nest abandonment was also significantly different. No nests were abandoned without disturbance, while during years with disturbance, the probability of nest abandonment reached 0.442. During years of disturbance, the season of the disturbance affected breeding success significantly. None of the nests disturbed in April was successful, while after disturbances in other seasons, about 50% of pairs bred successfully. The distance of the disturbance also has an effect on breeding success. In summary, forestry-related disturbance, particularly in the spring, can be held responsible for omitted breeding seasons or breeding failures in approximately 70% of the relevant cases. We recommend to halt all forestry activities in Latvia at least during the month of April, and to expand the buffer zone around micro-reserves for black stork nests to no less than a radius of 500 meters around the nest.

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## **ESTIMATING UNBIASED AVIAN SPRING ARRIVAL DATES USING AN ADAPTED SITE-OCCUPANCY MODEL**

Presented by **Nicolas Strebel**

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Much of the evidence for recent changes in phenology of migrating bird species is based on data from long-term monitoring programs. However, phenology measures obtained from monitoring data are likely to be biased if the number of occupied sites or the probability to detect a species changes over time. Although such bias in phenology measure is acknowledged in the literature, few methods exist to analyze phenology changes by accounting for site occupancy and detection probability. Here, we extend a traditional site occupancy model that was developed to estimate site occupancy of species with imperfect detection by accounting for the different arrival of the species at the study sites. Using simulated data, we show that our model provides unbiased estimates of phenology measure and compare the estimates from our model with the estimates from traditional analyses. Furthermore, we apply our model to real data of migrating bird species from a long-term monitoring program in the canton of Aargau, Switzerland.

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## **INVASIVE ALIEN BIRDS IN EUROPE: EVIDENCE FOR CLIMATIC NICHE SHIFTS?**

Presented by **Diederik Strubbe**

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Invasive alien species rank among the most pervasive threats to global biodiversity, but predicting invasion success of non-native species remains difficult. One of the main tools used to assess the probability that a species will be able to invade a certain area are species distribution models (SDMs). These techniques relate species occurrences to environmental descriptors and can be used to characterize the (climatic) niche of a species in its native range. Projecting models built in the native range onto the invaded ranges yields spatially explicit predictions of the suitability of the environment for the species under consideration. SDMs implicitly assume that climatic niches are conservative, i.e., that niches are fixed and immutable characteristics of a species, unchanging over space and time. However, recent findings of niche shifts during biological invasions have shown that this assumption is not always valid. Detecting niche shifts is thus paramount for our ability to predict the invasion success of non-native species. Niche shifts may be caused by evolution of the fundamental niche of a species, changes in its realized niche or can also be due to statistical artifacts related to the techniques used. Using a novel methodology that allows comparing species niches directly in the climatic space, we will analyze a large database holding information on the distribution of non-native birds species in Europe (available from the DAISIE project). This will yield insight in the prevalence and conditions of niche shifts, while also providing a large scale assessment of the validity of SDM-derived predictions of invasion success.

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## CITY SLICKERS — HABITAT USE, BREEDING BIOLOGY AND FEEDING ECOLOGY OF URBAN KESTRELS (*FALCO TINNUNCULUS*)

Presented by **Petra Sumasgutner**

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Among all raptors the Common Kestrel (*Falco tinnunculus*) is the most abundant aerial predator in Vienna (city area 415 km<sup>2</sup>) with approximately 350—400 breeding pairs. This population density is considerably higher than in other European cities and rural areas. A decisive factor in this may be the diverse structures offered in cities and a correlative abundance of nesting sites and prey availability. Our research analyzes the influence of demography and environmental factors on urban breeding Kestrels. The large sample size of 307 confirmed nest sites in 2010 provided a broad basis for habitat analysis. From those nests we selected 36 for particular investigation of the success strategies and adjustments of urban breeding Kestrels. Raptors need large home ranges that may extend beyond the urban boundaries and therefore they do not need to satisfy all their ecological requirements in inner-city districts. Considering the large clutch size of Kestrels, it seems to be inefficient to fly long distances to hunt voles outside the city; therefore they switch to prey of similar size with poorer caloric intake, but occurrence in urban areas, like passerines. We conclude that the cost-benefit ratio defined by nutritional value and hunting effort, shifts within the periphery. We also compare the abundance of potential prey to diet choice, analyzed from collected pellets and direct monitoring via video-system. In some predatory, size-dimorphic bird species early breeding females produce more daughters, which can be related to the geographical scale. We want to find out whether an urban gradient has a comparable effect on sex-ratio in offspring. The analysis of kinship in urban Kestrels focus on the number of paternities in one brood to investigate the effect of extra-pair copulation and parental investment. An understanding of the costs and benefits of urban breeding Kestrels is crucial to analyze causes of population limitation and deduce adequate measures for conservation.

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## A COMPARISON OF MICROSCOPY AND PCR DIAGNOSTICS FOR LOW INTENSITY INFECTIONS OF BLOOD PARASITES IN A BOREAL PASSERINE BIRD

Presented by **Valērija Suraka**

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This study compares the sensitivity of a polymerase chain reaction (PCR)-based method and microscopy examination of blood smears for diagnosing avian malaria (*Plasmodium* and *Haemaphysalis*) and closely related hematozoan parasite, *Leucocytozoon*, prevalence in Siberian tits (*Parus cinctus*) breeding in northern Finland. During molecular analysis we used PCR screening and RFLP as post-PCR diagnostic step. The blood parasites were found in the blood of 95% of 40 breeding Siberian tits by using molecular methods, while the prevalence of avian malaria and *Leucocytozoon* spp. was found to be significantly lower when the same samples were tested by microscopy. However, habitat and sex effects on the total count of parasites, *Plasmodium* spp, *Haemaphysalis* spp. and *Leucocytozoon* spp. counts appeared to be similar when obtained by either screening methods. Microscopy examination of blood smears and PCR diagnostics showed the same prevalences for *Leucocytozoon* spp. infections. Prevalences of *Haemaphysalis* spp. and *Plasmodium* spp. determined by molecular methods were significantly higher than the prevalence determined by microscopy screening. The results of this study suggest that PCR diagnostic and subsequent use of RFLP analysis may be sufficient to avoid the risk of co-amplification of closely related genera of blood parasites, while microscopy is a reliable method for detecting blood parasites of birds except for diagnosing chronic, low intensity infections.

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## HOW CAN WE BE MORE EFFECTIVE IN CONSERVING BIRDS?

Presented by **William Sutherland**

William Sutherland

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I believe we are less effective than we should be due to not considering the issues that might arise, not planning our research sufficiently, not taking sufficient notice of the existing literature and not learning from experience. I will describe a collaborative horizon scanning project identifying the current and possible future threats and opportunities to shorebirds. We will be close to completing a synopsis of the evidence relating to conservation. This project, led by David Williams, is collating the global evidence on the effectiveness of interventions relating to bird conservation. This will also be available for inspection at a stall at the conference. I will describe how we can use the collation of evidence to identify research priorities for conservation action. Successful conservation is likely to require collaboration of policy makers and practitioners and I will describe how this could operate.

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## THE STATUS OF THE WHOOPER SWAN (*CYGNUS CYGNUS*) POPULATION IN NORTHERN AND CENTRAL EUROPE

Presented by **Saulius Svazas**

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Changes in numbers and breeding distribution of Whooper Swans throughout the last 50 years were analyzed in Central Europe and in the northeast European tundra of Russia. A significant northwards shift of the distribution range of the species has recently been recorded in the tundra region, with breeding birds found in the Novaya Zemlya and Vaigatch Islands of the Barents Sea, on the Kanin Peninsula, in the major part of Malozemelskaya Tundra and in the western part Bolshezemelskaya Tundra (up to 68°31'N). The total breeding population of the Whooper Swan in the northeast European tundra region is estimated at about 10 000—12 000 individuals and is increasing. A rapid increase in numbers and the south-westwards breeding range expansion of Whooper Swans was recorded in Central Europe since the 1970s—1980s. The breeding range of the species in this region has expanded by more than 1000 km and presently covers the Baltic States, Poland and partly Belarus, Ukraine and Hungary. The man-made wetlands (extensively used fishponds, ponds, exploited peat extraction sites, etc.) are the preferred nesting sites of Whooper Swans in this region. It is likely that recent changes in numbers and distribution of Whooper Swans were mainly caused by the improved protection measures for this species, impacts of global climate change and formation of new types of habitats suitable for these birds in different regions of Europe

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## DISTRIBUTION AND ABUNDANCE OF RED-BACKED SHRIKE (*LANIUS COLLURIO*) IN ROMANIA BASED ON COMMON BIRD MONITORING DATA

Presented by **Zoltán D. Szabó**

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The red-backed shrike (*Lanius collurio*) is one of the country's flag species: both because Romania hosts the largest population in Europe (except European Russia) and because it is still a common, widespread species. Little is known about the red-backed shrike recent historical status and distribution at the country level, mainly due to lack of a nationwide evaluation programme. In this presentation we summarize the results obtained from the Romanian Common Bird Monitoring project. The scheme started in 2006, using a point-count survey with semi-randomized sampling design. Based on five years data (2006—2010) from over 200 monitoring plots we are able to calculate for the first time at the national level the density and estimated population size, using GIS tools to interpolate spatial data. The national level results were then compared to data collected at a smaller scale, using line transect surveys. Compiling all this information, we have now a clear picture of species status in Romania, based on recent, best available data. This information can be used as a baseline for future surveys.

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## IS IMMIGRATION LINKED TO NATAL RECRUITMENT IN A COMMON TERN COLONY?

Presented by **Lesley Szostek**

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In an ongoing study we estimated immigration rates at the Common Tern colony "Banter See" in the German Wadden Sea over a 19-year period. All breeding birds, native and immigrant, were recorded each year. Individual life histories of all native terns were collected, with re-sighting probabilities as high as 100% for breeders, which allowed for very accurate estimations of vital rates, such as survival, recruitment rate and age at first breeding. Non-native breeders at the colony could be identified as such, as all native birds were marked with transponders and rings. According to the laying date of immigrant terns we could approximate the proportions of experienced breeders and recruits among the immigrants by comparing them to laying dates of native breeders. Strong inter-year fluctuations could be seen in the immigration rate at this colony. In order to identify which environmental attracted immigrants in some years more than others, we linked variation in immigration rate to various proxies for environmental quality, specifically colony size (conspecific attraction), breeding success, return rate and recruitment rate. Preliminary results suggest that high recruitment rates bring on immigration waves.

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## VARIABLE INTENSITY OF MATE GUARDING IN REED WARBLER (*ACROCEPHALUS SCIRPACEUS*)

Presented by **Hanna Sztwiertnia**

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Mate guarding is one of paternity protection behaviours which consists of females being followed very close by their social mates. Many previous studies have shown that male mate guarding is a common way of preventing infidelity and maximizing paternity assurance in birds – as one of the sperm competition strategies. In socially monogamous species it is very important for males to coincide paternity guard with female's fertility peak. The intensity of mate guarding is variable and is expected to be related to risk of paternity loss. I observed intensity of male mate guarding in individually marked population of Reed Warbler (*Acrocephalus scirpaceus*) at the Milicz Fish-Ponds (nature reserve in SW Poland) from 2006 to 2010. Observations were made throughout the breeding season: from early May to the end of July. I collected blood from adult birds and their nestlings for the paternity analysis, which was also conducted. As previously discovered, in this population, male Reed Warblers can adapt their behaviour to risk of losing paternity by increasing intensity of mate guarding when the risk is high. Guarding was significantly more intense in the females' fertile period. Males followed their mates very closely, spending most of their time closer than 0.5 m from females. Here, I present how intensity of mate guarding is restricted or extended by some environmental conditions. I examined vegetation height in proximity of the nest of the pair, where the mate guarding behaviour had been observed. Number of neighbouring pairs and their brood status (building nest, incubation, feeding nestlings) were noted. Mate guarding intensified as the breeding season elapsed. Growth of vegetation and increasing number of neighbours may influence intensity of mate guarding, both affecting risk of paternity loss. Staying close to females is more difficult in higher vegetation. The probability of meeting a rival is higher when the density of breeding pairs is increasing.

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## THE GREATER FLAMINGO (*PHOENICOPTERUS ROSEUS*) IN THE LA MANCHA HÚMEDA BIOSPHERE RESERVE (CENTRAL SPAIN)

Presented by **Aina Taberner**

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The first reference made to the presence of flamingos (*Phoenicopterus roseus*) at the La Mancha Húmeda Biosphere Reserve (Castilla La-Mancha, Spain) dates back to the end of the 19th century on the Alcázar de San Juan shallow lakes. Since 1985, the species has returned at more regular intervals and groups of flamingos of varying sizes have been recorded, mainly during migration periods. Since 2005, reports of the presence and number of common flamingos on ponds and shallow lakes in the Biosphere Reserve have intensified. The first time that successful breeding took place in Castilla-La Mancha dates back to 1999 when flamingoes started a breeding colony on the Pétrola shallow lake (Albacete). Since this year breeding has not been successful; however, in 2010 breeding took place at the Manjavacas shallow lake of the Biosphere Reserve (2°51'N, 39° 25'W; Datum ETRS89; 670 m a.s.l.). From 2006 to 2010, we monthly monitored the flamingoes over several lagoons of the La Mancha Húmeda Biosphere Reserve and more the 500 PVC rings have been controlled. The highest number we have recorded in the La Mancha Húmeda Biosphere Reserve is 6138 flamingos, spread out over several lagoons in June 2010. In the breeding colony of Manjavacas, we recorded 1081 nesting platforms and 734 youngs, belonging to three breeding centers. The number of adults and youngs were higher than 3000. Although flamingoes from Italy, Turkey, Algeria, have been observed, the higher number of flamingoes at the Reserve Biosphere mainly proceeded from Fuente de Piedra (Málaga) and La Camargue (France).

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## IMPORTANCE AND EVALUATION OF THE INTERNATIONAL BLACK STORK COLOUR RINGING PROGRAMME

Presented by **Eniko Anna Tamas**

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In 1994, an international colour-ringing project on Black Storks was started by coordinators in 12 countries, mainly in Europe. In the following years several other countries joined the project. At the start of the project the colour-rings were orange, with a 3 digit inscription in black. The first inscription is a number or letter which refers to the country of origin: Austria (2), Belgium, France and Luxembourg (C), Bulgaria (A), China (9), Croatia (4), Czech Republic (6), Estonia (7), Germany (H), Hungary (5), Israel (ME), Italy (I), Latvia (0), Poland (1), Portugal (M), Romania (R), Serbia (X), Slovakia (8), Spain (E), White Russia (3) and Zimbabwe (Z). In Spain, Belgium and Czech Republic several other combinations have been used as first inscription. Since 2001, the standard coding is a white ring with black inscription with the first inscription the country code. Since the start of the project an impressive number of Black Storks have been colour ringed. Many hundreds of recoveries from these birds are an important source of information to study the migratory behaviour and the occurrence at breeding, summering, stopover and wintering sites. We analysed these data according to the place and time of occurrence. Post-breeding, first and second year, as well as older individuals have recovered, during spring and autumn migration, as well as in breeding season. We now have a considerable amount of recovery data, thus survival rates and dispersion can be estimated, and the fidelity to migration routes and stopover areas can be seen.

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## **BEYOND THE “INDICATORS CONCEPT” — INTRODUCING A NEW METHOD FOR EVALUATING POPULATION CHANGES IN GROUPS OF BIRD SPECIES**

Presented by **Tomas Telensky**

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When trying to identify causes of decline or increase of a bird population, the species are often grouped by certain criteria (e.g., by habitat, diet or migratory strategy) and their trends or indices are evaluated in groups. Currently, indicators (geometric mean of species' indices) are widely used, but such indicator itself does not provide any means to assess the trend of the whole group statistically or to perform comparison among several groups. For this purpose, the common practice is to process the group trends using statistical tests like t-test or ANOVA. This approach has several problems. We discuss these problems and propose a new method which further develops the concept of indicators so that we can directly evaluate the trends of the the species' groups (with their confidence intervals) and perform comparisons among them. We also propose a new method for controlling for the effect of one indicator on another. In this method, all indicators are computed at once using a single linear model. Application of these methods is presented on Czech common birds, grouping them by several ecological traits.

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## **EFFECT OF STRESS HORMONE AND SEVERE WEATHER CONDITIONS ON THE INCUBATION BEHAVIOUR OF ADÉLIE PENGUINS (*PYGOSCELIS ADELIAE*)**

Presented by **Anne-Mathilde Thierry**

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The time and energy demands of egg incubation can be substantial, and represent an important component of reproductive costs in birds. Corticosterone (CORT), the main avian stress hormone, can potentially mediate resource allocation, allowing animals to adjust their physiology and behaviour to changes in the environment. In this study, we investigated the effects of elevated baseline CORT levels and severe weather conditions on parental investment during incubation in the Adélie penguin (*Pygoscelis adeliae*). To do this, circulating CORT levels of male Adélie penguins were experimentally increased and birds were monitored throughout the reproductive season. Incubation behaviour was recorded using dummy eggs that measured egg temperature and rotation rates. Our results show that elevated CORT levels negatively affected both parental investment during the incubation period and reproductive success. Nest desertion rate was higher (64% vs. 7% for controls) and occurred earlier ( $14.7 \text{ days} \pm 0.9$  vs.  $21.5 \pm 1.8$ ) for birds with CORT-implants. Meanwhile, the eggs of CORT-treated penguins that did not desert their nest were incubated for 3 more days than controls. Indeed, incubation temperatures of CORT-treated birds were  $\sim 2.4^\circ\text{C}$  lower. Moreover, incubation temperatures were markedly decreased in CORT-treated birds during blizzard. Taken together our results support the hypothesis that CORT participates in the allocation of available energy. Elevated baseline CORT levels induced a decrease in energy allocation during reproduction to the benefit of self-maintenance and future reproductions. Further studies should precise the effects of environmental conditions on incubation behaviour and embryonic growth, and consequently hatching date and chick quality. Indeed, modifications in weather conditions in Antarctica are predicted due to global climate change and might affect breeding success of seabird species.

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## HOME RANGE AND HABITAT USE OF WINTERING WHITE STORKS

Presented by **Kai-Michael Thomsen**

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For more than twenty years, satellite tracking employing the ARGOS system was used to study the migration of White Storks (*Ciconia ciconia*) between Europe and Africa. The new generation of GPS transmitters provides high numbers of accurate locations. In 2009 and 2010, NABU (BirdLife Germany) marked seven White Storks with 30 g GPS satellite transmitters in northern Germany. One stork took the western migration route to Spain, and six storks migrated along the eastern route to east and south Africa. In 2010, five out of six birds stayed in an area around Lac Fitri in Chad. The remote sensing data were entered in a GIS. The location data were overlaid with land cover maps and climatic data, and the individual home ranges were analyzed.

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## COMPARATIVE PHYLOGEOGRAPHY OF EAST ASIAN PASSERINES AND THE EVOLUTION OF MIGRATION

Presented by **Dieter Thomas Tietze**

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Within an international collaborative project we studied potential causes for the latitudinal diversity gradient in passerine birds of the Himalayas. We compiled DNA sequences for these over 400 species to provide a phylogenetic framework for our further analyses. In order to evaluate the impact of geographic origin on the establishment of gradients in species richness, we performed ancestral-area reconstructions for 58 monophyletic species groups around genus level on a continental scale (Palearctic and Oriental regions). We therefore applied traditional parsimony-based methods as well as likelihood-based approaches the most recent of which also account for missing species. Beside our project's main objective we applied this dataset to the evolution of long-distance migration: Are geographic origin and percentage of migrating species per given clade correlated? If yes: Did long-distance migration evolve in a temperate or a tropical ancestor? If no: Which other (ecological) factors drove the evolution of migration in these clades? Answers to these questions are complicated by multiple emergence of migration in any given clade, necessitating a combination of binary-state and geographic-state evolutionary analysis of the phylogenies.

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## **PREDATOR-INDUCED CHANGES IN PARENTAL FEEDING PATTERNS IN TWO HOLE-NESTING PASSERINES**

Presented by **Vallo Tilgar**

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Many species alter reproductive behaviour under stressful conditions. Limited evidence suggests that under food limitation parents reduce overall provisioning rate, while increasing selectivity of food distribution within brood in favour of senior siblings. However, how acute stressors such as predation risk influence parental provisioning is poorly understood. We investigated predator-induced stress effects on parental provisioning strategies in two passerine birds, the pied flycatcher (*Ficedula hypoleuca*) and the great tit (*Parus major*), when nestlings were 3–5 days of age. We found several species- and sex-specific differences in parental provisioning under fear stress. Pied flycatchers reduced feeding rates remarkably when exposed to a predator of adults, whereas this was not the case for great tits. However, female great tits under fear stress significantly reduced the average duration of brooding bouts. Fear stress affected food distribution among siblings only in the pied flycatcher. In normal conditions, pied flycatchers preferred senior chicks to juniors, whereas this preference disappeared under predation risk. In great tits, food allocation rules between siblings were sex-dependent, but unaffected by fear stress. Male tits preferred senior siblings to juniors irrespective of the stress level, while females always provided food equally to different-sized siblings. We conclude that passerines alter several aspects of their provisioning behaviour in response to fear stress, and stress-induced reductions in provisioning rates or the time spent brooding may have cumulative and potentially harmful consequences on offspring fitness.

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## THE PHENOLOGY OF SPRING ARRIVAL OF BIRDS IN LATVIA FROM 1830 TO 2010

Presented by **Mārcis Tīrums**

Mārcis Tīrums

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Ornithophenological observations are one of the most ancient methods of investigation of bird migration; nevertheless, nowadays it is comparatively rarely used in comparison with other, technically complicated and expensive methods. The objective of the current study is to summarize phenological long-term trends of spring arrival of birds recorded in Latvia over the period 1830–2010. In Latvia the systematic recording of phenological events, like arrival of birds, has not been traditionally undertaken. We collected the first bird arrival data from various published and unpublished bird records. The first recordings of bird phenology in Latvia associated with the Baltic German naturalists. In the end of 20th century the regular registration of spring arrival of birds was started in 1993 by the Latvian Ornithological Society, and continues till nowadays. Until the beginning of 2011 the database includes information from 7400 questionnaires, for more than 80 000 records of migratory bird species. The first results reveal that the short distance migrants in last 60 years are arriving approximately 2.2 days per decade earlier. The long distance migrants are arriving 0.18 days per decade later. The most significant changes occurred in the arrival of the *Grus grus*, *Ardea cinerea*, *Cygnus cygnus* and *Buteo buteo*. Arrival date of *Grus grus* is getting earlier on average at a rate of 6.2 days decade. Since 1989 the arrival trends of short distance migrants reveal a slightly trend towards later arrival. To the best of our knowledge, no recent analysis of standardized time series of arrival dates have been published for Latvia, with the exception of a short-term data set of spring migration dates in Latvia over the period 1993–1999 and period from 1947–1987 for older time series of first arrival dates of birds in Snēpele.

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## **SPECIES-SPECIFIC REACTIONS OF MIGRATING RAPTORS TOWARDS WIND TURBINES: A CASE STUDY FROM SOUTHERN EUROPE**

Presented by **Ricardo Tomé**

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Portugal has one of the highest growth rates in wind production in the world and has over 2000 wind turbines in operation. The south-western region is one of the preferred areas to install turbines. However, this region is also the most important area in Portugal for the autumn migration of raptors, holding international importance as a secondary route of the main flyway to Gibraltar. We investigated the effects of the implantation of the largest wind farm in the region (twenty-five 2 MW turbines) on different species of raptors. The study started in 2004, in the pre-construction phase. Raptors were counted from fixed vantage points and observers mapped all individual movements and registered flight heights and interactions with turbines. In 2010, an X-band radar was also used to increase detection rate and obtain accurate trajectories. About 4000 raptors were estimated to cross the area yearly, most numerous species being Griffon Vulture, Booted Eagle, Short-toed Eagle, Common Buzzard, and Sparrowhawk. The diversity of species and the overall number of raptors observed did not vary after the implantation of the turbines, nor after the beginning of the exploitation phase. However, we observed species-specific changes in movement patterns, caused by the turbines presence. The number of movements of medium-sized species, e.g., Booted Eagle and Bonelli's Eagle decreased markedly near the turbines after their implantation, while the routes of large raptors, e.g., Griffon Vultures and Black Vultures, were not affected. Additionally, many smaller species started to fly significantly higher over turbines in comparison to flight heights used before their implantation. In contrast, flight height of larger species seemed not to be affected. We evaluate the impacts of wind farms in the region, considering potential collision risks and barrier effects for different species and discuss the possible implications for migratory behaviour and survival.

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## VARIATION IN APPARENT ADULT SURVIVAL OF GOSHAWK MALES IN FINLAND IS EXPLAINED BY MID-WINTER TEMPERATURES

Presented by **Risto Tornberg**

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Breeding goshawks were trapped at their nesting sites during the breeding season using a mist net and a stuffed eagle owl as a decoy. During years 2002–2010 altogether 42 breeding goshawk males were trapped near Oulu in northern Finland and 23 males during 2007–2010 in southwestern Finland near Turku. Trappings accounted for 66 encounters in Oulu and 37 in Turku. We analysed the trapping histories with Program MARK with the aim of quantifying apparent adult survival and explaining variation in it. Our global model included time dependence and a time since marking effect in survival, but constant recapture rates. We also included age as a factor in the global model. Our a priori list of explanatory factors included mean temperature of the December-January period, autumn grouse density (main prey for goshawks) and individual wing length. The global model fit the data ( $p=0.344$ ,  $\hat{c}=1.14$ ). Despite small sample size, the data collected from Oulu supported time dependence in survival ( $\Delta AIC=6$ ), which enabled testing for the covariates explaining temporal variation. Time since marking received similar support to the unconstrained model indicating possible age differences in survival or possible transience. The best model included mid-winter temperature as a covariate, with a 2.95  $\Delta AIC$  difference to the time dependent model. The parameter estimate from that model ( $\beta_{WINTER\ TEMPERATURE}=0.32$ , CI 0.052–0.587) suggests that survival approaches zero when the mean temperature of the December–January time period approaches  $-15\text{ C}^\circ$ . Grouse density and wing length did not explain survival. Comparison of apparent adult survival of males between Oulu and Turku during 2007–2010 showed lower survival probabilities for the Oulu region ( $0.64\pm 0.255$ ) than for the more southern and warmer Turku region ( $0.82\pm 0.161$ ). This is the first study that uses capture-recapture data on from live recaptures to study apparent adult survival of Eurasian goshawks.

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## RELATING ENVIRONMENTAL CONDITIONS DURING NON-BREEDING SEASON TO BREEDING PERFORMANCE AND PHENOLOGY IN A LONG-DISTANCE MIGRATORY SONGBIRD USING GEOLOCATOR DATA

Presented by **Anders P. Tøttrup**

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Long-distance migratory songbirds spend most of the year away from their breeding grounds — either on migration or in the wintering areas. Yet, basic knowledge of factors affecting migrants during this 8—10 month long non-breeding period remains poor. Now, miniaturized light-level loggers (geolocators) provide the possibility to track even passerines throughout their entire annual cycle resulting in detailed information on where and when individual birds are migrating. This study is based on trapping in 2009 and 2010 of nine individual red-backed shrikes (*Lanius collurio*) at three sites in Denmark and Sweden. By use of geolocators we have reconstructed year-round migration tracks of this 30-g long-distance trans-Saharan migrant. In this talk, we use the data to elucidate the spatio-temporal movement patterns of individuals to environmental conditions along the migration routes and in the wintering areas. Furthermore, we discuss how breeding performance and phenology is affected by the environmental conditions experienced during the time spent outside the breeding grounds.

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## INCLUDING PRESELECTED LAND-USE VARIABLES IMPROVES SPECIES DISTRIBUTION MODELS FOR BIRDS IN EUROPE

Presented by **Sven Trautmann**

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Species distribution models (SDMs) often suffer from a lack of transferability, and thus realistic predictions of global change impacts on species distributions and species richness are hampered. Apart from uncertainty introduced by the use of different model algorithms, climate models (GCMs) and climate change scenarios, two more problems might limit the usability of SDMs: Often, SDMs rely solely on climatic variables, whereas land-use as a major factor influencing current distribution patterns is often disregarded. Additionally, SDMs using standard variable sets are not necessarily fit for a large set of species, eg. due to differences in species biology or due to the risk of overfitting models. We address both these issues by including (a) land-use variables into species distribution models in order to compare SDMs including climatic and land-use variables to models including only climatic variables and (b) expert knowledge into the variable selection process which serves to include species biology into SDMs and thereby avoid methodological artefacts. For this means, we apply a twofold mechanism weighting variables according to expert knowledge and accounting for model complexity using a modified AIC. We find that the inclusion of both land-use and expert knowledge into SDMs improves model goodness of fit and should be used to enhance predictive modelling.

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## WINTERING OF MONTAGU'S HARRIERS IN THE SAHEL — RESULTS FROM SATELLITE TRACKING AND FIELD WORK

Presented by **Christiane Trierweiler**

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Montagu's Harriers (*Circus pygargus*) are red-listed in many European countries. In spite of conservation actions in the breeding grounds, numbers of wintering harriers in the West-African Sahel have declined dramatically during the last decades. Using satellite telemetry during 2005–2010, the most important migratory routes, stopover sites and core wintering areas of Montagu's Harriers were identified. Satellite telemetry revealed a high migratory connectivity between breeding and wintering populations, which may have consequences on a population level. Tagged Montagu's harriers made southwestern movements during their overwinter stay in the Sahel that related to vegetation greenness, which was in turn linked to prey availability. Based on telemetry, harriers preferred a mixture of steppe and farmland habitat types in the Sahel, which was confirmed by field data. Field data showed also that harriers preferred less degraded over more degraded habitats. Migratory locusts were supposed to play an important role in the harriers' diet. Diet based on harrier pellets collected at communal night roosts, however, contained many species of non-migratory grasshoppers and alternative prey items. This indicates that resident grasshopper species as well as other prey types play an important role in the harriers' diet. The main threats to Montagu's Harriers in the Sahel that we are aware of are non-sustainable intensification of agriculture, direct raptor persecution and chemical treatment of their grasshopper food. Conservation strategies comprise e.g. information campaigns amongst the countryside population in the Sahel and the treatment of grasshoppers using bio-pesticides, which are not harmful to birds. Conservation actions should be concentrated in core wintering areas.

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## DOES A CUE SPECIES POPULATION CRASH CAUSE A DECLINE IN HETERO SPECIFICALLY ATTRACTED SPECIES?

Presented by **Piotr Tryjanowski**

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A growing body of evidence suggests that both conspecific and heterospecific attraction plays an important role in changes of animal populations. Both mechanisms gained recently increasing interest of conservation biologist, since declines in numbers and densities in one species may lead to drops in population of another species, sometimes even treated as competitor. In western Poland, the Great Grey Shrike is a year-round territorial resident and one of the earliest breeding passerines. In contrast, the Red-backed Shrike is a long-distance migrant, wintering exclusively in Africa and one of the last arriving species in spring. Males of the second species arrive on the breeding grounds prior to females and choose the nesting site. Both species use similar breeding habitats: a mix of farmland and natural meadows with dispersed shrubs and trees for nests, perches and cache sites, and often nest near one another. In our former study, we have shown that Red-backed Shrikes exhibit social heterospecific attraction and settle preferably within the territories of the Great Grey Shrikes. They also use caches of the Great Grey Shrike as cues during habitat selection. Testing heterospecific attraction in the field is difficult mainly due to variance in habitat quality among patches and difficulties in manipulation of presence of the species which serve an information about environment resources. Severe winters are known to be bottle-neck periods for resident species, including the Great Grey Shrike. In this study, we tested Red-backed Shrike population changes during normal years and after a population crash of the Great Grey Shrike. Moreover, we compared reproductive performance of Red-backed Shrikes within and outside territories of the Great Grey Shrikes. Also, we discuss the role of heterospecific social attraction during the non-breeding period.

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## HASTE MAKES WASTE: ACCELERATED MOULT ADVERSELY AFFECTS THE EXPRESSION OF MELANIN-BASED AND DEPIGMENTED PLUMAGE ORNAMENTS IN HOUSE SPARROWS

Presented by **Csongor Vágási**

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Many animals display colourful signals in their integument which convey information about the quality of their bearer. Theoretically, these ornaments incur differential production and/or maintenance costs that enforce their honesty. However, the proximate mechanisms of production costs are poorly understood and contentious in cases of non-carotenoid-based plumage ornaments like the melanin-based badge and depigmented white wing-bar in house sparrows (*Passer domesticus*). Costly life-history events are adaptively separated in time, thus, when reproduction is extended, the time available for moult is curtailed and, in turn, moult rate is accelerated. We experimentally accelerated the moult rate by shortening the photoperiod in order to test whether this environmental constraint is mirrored in the expression of plumage ornaments. Sparrows which had undergone an accelerated moult developed smaller badges and less bright wing-bars compared to conspecifics that moulted at a natural rate being held at natural-like photoperiod. There was no difference in the brightness of the badge or the size of the wing-bar. These results indicate that the time available for moult and thus the rate at which moult occurs may constrain the expression of melanin-based and depigmented plumage advertisements. This mechanism may lead to the evolution of honest signalling if the onset of moult is condition-dependent through the timing of and/or trade-off between breeding and moult.

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## INTERRUPTION OF AUTUMN MIGRATION FOR MOULT IN A PALAEARCTIC PASSERINES: THE LANCEOLATED GRASSHOPPER WARBLER (*LOCUSTELLA LANCEOLATA*) CASE

Presented by **Olga Valchuk**

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We showed for the first time the interruption of autumn migration for moult in East Palearctic passerines in case of *Emberiza rutila* (Emberizidae). By now we have received initial facts confirming a similar migratory strategy for *Locustella lanceolata* (Sylviidae). The studies were performed at a banding station at the utmost south of the Russian Far East (42°57'N; 132°53'E) in 2008—2010. Lanceolated grasshopper warblers are typical inhabitants of grassy marshes and lawns among waterlogged sparse woods. This bird was a small-numbered transitory migrant around the banding station. We caught 59 birds in total, which was only 0.3% of the whole amount of banded birds of all species (23 534). All birds were of their first year of life, 37 of them (63%) were undergoing various stages of moulting. Three individuals were caught repeatedly and the duration of their stopover at the site amounted to 2; 9 and 13 days. One of the birds started moulting about 5—7 days after the first catch. The first moulting bird was noticed on September 1 while the last one — on October 20. Thus, the total season of post-juvenile moult in the study area can amount to more than 50 days. The small number of recoveries allows for assuming two probable variants in the migratory strategy of the species — moult at stopover sites or a combination of both moult and migration. The majority of surveyed birds was moulting quite intensively in all pteryla and had no subcutaneous fat at all. Such specimens could hardly continue their long-distance flight, but it still remains possible that birds can take short-range flights. We will continue gathering material.

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## **PRODUCTIVITY AND OFFSPRING SEX RATIO IN THE LESSER SPOTTED EAGLE: DOES TIME MATTER?**

Presented by **Ülo Väli**

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Reproductive success in bird populations fluctuates over time due to variable environmental conditions. One of the most important factors is food availability, which in sexually dimorphic species also may bias offspring sex ratio from parity. The Lesser Spotted Eagle (*Aquila pomarina*) is a raptor preying mainly upon amphibians and small mammals whose numbers and availability, as well as proportions in the diet of the eagle, vary both within and between the years. Using twelve-year monitoring data from Estonia, I checked whether productivity and offspring sex ratio in the Lesser Spotted Eagle are intercorrelated, and do they depend on the interannual changes of prey availability and on the starting time of breeding in particular year. Although the early start of breeding resulted in higher productivity of eagles, it did not impact the sex ratio of their fledglings. On the other hand, cyclic fluctuations of rodent abundance influenced both productivity and the nestling sex ratio — in the years with higher productivity more daughters, a more costly sex, were produced.

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## **BRIEF HISTORY AND IMPACT OF MARK-RECAPTURE MODELING IN ORNITHOLOGICAL RESEARCH**

Presented by **Henk van der Jeugd**

Henk van der Jeugd

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Understanding the demographic processes that underly the growth and decline of populations is central for conservation and many ecological and evolutionary questions. Estimates of survival, recruitment, immigration and emigration rates can be obtained, if the fate of individuals can be followed through time and space, for example through bird ringing. However, the estimation of demographic rates is complicated by the fact that marked individuals cannot always be observed. Statistical techniques to deal with this problem have been developed since the 1960s and are constantly being refined and extended. Mark-recapture modelling has become a science in itself within the ornithological research, and the number of mark-recapture studies published annually has boomed. Sophisticated computer programs have been developed that enable ornithologists to analyse the large mark-recapture or dead recovery data that have accumulated over many decades. At the same time, there is a risk that the gap between the developers of the methods and the biologists that have to use them, increases. Technical meetings regularly organised by EURING attempt to bridge this gap and to exchange ideas between statisticians, software developers and biologists. In this symposium we will specifically address the recent advances in multi-state modelling, an approach that opens new possibilities in quantifying demographic rates of bird populations using large datasets.

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## **LOW CAPTURE RATES FOR YOUNG MALES SHOW BREEDING SURPLUS IN AN ISLAND POPULATION OF GREAT TITS**

Presented by **Arie J. van Noordwijk**

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Given a balanced sex-ratio at fledging and a higher survival in males, a surplus of males in the breeding season is expected. Yet, demonstrating this is quite difficult. I analysed data from the two great tit sub-populations on the island Vlieland with multi-state mark-recapture models. There were consistent differences in survival between the two sub-populations on the island. In the sub-population with high survival, in about a third of the years, the capture rate for young (2cy) males is lower than the lowest capture rate for older males (0.67). This was not found in females and also not in the sub-population with low survival, where field methods were exactly the same. At the within-individual level, it appears that the chance of not being caught as a 2cy bird (1/3) is twice as high as the chance of not being caught as a 3 cy bird (1/6). The low capture rates for young males are correlated to high adult survival in the previous year, to low immigration rates and to relatively high movements to the other sub-population. Thus, it is very likely that substantial numbers of males (up to 50%) do not breed in the first year and on Vlieland they remain on the island.

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## LAST EGGS ARE SMALLER BUT HAVE SIMILAR ANDROGEN LEVELS IN A SEABIRD WITH VARIABLE HATCHING ASYNCHRONY.

Presented by **Hendrika J. van Noordwijk**

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The maternal favouritism hypothesis states that mothers customise the competitive playing field in their nest to maximise their own reproductive output. Three non-exclusive ways to achieved this are: (1) Increasing or decreasing hatching asynchrony between siblings, (2) differential investment in egg and yolk size with laying order, and (3) depositing different amounts of androgens in the yolks. In species with facultative brood reduction, mothers should facilitate early brood reduction by increasing the disadvantages of younger siblings and thereby decreasing competition when conditions are poor. Either by decreasing egg and yolk size with laying order, or by decreasing the amount of androgens in the yolk, or by increasing the hatching asynchrony in the nest, or by a combination. Under good environmental conditions however, the investment into the eggs should be more equal, to increase the younger sibling's survival. This can be achieved by equal or increasing egg and yolk sizes and/or increasing amounts of yolk androgens with laying order and by decreasing hatching asynchrony in the nest. We studied Imperial shags (*Phalacrocorax albiventer atriceps*) in a colony on the Falkland Islands because this species shows a large variation in hatching asynchrony between nests. We investigated maternal investment into egg and yolk size and yolk hormones with laying order, and amount of hatching asynchrony in the nest to find the factors affecting the brood hierarchy in three years with different breeding success. We found that last laid eggs were disadvantaged by size and hatching days after their siblings but we found no evidence for hormonal compensation.

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## LOUSE DIVERSITY ON BROOD PARASITIC BIRDS — THE EFFECT OF BROOD PARASITIC BEHAVIOUR ON THE TAXONOMIC RICHNESS OF LICE (INSECTA: PHTHIRAPTERA)

Presented by **Zoltán Vas**

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Interspecific brood parasitism evolved 7 times independently in birds: once in the black-headed ducks (*Heteronetta atricapilla*), three times in cuckoos (*Cuculidae*), once in honeyguides (*Indicatoridae*) and two times in passerines (cowbirds: *Icteridae*; and indigobirds and allies: *Viduidae*). Many of these species harbour quite host-specific obligate ectoparasitic lice. Lice complete their entire life cycle on the body surface of their hosts, thus colonising new host individuals requires direct physical contact among them. As these hosts are brood parasites, the vertical transmission of lice (from parents to offsprings) is impossible, which is thought to be the most important transmission method. We tested whether brood parasitic behaviour reduces taxonomic richness of lice in brood parasitic host clades, compared to non-parasitic sister host clades by using phylogenetically independent pairwise comparisons. We controlled louse richness data for uneven sampling effort. As the number of branching points (7 independent origins) are quite low, it is hard to recognise a general patterns. However, we found that louse diversity is reduced in the oldest brood parasitic lineages (*Cuculidae*) both in Ischnoceran and Amblyceran lice. Interestingly, cowbirds (*Molothrus* spp), which are characterised by a higher degree of co-adaptation with their hosts also possess lower diversity of lice. We discuss alternative hypotheses explaining these patterns.

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## HIGH POPULATION TURNOVER OF EURASIAN KESTRELS CAUSED BY DISPERSAL AND FLUCTUATING MAIN FOOD ABUNDANCE

Presented by **Ville Vasko**

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Population turnover is determined by the recruitment of individuals due to birth and immigration and loss of individuals due to death or emigration. Turnover will be high if individuals are short-lived, or if they frequently change territory. New individuals arriving in the population can be either young, first-time breeders, or older ones that have been breeding somewhere else before. Thus, high numbers of immigrants are connected with long-distance natal and breeding dispersal. Knowing what processes cause the influx of new individuals in the population is important when assessing the ultimate causes of population fluctuations. In this study, we examine the factors driving high and fluctuating population turnover of vole-eating Eurasian Kestrels. We use the data of two large study areas, where trapping of breeding kestrels has been continued with relatively constant effort for 26 and 23 years, and where also the abundance of their main prey (voles) has been estimated with constant trapping. We found the average turnover rate to be consistently very high in females. The turnover rates of males were lower, but increased with vole abundance. Population fluctuations were mainly driven by the number of immigrants, which in turn followed vole abundance. Immigrants were mainly yearling or two-year-old birds, likely breeding for their first time anywhere. Natal dispersal might thus be the main process causing high turnover and population size fluctuations. However, nestling production in the previous years did not explain the number of immigrants.

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## CLIMATE WARMING AFFECTS PHENOLOGY AT SEVERAL TROPHIC LEVELS — A NORTHERN PERSPECTIVE

Presented by **Emma Votka**

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Warming springs would result in trophic mismatches if temperature responses varied in different levels of the food chain. We studied how spring temperatures correlate with phenology at four trophic levels in a boreal food chain (birch—caterpillars—passerine birds— birds of prey) and how the respective temporal trends in timing vary. We tested the “temperature hypotheses” that a mismatch would arise due to the unequal increases of early and late spring temperatures. We examined breeding success in relation to the synchrony with the caterpillar food peak in a boreal passerine (willow tit *Poecile montana*) and two broad leaved forest specialists (blue tit *Cyanistes caeruleus* and great tit *Parus major*, which are considered as new-comers at high latitudes) using (generalized) linear models. Phenology is highly temperature related at all trophic levels, but the responses vary and thus temporal trends differ. Plants and insects have advanced the most with warming springs. However, climate change has not induced mismatch with the caterpillar food peak in any of the three tit species we studied in northern Europe. Our results show differences in the influence of synchrony in breeding success of boreal versus southern passerines. The study provides an interesting point of comparison to the studies carried out in the Central Europe, also concerning several trophic levels.

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## **EFFECTS OF EXPERIMENTAL MANIPULATION OF TEMPERATURE IN THE LAYING PHASE ON INCUBATION ONSET AND CLUTCH SIZE IN THE BLUE TIT (*CYANISTES CAERULEUS*)**

Presented by **Oscar Vedder**

Oscar Vedder

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Ambient temperature acts as an important cue for the timing of food-availability in temperate-zone birds. After the onset of laying, birds may still use this cue in fine-tuning the timing of offspring hatching, and adjust the onset of incubation and clutch size accordingly. However, positive effects of ambient temperature on incubation intensity after clutch completion have traditionally been explained as a result of relieved energetic constraints. In the laying phase, the effect of temperature as a cue is expected to be different from its energetic effects, since a cue for late timing of reproduction, relative to food-availability, predicts earlier incubation onset and smaller clutch size, while a more benign environment predicts larger clutches and later onset of incubation, to reduce hatching asynchrony. Blue tits are ideal to test these predictions as they breed in nestboxes, have a long laying phase, and progressively start incubating from the first night after laying start, making it possible to experimentally manipulate nest-temperature and monitor subsequent incubation and egg laying behaviour. Here, I present the results of such an experiment in relation to above predictions, and report the functional consequences for the offspring.

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## **THE IMPORTANCE OF ARRIVAL TIME TO BREEDING PERFORMANCE IN A LONG-DISTANCE MIGRANT BIRD**

Presented by **William Velmala**

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Toni Laaksonen

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The timing of arrival to the breeding grounds in spring can be crucial for a migratory bird. Arrival date can affect several factors contributing to fitness, such as territory or mate quality and probability of polygyny. According to this scenario, birds arriving early get to choose the best quality territories and the best mates. On the contrary, birds arriving late have to settle in less beneficial territories or with mates of poorer quality. The influence of arrival time to breeding performance has, however, rarely been empirically studied. We studied the importance of arrival time to various parameters of breeding performance in the Pied Flycatcher, a long-distance migrant wintering in tropical Africa. We will present results on how clutch size and number of fledglings are associated with arrival date of males in a 7-year period during which the arrival dates of individual males were monitored at the breeding grounds. We further examined repeatability of the arrival date, in order to define whether the same individual arrives on a similar schedule from year to year.

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## **DO TELOMERES LINK REARING CONDITIONS, LIFE STYLE AND LIFE HISTORY?**

Presented by **Simon Verhulst**

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Telomeres, the sequence TTAGGG that is repeated for thousands of base pairs at the end of eukaryote chromosomes, protect chromosomes against fusion. Telomeres become shorter with age, through oxidative stress and other processes, and cultured cells stop dividing when telomeres reach a critical length. In vivo, telomeres predict mortality of individuals in humans and various avian species. Thus telomeres are exciting because they may provide an empirical handle on abstract concepts such as phenotypic quality, condition and 'state', but many fundamental questions regarding telomere dynamics and their link to fitness remain unanswered. In this presentation I will address the following questions using data on jackdaws, zebra finches and humans: (i) What effects are there of genetics and rearing conditions (manipulated brood size) on offspring telomere length? (ii) Are class II and class III (ultralong) telomeres similarly affected by age and genetics? (iii) Can telomere length be interpreted as a measure of 'biological age' with respect to mortality or does telomere length predict survival independent of age?

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## **THE EFFECT OF SHEEP GRAZING ON BREEDING SUCCESS OF A WOODLARK (*LULLULA ARBOREA*) POPULATION**

Presented by **Glenn Vermeersch**

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The Woodlark (*Lullula arborea*) is a multi-brooded ground-breeding insectivorous passerine of high conservation concern (listed on Annex I of the European Birds Directive). In Flanders, it occurs mainly in large heathland areas, many of which are grazed by large herbivores for nature management purposes. The aim of our research was to study whether there is an impact of grazing on breeding success. Our study area is a large (>1500ha) heathland nature reserve in the northern part of the Antwerp province and across the border in the Netherlands, called “Grenspark De Zoom-Kalmthoutse Heide”. Sheep grazing within fixed plots is only implemented in the Belgian part of the nature reserve, the Dutch part remains ungrazed. During the breeding season (march-june) we searched and found 75 nests (40 grazed / 35 ungrazed). We focused on the first two broods of each pair that we located. In most cases, both clutches of individual pairs could be located, most of them in the egg-phase. Breeding success was significantly higher during the first brood and we found no difference in breeding success between grazed and ungrazed plots while sheep were still absent (only present during the second brood). However, we found that there is a significant negative impact of the presence of sheep on breeding success of the second brood. This suggests that nests are lost either directly by trampling or indirectly by predation made possible by females leaving the nest being disturbed by the sheep herd.

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## HARVESTING GEOGRAPHY OF MALLARD (*ANAS PLATYRHYNCHOS*) HATCHED IN ARTIFICIAL NEST SITES IN WESTERN LATVIA IN 2005—2010

Presented by **Jānis Viksne**

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Altogether 3002 one day old Mallard ducklings hatched in artificial elevated nest sites with predator guards, as well as 135 incubating females were ringed in two sampling areas where duck autumn hunting was allowed. Until February 1 2011, 178 of them were reported shot: 162 ringed as ducklings (5.4%), 16 ringed as incubating females (11.9%). Most of birds (in average 80.3%; 1st years: 83.6%, adults: 68.4%) were shot up to 5 km from hatching/nesting point. Number of birds shot just on the native pond significantly differed on two sampling areas (17.3% and 67.0%, respectively). It could be explained with different feeding conditions. In 2005-2010 hunting season in Latvia was opened correspondingly in August 13, 12, 11, 9, 8 and 14, and lasted till November 15 (till November 30 in 2010). Till September 15 shooting was allowed in Saturday, Sunday and Wednesday, later — every day. In average 62% of Mallards were harvested in August (51% at opening Saturday/Sunday), 15% in September, 13% in October, 4% in November, and 6% between December and January. Only 8.4% were reported from traditional wintering grounds in Western Europe or en route during migration. Few young Mallards departed in direction of wintering grounds already in late August (two recoveries in Kaliningrad Region in Russia, and in Sweden), the rest of the recoveries in this direction appeared in the second half of November (three in Germany, Denmark, Poland). Between December and January, all recoveries are reported from traditional wintering grounds (six in Germany, two in The Netherlands, one in England). A part of the local population possibly winters in Latvia but there is no evidence in the present material.

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## EUROPEAN POPULATION TRENDS OF COMMON BIRDS: HOW CAN WE IMPROVE THE VALUE?

Presented by **Petr Vorisek**

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Pan-European Common Bird Monitoring Scheme (PECBMS) produces European population trends and indices of more than 130 species of bird species. Besides using the PECBMS results for various policy purposes including delivering indicators for EU Structural Indicators and Indicators of Sustainable Development, the outputs have been also used for research studies exploring an effect of environmental variables and global change on bird populations. In order to derive proper inferences, the monitoring results should be accurate and precise as much as possible. One of the difficulties of the PECBMS are patchy data in 1980—1990. We developed a procedure to test the credibility of trends in this period using results of Birds in Europe (Tucker and Heath 1994, BirdLife International 2004) as a yardstick. The procedure of validation is aimed to significantly enhance credibility to the results. Also proper interpretation and understanding of population species indices and multi-species indices (indicators) matter. The problems and their solutions will be illustrated at the example of updated PECBMS results.

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## TRADE-OFF BETWEEN CELLULAR AND HUMORAL IMMUNITY IN WINTERING GREAT TITS

Presented by **Jolanta Vrubļevska**

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Physiological costs of immunological defense under limited resources are sufficiently large to affect fitness (e.g., reproductive output, growth or survival). These costs, involved in life-history trade-offs, are based on constraints of energy use. Recent evidence suggests a trade-off between different arms of immune system. We challenged immunity of wintering great tits in Latvia with *Brucella abortus* antigen and tested whether there is a trade-off between humoral and cell-mediated immunity. Birds with higher physiological stress at the time of capture had lower immune responsiveness against *Brucella abortus* antigen during extreme environmental conditions of cold winters, confirming the expected trade-off, which might be rooted in the basis of cross-regulation between humoral and cell-mediated immune responses of wintering passerines.

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## **POPULATION DECLINE OF THE WHITE-BACKED WOODPECKER (*DENDROCOPOS LEUCOTOS*) IN THE BIAŁOWIEŻA FOREST: FOREST MANAGEMENT, HABITAT LOSS AND CONSERVATION IMPLICATIONS**

Presented by **Wiesław Walankiewicz**

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Data on the White-backed Woodpecker (WBW) distribution and habitat parameters were collected in March 2010 in the Polish part of the Białowieża Forest. The aim was to assess the status of this woodpecker in different parts of the forest and evaluate changes in population number compare to data obtained by the same method in 1991. Observers walked along forest transects which were 500 m apart and used playbacks of drumming to enhance detection of birds. Presence/absence of woodpeckers was recorded within each forest compartment (ca. 28 ha). Stand type (swampy ash-alder, hornbeam-lime-oak, spruce-pine), age of stand, and dead wood amount were also recorded. Distribution of WBW strongly depended on conservation status (national park, nature reserves, and managed stands). The highest occupancy was in the national park, BNP (19%), lower in reserves, RES (11 %), and the lowest in managed stands, MAN (4%), and it was related to distribution of dead wood and forest type. Compare to 1991, numbers of recorded woodpeckers was 28% lower. However, no change in BNP was found, while frequency of occupancy significantly decreased in RES and in MAN. It seems that the BNP area is too small, to assure the long-term survival of the Białowieża Forest populations of WBW. Changes in commercial forestry practice to make it less damaging to WBW could slow it down but the best solution would be enlargement of the BNP on the whole Białowieża Forest. Our results demonstrate that reduction in WBW distribution is linked to ongoing logging and resulting removal of dead wood.

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## THE ENERGETIC CONSEQUENCES OF ECOLOGICAL MISMATCH: THE EFFECTS OF FOOD SUPPLEMENTATION ON SEASONAL TIMING AND DAILY ENERGY EXPENDITURE

Presented by **Simone Webber**

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The availability of food resources at key points of the breeding season is one of the determining factors in the timing of reproductive attempts in seasonally breeding birds. The ability of Great Tits (*Parus major*) to match the peak in brood nutritional demand with that of their caterpillar prey has a marked influence on offspring survival and recruitment. Alteration in resource availability through food supplementation prior to the breeding period often results in an advance of clutch initiation, potentially creating a temporal ecological trap and leading to a phenological mismatch between brood demand and natural food availability during the chick-rearing period. We used the doubly-labelled water technique in 2010 to compare the Daily Energy Expenditure (DEE) of brood-rearing female Great Tits that were food-supplemented from pre-nest initiation until post-fledging, with those that were not supplemented. Food supplementation resulted in a significant phenological mismatch between brood demand and peak caterpillar availability, affording us a rare opportunity to examine the energetic consequences. Pair provisioning rates (measured using Passive Integrated Transponder technology) were significantly higher in the supplemented broods. However, partial brood mortality was also higher, suggesting an energetic threshold beyond which parents were unwilling or unable to work. DEE results support the existence of such an investment threshold and data from the 2011 breeding season will allow us to investigate the downstream life history consequences, highlighting the trade-off between current and future reproductive investment.

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## INCUBATION BEHAVIOUR AND NEST PREDATION IN ANTARCTIC TERN (*STERNA VITTATA*) AT SOUTHERN BORDER OF BREEDING RANGE

Presented by **Karel Weidinger**

Karel Weidinger, Vaclav Pavel

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The Antarctic Tern is a circumpolar species breeding on sub-Antarctic islands and Antarctic Peninsula. Its breeding success is generally low, which is often attributed to high predation, inclement weather and sensitivity to human disturbance. However, scarce data exist on breeding performance in the southernmost part of the breeding range. We studied terns (total  $n=124$  active nests) during two austral summers (2008/2009, 2010/2011) at James Ross Island, Antarctica ( $63^{\circ}49'$  S,  $57^{\circ}53'$  W), where they are exposed to extreme climate, and their eggs and chicks represent the only terrestrial prey for locally abundant predators – the Antarctic Skuas (*Catharacta maccormicki*). Comparative data ( $n=120$  active nests) were obtained in 2010/2011 on Seymour Island (70 km SE) with similar climate, but lower predation pressure. Incubation behaviour was monitored by means of continuous video surveillance ( $n=25$  and 11 nests with  $\geq 24$  h records). Preliminary analysis suggests incubation shifts lasting on average about 1 h, incubation recesses lasting  $<1$  min, and overall nest attendance reaching almost 99%. Daily predation rate (DPR) on active nests was higher on J.R. Island ( $0.031 \pm 0.008$ ) than on S. Island ( $0.002 \pm 0.002$ ). We conducted experiments with artificial eggs placed either in real inactive nests, or outside nests within/outside colony. Results suggest that skuas search for eggs more efficiently in traditional tern nesting sites than in locations potentially suitable, but not used for nesting. Higher predation in inactive colonies with artificial eggs, compared to active colonies, suggests strong effect of communal parental defence on decreasing the risk of nest predation.

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## PREDATORS OF THE BROODS OF MONTAGU'S HARRIER (*CIRCUS PYGARGUS*) IN THE CALCAREOUS MARSHES IN EASTERN POLAND

Presented by **Jaroslaw Wiacek**

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Observations were made in the special protection area for birds NATURA 2000 "Chelm Calcareous Marshes" (PLB 060002) near the Polish—Ukrainian border (51°10' N, 23°37' E). The study area was 1338 ha. The marsh landscape of this area is dominated by the sedge *Cladium mariscus* with admixture of the reed *Phragmites australis*. Harriers were observed in the seasons 2003—2010. The study was carried out from April after spring migration to end of July when young birds started first flights. 62 broods of the Montagu's harrier were monitored. During the observation period, 41 broods (66.1%) were destroyed by predators. The main predators of harriers' broods were corvids Corvidae (48.8%), Marsh harrier (*Circus aeruginosus*) (24.4%) and fox (*Vulpes vulpes*) (12.2%). Addled eggs were recorded in four nests (7.3%). Two nests drowned (4.9%). One nest with poisoned fledglings (2.4%) was recorded. In comparison with former studies in this area conducted in the eighties and nineties of the 20th century, nest predation significantly increased (22% to 66,1%). The role of corvids as predators increased (14% to 48.8%), so did the role of the Marsh Harrier (20% to 24.4%), while fox impacts decreased (60% to 12.2%).

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## **ECOLOGY OF HEN HARRIERS (*CIRCUS CYANEUS*) IN FORESTED LANDSCAPES IN IRELAND**

Presented by **Mark Wilson**

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Hen Harriers (*Circus cyaneus*) are vulnerable across much of their range, and in Ireland are protected by national and EU law. Traditionally, this species has bred in open, upland habitats in areas that typically remain suitable for Hen Harriers over long periods of time. However, many of the areas in which Hen Harriers in Ireland breed are now dominated by forest plantations. In contrast to open habitats like moorland, heather bog and rough pasture, young plantations are ephemeral habitats that cease to be suitable for Hen Harriers when the forest canopy closes. We carried out an analysis of nest locations (recorded in national surveys in 2000 and 2005) in relation to habitat availability. The results indicate that Hen Harriers select young plantations for breeding, and do not appear to avoid areas dominated by closed canopy forests. Heavily afforested areas harvested by clearfelling may, therefore, remain suitable for Hen Harriers in the longer term. However, we need to more fully understand the influence of habitat composition on Hen Harriers' hunting behaviour and breeding success in order to be confident in this conclusion. Previously we have described a GPS harness system that we had developed for collecting data on movements and habitat use of breeding Hen Harriers. We have now used this system successfully to collect data on movements and habitat use of breeding Hen Harriers in Ireland. We present this data, along with data on Hen Harrier breeding success and productivity, and discuss the sustainability of Hen Harrier populations breeding in forested areas in Ireland.

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## THE RELATIONSHIP BETWEEN HOLE-NESTING BIRDS AND TREE HOLE ABUNDANCE IN PRIMEVAL SPRUCE-PINE AND LIME-HORNBEAM-OAK STANDS OF THE BIALOWIEZA FOREST, POLAND

Presented by **Marcin Wiśniewski**

Wiesław Walankiewicz, Marcin Wiśniewski, Dorota Czeszczewik,  
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There is a well-known and commonly accepted limiting effect of cavity abundance on the density of non-excavators, hole-nesting Passerines. However, our knowledge on this subject came mostly from human transformed stands in temperate zones. We studied relationships between secondary hole-nesting bird abundance and densities of holes in two stand types (poor coniferous spruce-pine and rich lime-hornbeam-oak) of the Białowieża National Park. Holes were classified into two groups: natural and woodpecker-made. The knowledge on origin of holes (rate: natural vs. woodpecker-made) is poorly recognized in old-growth stands. We also measured resource use (trees able to support holes; alive and snags) in relation to their availability (tree stand composition, DBH of trees). This data allows us to answer the question: do abandoned woodpecker holes provide secondary hole-nesters with suitable nesting sites, or natural holes are so abundant that the role of woodpeckers in providing birds with nesting-holes is minor. This way we wanted to identify key species (woodpeckers, certain tree species) whose presence may be critical to the hole-nesters. Our results suggests that in two investigated habitats different factors play role: woodpeckers are more important in coniferous stands while in broad-leaved stands presence of certain tree species (e.g. hornbeam *Carpinus betulus*) is more important for secondary hole-nesters.

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## **MHC, MALARIA AND LIFETIME REPRODUCTIVE SUCCESS IN COLLARED FLYCATCHERS (*FICEDULA ALBICOLLIS*)**

Presented by **Magdalena Zagalska-Neubauer**

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MHC genes encode proteins involved in recognition of parasite-derived antigens. Their extreme polymorphism is presumed to be driven via coevolution with pathogens, but demonstration of current selection on MHC has remained elusive. Here, we use unique dataset on lifetime reproductive success (LRS) of collared flycatchers to test whether it is associated with specific MHC class II alleles, or their within-individual diversity. We also examine association between MHC and infection with avian malaria. Using 454 sequencing we found that individual flycatchers carry between 3 and 24 expressed MHC class II B allele, and we found that parasite load decreased with functional MHC diversity. However, we failed to find evidence for association between MHC diversity and LRS. On the other hand, we found significant associations between specific MHC alleles and both parasite infection, and, importantly, we have also found alleles significantly associated with female lifetime reproductive success. This result provides strong evidence of contemporary selection acting on MHC genes.

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## BIOMETRIC STRUCTURE OF THE BLACKCAP (*SYLVIA ATRICAPILLA*) AUTUMN MIGRATION

Presented by **Grzegorz Zaniewicz**

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The wing length of the Blackcap (*Sylvia atricapilla*) shows variation, generally becoming shorter towards the southern parts of the species breeding range. Biometrical data collected during a 43-year period (1967—2006) were used to calculate daily average wing length of blackcaps caught during autumn migration (14 Aug.—28 Oct.) at Bukowo-Kopań (54°21'N, 16°21'E) ringing station, Poland. The analysis showed differences in the timing of migration between long- and short-winged Blackcaps. The long-winged individuals passed the southern coast of the Baltic Sea first and short-winged blackcaps as one of the last. Median passage date of blackcaps grouped according to wing length showed a significant shift towards the end of the migratory season. The short-winged individuals were observed twice during the studied season: (1) just before the active migration when their fat load was on a relatively low level, and (2) in the second half of the migration period. Moreover, the highest percentage reaching as much as 50% (on average 16%) of birds caught more than once was ringed in the pre-migratory period. They also stayed at the ringing site relatively longer than birds ringed when migration was already in progress. This suggests local origin of the short-winged blackcaps, while the long-winged individuals most probably originated from the more distant areas of the species breeding range. This proposed pattern is consistent with the leap-frog migration known for the Blackcap.

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## **WIND DIRECTION CONTROLS AUTUMN MIGRATION OF WHITE STORK (*CICONIA CICONIA*): A CASE STUDY OF SOARING BIRD MIGRATION AT VIA PONTICA**

Presented by **Pavel Zehtindjiev**

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Knowledge of spatial distribution of birds is a source for answering many fundamental questions of the evolutionary ecology and ornithology as well as for practical solutions. In particular, the distribution of migrants through a certain territory along the Bulgarian Black Sea Coast, known as Via Pontica, is of primary interest for the development of wind power industry in the region. The conditional group of soaring birds includes pelicans, storks, birds of prey and cranes, although some raptor species and cranes fly mainly in an active manner (waving their wings). These birds use the lifting warm air currents for a special kind of flight, i.e. soaring. There are data pointing to the guiding role of the Black Sea coast for soaring birds known as Via Pontica. Satellite tracking data of White Storks shows deviation of over 200 km of individual migratory roads in autumn seasons. The results suggest that White Storks have only a rough inherited migratory direction and therefore meteorological conditions and winds particularly must influence their direction and distribution at migration. We studied the dynamics of the White Stork autumn migrations by visual observations simultaneously in two locations, i.e. at the coast of the sea and at 60 km inwards in NE Bulgaria during 2008—2010. Over 90% of White Storks appeared in the coastal region under strong western winds in two autumn seasons and did not appear during one season when there were no western winds. Comparative quantitative analysis favored the role of winds instead of endogenous program of the migratory road in White Storks. Therefore, the definition of Via Pontica needs to be amended by involving meteorological components instead of being fixed to geographical location.

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## **SURVIVAL SENESCENCE AND ASSOCIATIONS BETWEEN LIFESPAN AND LIFE HISTORY TRAITS IN COMMON TERNS**

Presented by **He Zhang**

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Life history traits are the keys to understand the intraspecific variation in survival. This paper studies the lifespan of Common Tern (*Sterna hirundo*) based on long term data of individuals' life-history characteristics such as recruitment age, timing of arrival and egg laying, body mass, reproductive success etc. during the breeding seasons 1992–2009. The longitudinal data are collected at a colony site at Banter See, Wilhelmshaven, Germany. The colony site consists of six artificial concrete islands and has been equipped with an antenna system which records the individuals marked with injected transponders year by year remotely and automatically without trapping. The dataset based on completely documented life trajectories allows survival analysis (life table, Kaplan-Meier estimation and survival regression model) to calculate age-specific survival rates and evaluate the relationship between lifespan and life-history traits. We found that the terns' survival rate drops below 85% when they are 15 years old. The estimated lifespan is strongly associated with most traits investigated except recruitment age and egg volume. Similar patterns were demonstrated by the traits in early life (age 5–7), when lifespan is reduced additionally by high effort in timing and reproduction. By using multivariate analysis we conclude that individuals with high longevity are characterized by early arrival, great body mass and large number of fledglings.

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## PRESENT SITUATION OF THE BLACK STORK (*CICONIA NIGRA*) IN POLAND

Presented by **Piotr Zielinski**

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The number of Black Stork pairs breeding in Poland started to increase since the beginning of the 20th century. In 1900—1918 the population was estimated to hold about 90 pairs, in the 1930s 283 pairs, in 1966 500—530 pairs, in 1981—1982 800—900 pairs, and in 2001 1100—1200 pairs. However, recent large-area direct census carried out in a mosaic landscape in different parts of Poland revealed that the density of the Black Stork is, compared to the data obtained from the forest districts and amateur ornithologists, strongly underestimated. This is because of the secret way of life of this species breeding in remote and wet places, and frequent movements of a breeding pair between different nest localities within the same territory, thus making it difficult to locate new nests. Actually, the Black Stork population in Poland is estimated to hold about 1400—1600 pairs, and the species is found in the whole country. Based on an area of 203 480 km<sup>2</sup> (65% of Poland) the calculated density was 0.5 pairs/100 km<sup>2</sup> of total area and 1.9 pairs/100 km<sup>2</sup> of forest area. In Poland (based on published data) the highest recorded nest of the Black Stork was at an altitude of 1000 m a.s.l. in the Tatra Mountains, at 1050 m a.s.l. in the Gorce Mountains, and at 1100 m a.s.l. in the Bialskie Mountains. The highest density was recorded in the Bialowieza Primeval Forest (5.5 pairs/100 km<sup>2</sup> of total area and 6.1 pairs/100 km<sup>2</sup> of forest area), in the Biebrza Marshes (2.1 pairs/100 km<sup>2</sup> t.a. and 7.0 pairs/100 km<sup>2</sup> f.a.) and in the Kampinoski National Park (2.8 pairs/100 km<sup>2</sup> t.a. and 5.0 pairs/100 km<sup>2</sup> f.a.). Nests were built in oaks (48%), pines (24%) beeches (9%), alders (9%), firs (3%) and other tree species (7%). Mean number of fledged young varied from 2.3 to 2.9 per successful pair.

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## IMPACTS OF URBAN NOISE ON SONG LEARNING AND VOCAL PRODUCTION IN BIRDS

Presented by **Sue Anne Zollinger**

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Urbanization and other anthropogenic activities dramatically alter the acoustic environments in which birds live and communicate. Anthropogenic noise has been linked with changes in the vocal behaviour of many species of birds across the globe. However, little is known about the physiological and developmental mechanisms underlying the observed changes in the songs of urban species. We collected great tits as nestlings from nest boxes in quiet forest areas, and hand-reared them in different background noise conditions. Birds were either exposed to city-like noise (noise with sound energy below 3 kHz) or to “inverse city noise” (noise of the same bandwidth, but with sound energy above 3 kHz). Both groups were tutored with recordings of 9 great tit songs that ranged in frequency, sound structure and complexity. We found that the birds exposed to the “inverse city noise” had a delayed vocal development, and crystallized their songs significantly later than birds in the “city noise” group. However, as adults, birds in each group learned and sang accurate copies of tutor songs. We show that the songs of great tits exposed to city-like noise during their first year did not differ in frequency from the songs of their tutors. This suggests that contrary to prevailing hypotheses, great tits do not increase the frequency of their songs to cope with acoustic masking from background noise. In a second experiment, we measured the metabolic and respiratory costs of singing in noise. We show that increasing vocal amplitude, even by 20 dB does not require significantly greater metabolic energy. However, we did find that exposure to high levels of background noise significantly increased oxygen consumption and respiration rate in birds, independent of singing behaviour. We advocate an integrative approach to studying anthropogenic effects on wildlife, including experimental studies to identify the proximate mechanisms that may constrain adaptations to urban environments.

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## **NEST REUSE IN BLACKBIRDS IS CAUSED BY LACK OF AVAILABLE NESTING SITES AND NOT AN ADAPTATION FOR MAXIMIZING REPRODUCTIVE SUCCESS?**

Presented by **Dawid Zyskowski**

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The following study presents data on nest reuse by Blackbirds (*Turdus merula*) inhabiting Żeromski city park and urban cemetery in Szczecin (NW Poland). During the years 1997—2010, 31 out of 723 failed nests in the city park were reused, while 65 out of 161 successful nests were reused. Nest reuse of failed nests occurred more often in years with high population density. Additionally, a comparative study was conducted during the years 2005—2007 on a Blackbird population inhabiting the urban graveyard, where density of coniferous shrubs, providing dense, hard to penetrate for predators environment, is almost twice as high as in the city park. In the graveyard population, none of the 10 successful nests was reused, while during the same time period in the city park, 14 out of 34 successful nests were reused. These results indicate that blackbirds choose to reuse the same nests when there are no alternative nesting sites available and suggest that nest reuse is not primarily an adaptive strategy to maximize reproductive output.

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