



**9<sup>th</sup> European Conference on Behavioural Biology (ECBB)**

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**List of Plenary Speakers and Symposia**

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**Plenary speakers**

Dr Andrew King (Swansea University)

Prof Michael Mendl (University Of Bristol)

Dr Amanda Seed (University of St Andrews)

Dr Barbara Taborsky (University of Bern)

Prof Judy Stamps (University of California)

## **Symposium 1.**

### **Social instability: Direct fitness consequences and underlying physiological mechanisms.**

Luis A. Ebensperger<sup>1</sup>, Loren D. Hayes<sup>2</sup>

<sup>1</sup> Departamento de Ecología, Universidad Católica de Chile, Santiago, Chile; <sup>2</sup> Department of Biology, Geology, and Environmental Science, University of Tennessee at Chattanooga, Chattanooga, USA

The composition of animal social groups may vary permanently due to mortality, individuals leaving the group (i.e. emigration) or individuals joining a different group. Limited evidence from field-based studies and functionally oriented studies show how this form of social instability may have direct fitness consequences to individuals, and interfere with fitness enhancing social attributes, including cooperation. Thus, we need to address how instability influences social benefits and costs in a diversity of taxonomic groups. Similarly, few functionally oriented studies have addressed the neural and physiological mechanisms underlying direct fitness consequences of social instability. In contrast, biomedical studies have established the importance of social instability on neuroendocrine and immunological pathways underlying behavioural responses to social and other environmental stressors. To advance our understanding, we need to identify how these well documented mechanisms in the biomedical literature underlie the relationship social instability and direct fitness. Critically, we need to understand how social instability during development influences subsequent social phenotypes including parental care and cooperation. Across taxa, neural and physiological mechanisms associated with social strategies are diverse. Thus, we need to examine how instability influences mechanisms in a diversity of taxonomic groups. The purpose of this symposium will be to highlight and discuss the latest research linking social instability, neural and physiological mechanisms, and direct fitness in a diverse sample of social vertebrates.

## **Symposium 2.**

### **Acoustic signatures in animal vocalisations.**

L. Favaro<sup>1</sup>, M. Gamba<sup>1</sup>, M. Scheumann<sup>2</sup>

<sup>1</sup> Department of Life Sciences and Systems Biology, University of Turin, Turin, Italy; <sup>2</sup> Institute of Zoology, University of Veterinary Medicine Hannover, Hannover, Germany

Vocal communication is widespread in vertebrates and vocalisations have the potential to encode a variety of information, including the species, population, and geographical location of the emitter. When looking more in detail at the content of the vocal signals, these often also contain acoustic cues to individuality, sex, age, body size and even emotional status. Such acoustic signatures can be encoded in vocalisations using universal voice cues, related to the physical features of the signaler, modulation of spectral characteristics over time, which requires fine control of the vocal organs, or the combination of vocal units into meaningful biological sequences. Studying acoustic signatures in vocalisations can allow a better understanding of species' evolutionary history, behavioral ecology as well as investigating the sexual and social sources of selection acting on both signalers and receivers. This symposium will explore new approaches and directions in the field of sensory ecology. It will focus on comparison across species, with contributions focusing on different taxa and several modalities to encode acoustic signatures in vocalisations. Finally, it will explore how recent advances in sound recording and signal processing allow a far better investigation of the content of animal calls. Such technological improvements also open novel scenarios for tracking individuals or populations using sounds.

### **Symposium 3.**

#### **Individual identity signalling in animals: Biology of individual distinctiveness and its applications.**

P. Linhart<sup>1</sup>, T. Petrusková<sup>2</sup>

<sup>1</sup> Department of Behavioural Ecology, Adam Mickiewicz University, Poznań, Poland; <sup>2</sup> Department of Ecology, Charles University, Prague, Czechia

Almost any animal social behaviour that one can imagine depends on a mischievously simple thing: animals must be able to discriminate between individuals and associate different experiences with particular conspecifics. Surprisingly, evolution of identity (individuality) signalling is still little understood despite its crucial importance for social behaviours and other biological phenomena. Each individual has a unique phenotype and many studies report individual variation on visual and/or acoustic signals. But are at least some of these variable features true identity signals that evolved to signal individual identity? Are there adaptations to sound and look distinct? Are there adaptations to look and sound the same? Does identity signalling change over the life span and in different life stages / social roles? How did identity signalling evolve and which life-history traits promote increased individual identity within and among species? Which individually distinct features do animals really use in individual recognition? With few exceptions, these questions were only superficially treated. Better theoretical knowledge on identity signals is crucial for understanding many social behaviours and could be further applied to develop automatic systems capable of recognition of individual animals in behavioural and ecological studies. This symposium will explore how basic and applied research on identity signalling might interfere to better understand and follow social behaviour of individuals.

### **Symposium 4.**

#### **Cooperative interactions in fishes.**

J.G. Frommen<sup>1</sup>, S. Fischer<sup>1</sup>

<sup>1</sup> Division of Behavioural Ecology, Institute of Ecology and Evolution, University of Bern, Switzerland

Cooperative interactions are a widespread phenomenon throughout the animal kingdom. Accordingly, they have gathered a continuous attention in the research community since the beginning of behavioural research. The occurrence of cooperative behaviour is usually explained either by generating direct benefits, e.g. through reciprocity, mutualisms or manipulations, or by indirect fitness benefits through cooperating with related individuals. Still, our knowledge of how ecological and social factors mediate cooperative interactions is limited. Fishes inhabit a broad variety of ecological niches, from the open ocean to highly complex benthic habitats. The structure of fish communities ranges from solitary- and pair-living to loose fission-fusion groups and highly structured societies. Here, cooperative interactions occur in a variety of social situation, such as reciprocal predator inspection, mutualistic foraging or alloparental care for offspring. Such interactions take place not only among relatives, but also between unrelated individuals and even between different species. This fascinating behavioural diversity offers ample opportunities to increase our understanding of the evolution and ecology of cooperative behaviour, both by studying cooperative interactions within and between single species and by applying comparative approaches between taxonomic groups. This symposium aims at bringing together researchers working on the mechanisms, functions and evolution of cooperative interactions in order to discuss the most recent advances in the field of cooperation research, focussing on this highly variable animal group as model organisms.

## **Symposium 5.**

### **Emerging techniques in the study of behavioural plasticity.**

V. Marasco<sup>1</sup>, M. Larriva<sup>2</sup> & K. A. Spencer<sup>2</sup>

<sup>1</sup>Department of Integrative Biology and Evolution, Konrad Lorenz Institute of Ethology, University of Veterinary Medicine Vienna, Vienna, Austria; <sup>2</sup>School of Psychology & Neuroscience, University of St Andrews, St Andrews, Scotland

Phenotypic plasticity is the capacity for behavioural, morphological or physiological change within genotypes in response to different environmental contexts. Phenotypic plasticity encompasses a large diversity of kinds of variability, from the environmentally-induced sensitivity to early life stressors that diversify developmental trajectories and adult phenotypes to the more reversible behavioural flexibility that animals show during specific life history stages such as migration and reproduction. Despite the theoretical framework for understanding the different forms of plasticity has been well developed, we still know relatively little about the proximate mechanisms that allow individuals to shift between behavioural states. This symposium will bring together people who are utilising novel and emerging techniques to study the mechanisms that underlie transitions in behaviour in response to changing environments. The aim is to firstly showcase the types of methodologies that could be useful in the study of behavioural plasticity, highlighting the advantages and pitfalls of each technique. Secondly we aim to initiate discussion amongst a wider group of researchers about the techniques and approaches that would be most appropriate in driving innovations within the field of phenotypic plasticity. Finally we hope to provide a platform for potential future collaborations. The talks in the symposium aim at representing a range of approaches, from molecular biology (RNA-Seq) to imaging techniques and novel manipulation tools such as optogenetics. This multi-disciplinary platform, we hope, will enable fruitful discussion about the way forward in this field of research.

## **Symposium 6.**

### **Animal Personality: providing new insights into behaviour?**

V. Wilson<sup>1,2,3</sup>, D. Altschul<sup>4,5</sup>

<sup>1</sup> Georg-August-University Göttingen; <sup>2</sup> German Primate Center; <sup>3</sup> Leibniz-Science Campus; <sup>4</sup> The University of Edinburgh; <sup>5</sup> Scottish Primate Research Group

In a recent review, Beekman and Jordan asked, 'Does the field of animal personality provide any new insights for behavioural ecology?' Their paper sparked debate about the purpose, novelty and benefits of studying behavioural variance through the label of 'personality'. In this symposium, we will focus on two aspects of research from this field, discussing what insights the study of personality can provide for the study of animal behaviour in the broadest sense. We will address (1) how personality phenotypes are maintained in the face of selection pressures that should reduce behavioural variation. Contrary to the assertion that behavioural variation is the raw material upon which selection acts, this variation can also be the product of natural selection. The study of personality phenotypes under carefully controlled conditions can help researchers to pull apart the effects of genetic versus environmental factors underlying this variation. In addition to considering the theoretical benefits of personality research, we will also discuss how theory addresses (2) the practical applications of studying personality. For example, understanding the role of personality on cognition can help to reduce selection bias and improve the overall interpretation of species differences in cognitive ability. It can also be used to take an individualised approach to wellbeing and welfare. By addressing these issues, we wish to highlight that the study of animal personality is not simply about examining suites of correlated behaviours, but provides insight across the broader field of behavioural research.

## **Symposium 7.**

### **The role of hormones in mediating behavioural phenotypic plasticity to anthropogenic change**

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The growing human population in combination with technological development are rapidly changing the planet with significant consequences for most other species. Realizing the magnitude of human-induced change, an international consortium of scientists has suggested to term the current geological time as the “Anthropocene”. In this symposium we ask how hormones contribute to phenotypic plasticity of animals to behaviourally cope with environmental challenges, such as those imposed by humans. Knowledge of proximate mechanisms of how animals deal with anthropogenic change is crucial to understand their adaptive capacity. Hormones provide a crucial role here, because they translate environmental information to pleiotropic changes in the organism. Questions we would like to address include, for example, how do animals behaviourally and hormonally respond to contaminants exposure (trace metals, organic pollutants), artificial light, noise, temperature change, and habitat destruction? How do single intense stressful periods or longer periods of stress influence hormone levels and individual fitness? How do multi-stressors interact (e.g. contaminants + temperature) and influence hormonal pathways? We will focus on a diversity of endocrine systems, and both cover maternal effects, early pre and postnatal effects with potential organising and transgenerational effects (developmental plasticity), as well as adult phenotypic plasticity. We aim to create a symposium that can showcase how studies of behaviour and hormones can contribute to predict the susceptibility or resilience of animals to human-induced global change?

## **Symposium 8.**

### **The trade-offs of honest signals**

D.J. Penn<sup>1</sup> & S. Számadó<sup>2,3</sup>

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Explaining the evolution of honest or reliable signals has been a major problem in evolutionary biology and behavioural ecology. Most hypotheses are based on the cost of signals (‘costly signalling theory’), and yet costs are not enough to explain the evolution of any behaviour. It is the ratio of costs to benefits that needs to be measured to determine the functions of signals, as with other traits. The cost-benefit ratio of honest signalling can differ for different individuals, and it can be subject to a multidimensional optimization problem where changing the trait can influence fitness in different ways. The effect of these changes can be antagonistic. Such trade-offs are well known in evolutionary life history theory, but need more attention for understanding reliable signals. Here we would like to explore this issue from theoretical and empirical perspectives. What are the trade-offs in the evolution and maintenance of honest signalling? What kind of trade-offs favour honest versus dishonest signals? What is the current empirical evidence measuring both costs and benefits of honesty? What kinds of experiments are needed to obtain a better understanding of the trade-offs for honest communication?