

## > “Predictive Adaptive Responses (PARs) and fitness – A workshop to explore the evidence and further requirements“ 3 – 4 February 2015

### Topic of the workshop

Exposure to particular environmental conditions during development produces durable changes in behaviour; such changes may serve to increase the likelihood that the phenotype will fit with the environment and increase Darwinian fitness. **Predictive Adaptive Responses (PARs)** are a special sub-class of developmental changes and refer to responses that alter the developmental trajectory in such a way as to better fit the organism’s phenotype with future, anticipated environmental conditions. The utility (in a Darwinian sense) of the PARs will be influenced by many factors; an obvious one being the accuracy of the forecast of the future. This gives rise to the **match-mismatch hypothesis**. When there is a match between the early-life and later environments, the so-called PARs would be expected to increase fitness. On the other hand, when the forecast is inaccurate (i.e. there is a mismatch between the early and anticipated conditions) the PARs would be expected to decrease fitness. There is a growing body of evidence using indirect or proxy measures of fitness that PARs appear to be advantageous under matching conditions and disadvantageous under mismatching scenarios. These studies have used a wide range of species including invertebrates, fish, birds and human and non-human mammals. For example, in human a mismatch between conditions experienced in utero (e.g. poor nutrition) and in later-life (e.g. excess of nutrition) has been associated with increased metabolic and cardiovascular disease.

However, for various reasons, there are few studies testing PAR predictions using direct measures of fitness, and in some experiments the predictions have not always been confirmed. **The workshop will:** critically examine match-mismatch hypotheses and effects on Darwinian fitness, identify gaps in knowledge/concepts, and seek to identify robust experimental methodologies, conditions and measures appropriate for testing the PARs hypothesis and Darwinian fitness (with human and non-human mammals and other animals).

### Goals of the workshop

The goals of this workshop are, firstly, to train the doctoral students in conceptual thinking about behavioural plasticity, evolution and methodologies to test common assumptions. Secondly, the workshop is meant to foster collegial exchange and identify opportunities for collaboration on behavioural plasticity and PARs (in the Darwinian sense as well as for quality of life of animals).



Thirdly, the workshop should initiate a topic group for regular discussions amongst PIs and students of the Münster Graduate School of Evolution. These meetings may result in a review paper or the development of research proposals in preparation for grant applications.

### Confirmed speakers

- **Andrew M. Janczak** (Norwegian University of Life Sciences, Oslo, Norway)  
Research topics: multidisciplinary approaches to advance knowledge in animal welfare, studies of health, behavior, physiology, stress, neuroendocrinology, and epigenetics with relevance for motivation, cognition, and emotions  
<http://www.animalwelfarenorway.com/>
- **E. Tobias Krause** (University of Bielefeld, Germany)  
Research topics: evolution and function of avian olfaction, consequences of early developmental stress, animal welfare of laboratory animals  
<https://etkrause.wordpress.com/>
- **Lindsay Matthews** (University of Auckland, New Zealand)  
Research topics: fundamental and applied research in the experimental analysis of animal behaviour, motivation, cognition and animal welfare  
<http://www.animal-law.biz/node/505>

### Organizers:

- Joachim Kurtz (Westfälische Wilhelms-Universität Münster, Germany)  
Speaker of the Münster Graduate School of Evolution (MGSE)
- Lindsay Matthews (University of Auckland, New Zealand)  
ETT-Fellow of the Münster Graduate School of Evolution (MGSE)
- Vanessa Kloke (Westfälische Wilhelms-Universität Münster, Germany)  
Coordinator of the Münster Graduate School of Evolution (MGSE)

### Venue:

“Kavaliershäuschen”, Schlossplatz 6, 48149 Münster, Germany

