

SEEWIESEN

# LECTURE SERIES

FALL/WINTER 2018/19

Max Planck Institute  
for Ornithology



MAX-PLANCK-GESELLSCHAFT

THURSDAY | March 14th, 2019 | 13.00 | HOUSE 4 LECTURE ROOM

## TIMOTHY J. GREIVES

North Dakota State University | Host: Hau Research Group

### Mechanisms and importance of timing in a constantly changing world

Nearly all animals live in environments that experience dramatic fluctuations in environmental variables across daily and annual times scales. Daily and seasonal rhythms are hypothesized to enable animals to anticipate these environmental changes and appropriately adjust physiology and behavior in advance of these environmental shifts to enhance survival and reproductive success. In the wild, relationships between environmental variables of interest (e.g. daylength or sunrise) and individual variation in expression of behaviors or traits that influence fitness are often observed, yet the underlying mechanisms responsible for integrating multiple cues and regulating timing decisions are often unclear. In contrast, decades of laboratory investigations have generated a wealth of knowledge of underlying physiological mechanisms shaping these rhythms, however the relationships between these mechanisms and their contribution to evolutionary fitness in the highly variable environment of the wild remains unclear; only in the wild can fitness-related traits be quantified in a meaningful way. My research programs seeks to integrate studies grounded in behavioral ecology and physiology to begin to uncover the key sources of variation that influence timing decisions and their fitness implications in the wild. Specifically, my research asks: What are the mechanisms that influence initiation of daily behaviors and initiation of seasonal activation of reproductive physiology and behavior? How does individual variation in these daily and seasonal timing responses in physiology and behavior influence fitness? And, what are the evolutionary pressures, or costs, that have shaped the physiological processes regulating these timing decisions? Here I will present representative studies that highlight the integration of behavioral ecology and physiology in songbirds and outline future lines of research that I will pursue that will begin to address these key questions.

#### WHO IS TIMOTHY J. GREIVES?

2009 PhD Indiana University, Bloomington, IN USA  
2009-2011 USA National Science Foundation International Research Fellow, MPIO Radolfzell Germany  
2011-2012 Post-doctoral Research Scientist, MPIO Radolfzell Germany  
2013-present Assistant Professor, Biological Sciences, North Dakota State University, Fargo, ND, USA

#### SELECTED RELEVANT PUBLICATIONS

- Bauer, C.M., Fudickar, A.M., Anderson-Buckingham, S., Abolins-Abols, M., Atwell, J.W., Ketterson, E.D., Greives, T.J. 2018. Seasonally sympatric but allochronic: differential expression of hypothalamic genes in a songbird during gonadal development. *Proceedings of the Royal Society of London B*. 285: 20181735
- Graham, J.L., Cook, N., Needham, K., Hau, M., and Greives, T.J. 2017. Early to rise, early to breed: A role for daily rhythms in seasonal reproduction. *Behavioral Ecology*. 28:1266-1271
- Greives, T.J., Kingma, S.A., Kranstauber, B., Mortega, K., Wikelski, M. van Oers, K., Mateman, C. Ferguson, G., Beltrami, G. and Hau, M. 2015. Cost of sleeping in: circadian rhythms influence cuckoldry risk in a songbird. *Functional Ecology*. 29:1300-1307

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