

The University of Michigan Department of Ecology and Evolutionary Biology presents the
13th Annual Early Career Scientists Symposium



All presentations are in Forum Hall,
Palmer Commons, fourth floor.

Evening reception at 6 - 8 p.m., is on
the second floor of the U-M Museum of
Natural History.



ECOLOGY AND EVOLUTIONARY BIOLOGY OF PHENOTYPIC PLASTICITY

Saturday, March 11, 2017

Palmer Commons, fourth floor
Ann Arbor, Michigan

Early Career Scientists Symposium 2017 Committee:

Wei-Chin Ho, Ph.D. student
Andrea Hodgins-Davis, postdoctoral fellow and committee chair
Jill Myers, Ph.D. student
Annette Ostling, associate professor, associate director, MICDE
Mary Rogalski, postdoctoral fellow
Sonal Singhal, postdoctoral fellow
Carol Solomon, senior secretary
Earl Werner, professor emeritus of ecology and evolutionary biology

Sponsored by the Department of Ecology and Evolutionary Biology and the David Bay Photography Fund. The first 11 symposia were funded by the late alumna Dr. Nancy Williams Walls.



Morning Session

8:15 a.m. Check-in and continental breakfast, Palmers Commons, fourth floor

8:45 a.m. **Opening remarks, Andrea Hodgins-Davis**
Postdoctoral Fellow, U-M EEB

9:00 a.m. **Maggie Wagner**



Plasticity of glucosinolate content and implications for local adaptation in *Boechera stricta*

Maggie Wagner is a NSF Plant Genome Postdoctoral Fellow currently working at North Carolina State University. After obtaining her bachelor's degree in plant biology from the University of Michigan, she earned her Ph.D. under the mentorship of Dr. Thomas Mitchell-Olds at Duke University, where she investigated the role of genotype-by-environment interactions in the evolution of defensive chemistry in a wild perennial plant. Dr. Wagner studies how complex plant traits evolve in heterogeneous environments, with a special focus on plant-associated microbial communities – both as part of the plant habitat and as a “trait” influenced by host genetic and phenotypic variation. Her postdoctoral work combines quantitative genetics, field experiments, amplicon sequencing and metagenomics to study the effects of intensive breeding on maize microbiome composition and the consequences for crop phenotypes, disease resistance and productivity.

9:30 a.m. **Yuheng Huang**



Experimental evolution of gene expression and plasticity in alternative selective regimes

Yuheng Huang is currently a postdoctoral fellow at University of Wisconsin-Madison with Dr. John Pool. His research seeks to understand the effects of temporally and spatially varying environments on different aspects of populations, including genetic variation, adaptability and phenotypic plasticity. He applies quantitative genetics and genomic/transcriptomic approaches on both experimental and natural populations of fruit fly. Dr. Huang received his B.Sc. from Sun Yat-sen University in China in 2010. He went to Canada for a Ph.D. at University of Toronto, working with Dr. Aneil Agrawal from 2010-2016.

10:00 a.m. **Karin Burghardt**



The role of plastic plant defense strategies in determining landscape level variability in ecosystem processes

Karin T. Burghardt is an ecologist at the Smithsonian Environmental Research Center (SERC) as a postdoctoral fellow in the Smithson Fellowship Program. She is broadly interested in how plant defenses shape communities and ecosystems. Early work focused on how plant novelty and phylogenetic relatedness to native communities shape insect host use and community patterns. This led to intraspecific work examining how induced defenses in *Solidago altissima* impact insects while simultaneously altering fluxes and flows of nutrients. In 2007, she received a B.Sc. in wildlife conservation from the University of Delaware followed in 2016 by a Ph.D. from Yale University working within the lab of Dr. Oswald Schmitz. Her current projects focus on 1) the role of tree diversity in determining caterpillar community diversity and 2) the role of local adaptation and phenotypic plasticity in freeze tolerance for three widespread mangrove species.

10:30 a.m. Coffee break and refreshments, Palmer Commons, fourth floor

11:00 a.m. **Laura Stein**



The role of plasticity within and across generations in colonizing novel environments

Laura Stein is an NSF Postdoctoral Fellow at Colorado State University. Her research interests broadly span the interface between animal behavior and plasticity's role in evolution. In particular, she is interested in causes and consequences of behavioral plasticity within and across generations, their influence on evolutionary patterns, and the underlying processes by which experience results in behavioral phenotypes. She received her Ph.D. under Dr. Alison Bell at the University of Illinois Urbana-Champaign in 2015 testing hypotheses regarding plasticity's role in evolutionary patterns in threespine stickleback. Currently, she is using another excellent model of plasticity and evolution, the Trinidadian guppy, to investigate how maternal experience and population history interact to produce behavioral phenotypes using integrative genomic, neuroendocrine and epigenetic approaches.

11:30 p.m. **Holly Moeller**



Trade, borrow, or steal: how acquired metabolism confers phenotypic plasticity

Holly Moeller is a community ecologist who uses a combination of mathematical, empirical and observational approaches to study “acquired metabolism.” This is a phenomenon by which an organism can extend its metabolic niche beyond what's encoded in its DNA by forming metabolic mutualisms, stealing metabolic machinery, or acquiring metabolic gene pathways. Dr. Moeller studies acquired metabolism in both terrestrial and marine systems, ranging from the tree-fungal mutualisms that govern community structure and function in temperate forests, to acquired phototrophy in marine phytoplankton. She is an assistant professor of ecology, evolution and marine biology at the University of California, Santa Barbara, currently on leave as a Biodiversity Centre Postdoctoral Fellow at the University of British Columbia.

Afternoon Session

12:00 p.m. Morning speaker panel discussion moderated by Jillian Myers and Mary Rogalski

12:30 p.m. Lunch and poster session, Palmer Commons, fourth floor

2:00 p.m.

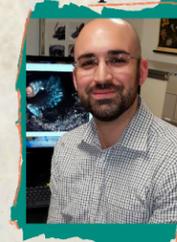


Ben Parker

What mechanisms generate genetic variation in phenotypic plasticity? Ecology and evolutionary genetics of the pea aphid wing polyphenism

Ben Parker is a postdoctoral researcher at the University of Rochester. He earned his Ph.D. in population biology, ecology, and evolution at Emory University in 2013, and then spent two years as an NSF Postdoctoral Research Fellow at the University of Oxford. Dr. Parker is an evolutionary ecologist whose research incorporates experimental biology, genomics and immunology using insect systems. He aims to understand variation in ecologically relevant traits: what genetic mechanisms underlie phenotypic variation and how variation is maintained in natural populations. He is particularly interested in host-microbe interactions, phenotypic plasticity, and the invertebrate immune system.

2:30 p.m.



Daniel Schwab

Developmental plasticity, symbiosis, and niche construction: insights from the study of *Onthophagus* beetles

Daniel Schwab is a Ph.D. candidate in Dr. Armin Moczek's lab in the Department of Biology at Indiana University, Bloomington. His research uses horned dung beetles in the genus *Onthophagus* to better understand how organism-environment interactions during development can shape patterns of phenotypic variation and bias evolutionary outcomes in natural populations. Schwab's most recent empirical work includes investigations of (i) the physiological basis and evolution of horn polyphenism, (ii) the role of maternally-inherited microbial symbionts in promoting the normative development of dung beetles, and (iii) the phenotypic and evolutionary consequences of developmental niche construction. Schwab will receive his Ph.D. in the summer of 2018 and is currently seeking postdoctoral positions at the interface of ecology, evolution and development.

3:00 p.m.



Clare Rittschof

Honey bee aggression and brain energy metabolism: understanding the temporal dynamics of behavioral plasticity

Clare Rittschof is an assistant professor in the Department of Entomology at the University of Kentucky. Most recently her research has focused on understanding how social interactions “get under the skin” to affect honey bee behavior and health through changes in the brain and the physiology of the bee. Her research combines perspectives from behavioral ecology, behavioral genomics, and neuroscience, incorporating field experiments, modeling approaches, molecular biology, and large scale measures of gene expression. Rittschof earned her Ph.D. in zoology with Dr. H. Jane Brockmann at the University of Florida. Dr. Rittschof has given a number of public lectures on honey bee health and behavior. She is a Science Policy Fellow for the Entomological Society of America.

3:30 p.m.

Coffee break and refreshments, Palmers Commons, fourth floor

4:00 p.m.



Oana Carja

The evolutionary advantage of phenotypic plasticity

Oana Carja creates mathematical and computational models that explore evolving strategies for life in an uncertain world. Evidence is accumulating that phenotypic variance constitutes an evolutionary driving force across diverse biological processes, including the adaptive immune system, the development of cancerous neoplasms, and the persistence of pathogens under drug pressure. All these systems are fundamentally characterized by high levels of environmental change and uncertainty: either persistent, global, temporal fluctuations in selection pressure, or local, micro-environmental and spatially-defined selective forces. A central question of her research is: How does evolution prepare organisms for this environmental stochasticity? Carja started her career in Romania, as a pure mathematician, before moving to Stanford University to work with Marc Feldman as a Ph.D. student. She is now a postdoc working with Dr. Joshua Plotkin at the University of Pennsylvania.

4:30 p.m.



Keynote presentation by Cameron Ghalambor

Does phenotypic plasticity facilitate or constrain adaptive evolution?

Cameron Ghalambor is a professor at Colorado State University. He serves as an associate editor for Integrative and Comparative Biology, and is chair-elect for the Division of Ecology and Evolution for the Society for Integrative and Comparative Biology. Born in Los Angeles, Dr. Ghalambor received his B.A. from the University of California, Los Angeles and his Ph.D from the University of Montana, where he worked on the role of predators in shaping the parental care strategies of birds. He then did postdoctoral work at the University of California, Riverside on the evolutionary ecology of Trinidadian guppies. In 2003, he joined the faculty at Colorado State University. Research in his lab is focused on the mechanisms that facilitate and constrain adaptive evolution in life history, physiology, morphology and behavior. A common theme in this research is how the environment acts both as a source of plasticity during development, and as a source of selection across generations.

5:30 p.m.

Afternoon speaker panel discussion moderated by Wei-Chin Ho and Sonal Singhal

6:00 p.m.

Evening reception, Natural History Museum