M A R E S

MECHANISMS *of* ANIMAL RESPONSES
to ENVIRONMENTAL STRESS

Fall Speaker Series

MARES Overview

The Center for Mechanisms of Animal Responses to Environmental Stress (MARES)'s vision is to understand biological mechanisms underlying how vertebrate animal populations in natural and managed ecosystems respond to climate change. Climate change is rapidly increasing average global temperatures and the frequency of extreme weather events. These changes will have profound impacts on both free-living and domestic animal populations. MARES will address the NSF Grand Challenges of "predicting organisms' characteristics from their genetic information (Genomes to Phenomes)" as well as "how organisms walk the tightrope between stability and change."

Objectives:

1. Define and predict the effects of climate change-related stressors (e.g., thermal, water/osmotic, infectious disease, and nutritional stresses) on the fitness of model and wild vertebrates in controlled and natural environments.

2. Create multilevel mechanistic models that integrate existing and new data to predict responses by vertebrates to these climate change-related stressors.

3. Provide educational training and research experience including field work from the undergraduate to the postdoctoral levels.

4. Serve as the national hub for quantitative analyses and knowledge dissemination pertaining to the mechanisms of vertebrate responses to climate change.

MARES Fall Speaker Series

Effect of Environmental Stress on Vertebrates

ABG CRN *63989*, Fall Quarter 2016

Wednesdays 4 - 5:30PM, 1138 Meyer Hall

October 5 - Steven M Ostoja

Director, USDA California Climate Hub

http://caclimatehub.ucdavis.edu/about-us/

The role of the USDA Climate Hub in developing and delivering climate smart information and technologies

Biography

Steve is a native Californian and grew up in nearby Sacramento who earned his BS in ecology and MS in biological sciences from Cal Poly, San Luis Obispo. Steve went on to earn his PhD in ecology and conservation biology from Utah State University where his research focused on the effects of invasive species on wildlife communities and resource-consumer interactions in an applied rangeland restoration context. Before joining the hub, Steve worked for the US Forest Service where he was head of the ecosystem management department on the Sierra National Forest. Prior to that, he worked as a supervisory ecologist for the US Geological Survey in the Yosemite office where he managed a research program that focused on invasive species management, restoration ecology, conservation biology and the effects of various stressors, including climate change, to plant and animal populations and communities. Steve joined USDA California Climate Hub in September 2016.

Oct 12 - Anne Todgham

Assistant Professor of Animal Science, UC Davis, Davis, CA

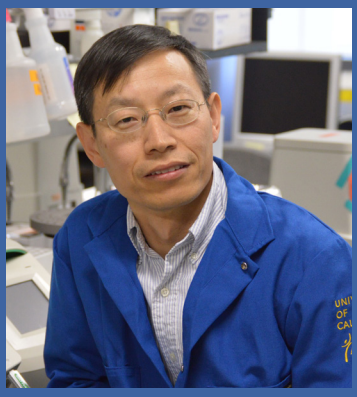
http://todghamlab.faculty.ucdavis.edu/

Importance of framing climate change biology in an ecologically-relevant context: Insights from intertidal snails

Topic Synopsis

Intertidal zone organisms may be among the most vulnerable groups of organisms to global climate change (GCC) since it is hypothesized that these organisms have already maximized their capacity to tolerate environmental change. Much of our understanding of the thermal physiology of intertidal organisms comes from single acute heat shock studies of organisms submerged in water despite the fact that these organisms more typically experience consecutive sublethal heat stresses that vary in magnitude while the organisms are aerially emersed. Using the fingered limpet, Lottia digitalis, we demonstrate that these complexities in the thermal environment matter and specifically that aerial exposure, inducible stress tolerance and stochastic vs. predictable changes in temperature affect the thermal physiology of L. digitalis. Our results suggest that previous studies have overlooked important mechanisms underlying thermal tolerance of intertidal animals and that research that incorporates the biophysical characterization of the stochasticity of the thermal environment is critical if we are to forecast the impacts of GCC on intertidal communities.

Oct 19 - Huaijun Zhou



Associate Professor, Department of Animal Science, Director of USAID Feed the Future Innovation Lab for Genomics to Improve Poultry, UC Davis
http://animalscience.ucdavis.edu/faculty/Zhou/people.html

Genetic dissection of host resistance to heat tolerance in chickens

Topic Synopsis

Environmental stressors have great impacts on poultry production. Heat stress is one of most significant factors that affect feed intake, feed efficiency, and cause additional death. Genomics to Improve Poultry Innovation Lab is to use advanced genetic and genomic technologies to address both disease and heat stress in African poultry. University experimental inbred lines were used as a foundational discovery platform. Physiological responses to heat stress in blood were measured and RNA-seq was used to identify genes and signaling pathways that are associated with genetic resistance to heat tolerance. Genome-wide association analysis in a commercial layer line was used to identify genomic regions or SNPs associated with heat tolerance. Finally, an economically affordable low-density panel will be developed to genetically improve heat tolerance in chickens.

October 26 - Erica Newman

Postdoctoral researcher, School of Natural Resources and the Environment
University of Arizona, Tucson, AZ
https://erg.berkeley.edu/people/newman-erica/

Ecological tradeoffs for different fire management strategies in California chaparral and their potential consequences for Lyme disease ecology

Topic Synopsis

California chaparral is a hugely diverse plant community with many endemic wildlife species. Because of its fire activity and fire-proneness, chaparral is often removed from areas where people live in order to reduce risk to lives and property. However, the consequences of these practices for wildlife and disease ecology are largely unknown. The pressure for fire prevention through vegetation removal is increasing with climate change, which is causing more wildfire activity in this ecosystem. Dr. Newman will discuss studies conducted at Hopland Research and Extension Center (Ukiah, CA) focusing on bird community shifts resulting from different fire management practices, and the role of these birds as wildlife reservoirs of Borrelia bacteria, one species of which causes Lyme Disease in humans.

November 2 – Luis Gustavo Barioni

Agronomist and Animal Scientist - Brazilian Agricultural Research Corporation
EMBRAPA, Empresa Brasileira de Pesquisa Agropecuária, Brazilia, Brazil
https://www.researchgate.net/profile/Luis_Barioni

Mitigating greenhouse gases emissions through sustainable intensification of livestock production

Biography

Dr. Luís Barioni is an Agriculture Scientist working predominantly on Modelling and Simulation of Agricultural Systems at Embrapa Agriculture Informatics, based in Campinas, Brazil. Dr. Barioni has developed solid recent work on estimation of GHG emissions and on mitigation options for the Brazilian beef cattle sector. He coordinated Embrapa's team participation in the AnimalChange (An Integration of Mitigation and Adaptation Options for Sustainable Livestock Production under Climate Change) EU project and is the leader of the biophysical modelling component of the PECUS project (Greenhouse Gases Dynamics in Brazilian Livestock Production Systems), both related to mitigation of GHG emissions and adaptation of the livestock sector to climate change. He is author of recent high impact papers in the area, including the recent nature climate change article entitled "Increasing beef production could lower greenhouse gas emissions in Brazil if decoupled from deforestation". He is the Brazilian representative in the Global Research Alliance on Agricultural Greenhouse Gases and provided input for the development of the Brazilian NAMAs and INDCs proposals.e to forecast the impacts of GCC on intertidal communities.

November 9 - Jennifer Gee

Director, the James San Jacinto Mountains Reserve, Biologist
http://www.ucnrs.org/reserves/james-san-jacinto-mountains-reserve.html

Quail tales: lessons from quail about the origin of species

Biography

Jennifer Gee has been studying North American Quail since 1997. Her fieldwork is designed to understand the causes of an adaptive radiation across 3 species pairs in the Colorado and Sonora Deserts. Her work is a blend of ecology, behavior and genetics.

Jennifer was initially trained at Swarthmore College in English, and Zoology from the University of Washington. She attended graduate school at Princeton University studying Ecology and Evolutionary Biology. After graduate school, Jennifer became a postdoctoral fellow at Cornell University (Dept. of Neurobiology and Behavior) and Harvard University (Dept. of Organismic and Evolutionary Biology). Jennifer started at UCR as a Research Associate and is now the Director of the James San Jacinto Mountains Reserve.

November 16 – Leslie Roche

Dr. Leslie Roche is a UCCE Specialist in Rangeland Management with the UC Davis Department of Plant Sciences.
http://www.caes.ucdavis.edu/about/directory/fsd/leslie-roche

Climate Impacts to Actions: Insights from a Social-Ecological Framework for Adaptive Rangeland Decision-Making

Biography
Dr. Leslie Roche is a UCCE Specialist in Rangeland Management with the UC Davis Department of Plant Sciences. She earned a Ph.D. in Ecology from UC Davis, and was a USDA-NIFA Postdoctoral Fellow and Project Scientist before joining the faculty in September 2015. Her research and extension program is at the intersection of agricultural, environmental, and social issues of ranching and livestock production on California's grazinglands. She works with a diversity of stakeholders to integrate management expertise and applied research to address key challenges, including managing for multiple agricultural and ecological outcomes and coping with and adapting to drought.