



ANIMAL BEHAVIOR BULLETIN

Center for the Integrative Study of Animal Behavior

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WHAT'S INSIDE

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CISAB MEMBER RECOGNITIONS

Meredith West presented her Distinguished Faculty Research Lecture, "Close Encounters of the Avian Kind: The Developmental Ecology of Vocal Communication in Birds" on April 16 to a packed crowd in the Frangipani Room of the Indiana Memorial Union.

Trustee Teaching Awards to faculty with the highest teaching ratings by the Psychology Departments BAC included CISAB members **George Rebec** and **Dale Sengelaub**.

News? Story Ideas? Let us know!

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REU STUDENTS Summer 2007

Lauren Brierley
Hope College

Mentors: Kevin Hunt &
Randy Patrick

Shawna Buerkle
North Carolina State University

Mentors: Emilia Martins &
Saul Nava

Stephen Chang
University of Michigan
Mentor: George Rebec

Margaret Donahue
Rochester Institute of Technology
Mentors: Laura Hurley &
Ian Hall

Victoria Flores
Brown University
Mentors: Troy Smith &
Antino Allen

Melissa Greulich
University of Wisconsin

Mentors: Emilia Martins &
Bhat Anu

Lauren Harold
Tuskegee University
Mentor: Bill Timberlake

Janell Harro
Illinois Wesleyan University
Mentor: Preston Garraghty

Andres Morera
Indiana University
Mentors: Troy Smith &
Antino Allen

Juliana Belen
University of Puerto Rico
Mentors: Greg Demas &
Melissa-Ann Scotti

Kathy Daniels
Teacher from New Castle Chrysler High School
Mentor: Emilia Martins



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SOME NEW CISAB FACULTY



JIM GOODSON

Dr. Goodson is an Associate Professor in the Biology Department. His research focuses on neural and neuroendocrine mechanisms of social behavior, comparative neuroanatomy, and the evolution of avian sociality.

He is currently investigating how the avian brain's neural network and processes of motivation differ between bird species that differ in sociality, i.e. the amount of gregariousness the species exhibits. Since social behavior circuits of the basal forebrain are structurally and functionally similar across vertebrate classes, his research findings can offer important insights to a broad range of species.

Dr. Goodson studies two estrildid finch species, the violet-eared waxbill (*Uraeginthus granatina*) and the spice finch (*Lonchura punctulata*). Although similar in most behavior and ecology, they differ in sociality, the violet-eared waxbills being territorial, while the spice finches live in groups of 100 or more.

To determine the neural processing involved with social behavior, Dr. Goodson is examining vasotocin neurons in the bed nucleus of the stria terminalis, a part of the brain's social behavior network. He has found that these neurons are more numerous and more active in gregarious finch species than in territorial species.

Recent Publications:

Goodson, J.L. & Wang, Y.A. 2006. Valence-sensitive neurons exhibit divergent functional profiles in gregarious and asocial species. *Proceedings of the National Academy of Sciences of the United States of America*, 103: 17013-17017

Goodson, J.L., Evans, A.K. & Wang, Y. 2006. Neuropeptide binding reflects convergent and divergent evolution in species-typical group sizes. *Hormones and Behavior*, 50: 223-236.

GREGORY VELICER



Associate Professor in the Biology Department, Dr. Velicer studies the evolution and ecology of bacterial social behavior and is interested in discovering the secrets of complex cooperative and competitive social interactions in these single celled organisms.

Dr. Velicer's lab focuses on three main areas of research: evolution, behavior and ecology, and genomics and molecular biology. Evolutionary topics deal with cooperative behavior, cheating and anti-cheating strategies, predation efficiency, and the evolution of novel cooperation mechanisms. He is also examining cooperation and conflict among strains of *Myxobacteria* during development, swarming and growth, local and global biogeography, natural variation in cooperation, predatory specialization, and functional roles in the soil community ecology. Genetics research focuses on sequencing genomes to identify evolutionary mutations, determining fitness and phenotypic effects, and detecting genetic and biochemical causes of social incompatibility among natural isolates.

Presently, Dr. Velicer is pursuing several lines of research using *Myxococcus xanthus* is a model species for engaging in cooperative swarming, predation and multicellular development. *M. xanthus* responds to low levels of its main nutrient source, amino acids, by aggregating into high density groups and undergoing genetically-based development into fruiting bodies. This process requires chemical social signals and only certain cells develop into fruiting bodies while the remainder die. He has shown that different strains of *M. xanthus* cooperate as isolated groups and then antagonize and exploit one another in mixed populations.

Recent Publications:

Kadam, S.V. & G.J. Velicer. 2006. Variable patterns of density dependent survival in a social bacterium. *Behavioral Ecology*, 17 (5): 833-838.

Fiegna, F., Y.T. N. Yu, S.V. Kadam, & G.J. Velicer 2006. Evolution of an obligate social cheater to a superior cooperator. *Nature*, 441: 310-314.

CISAB MEMBERS ON THE MOVE



Julienne Rutherford has obtained a position as postdoctoral fellow in the Laboratory of Human Biology Research at Northwestern University, where she will be working with Chris Kuzawa, Ph.D., MsPH. Her research with Dr. Kuzawa and other members of the LHBR at Northwestern and colleagues at the Carolina Population Center at the University of North Carolina will investigate dietary and lifestyle changes in an increasingly obese and sedentary Filipino population in relation to fetal development and the intrauterine programming of adult obesity and cardiovascular disease. The data are from the Cebu Longitudinal Health and Nutrition Study, a longitudinal study of a cohort of Filipino women who gave birth between 1983 and 1984. For over twenty years, anthropometric, questionnaire, and hormone data have been collected from these women, their offspring, and recently, their grand-offspring, providing unique opportunities to investigate the intergenerational effects of maternal nutrition and health on the development of metabolic, cardiovascular, immune, and reproductive function, in the context of dietary and socioeconomic change. She is also a co-investigator on a recently funded NIH grant to develop the common marmoset monkey as a model for maternal obesity, work that complements the human biology research she will be taking on at Northwestern.

Julienne was awarded travel grants from the College of Arts and Sciences and CISAB for her March 2007 American Association of Physical Anthropologists presentation "Using ultrasound to estimate gestational age from placental measurements in marmoset monkeys (*Callithrix jacchus*)", co-authored with Donna Layne Colon of the Southwest National Primate Research Center and Suzette D. Tardif of the University of Texas Health Science Center at San Antonio. She currently has a book chapter (co-authored with Suzette Tardif) in review for an upcoming book on marmoset monkey biology, under contract with Springer-Verlag.



Johanna Kolodziejski starts as Assistant Professor of Neurobiology at Keene State College in Keene, New Hampshire this fall. She will be teaching neurobiology, cells and physiology and freshmen topics courses. Hanna has been working with Troy Smith in the Department of Biology studying communication in weakly electric fish. She has been the recipient of several awards including the prestigious Well's Award in 2004 (see Oct 2004 Bulletin) and will be defending soon.



Bronwyn Heather Bleakley, after presenting her dissertation research, “Indirect genetic effects on behavior in guppies, *Poecilia reticulata*” May 21 will teach a field behavioral ecology course at Mountain Lake Biological Station. This fall, she will be using her NSF International Postdoctoral Research Fellowship to pursue research in England and Arizona. She will first travel to the University of Exeter, Cornwall to work with Drs. Allen Moore and John Hunt developing a quantitative genetic model that describes the evolution of cannibalism from the perspective of interacting phenotypes/indirect genetic effects. They are specifically interested in how sexual and social selection may interact within a cannibalistic system to generate extremely rapid evolution and how the rate and outcome of evolution is impacted by genetic covariance between morphological and behavioral traits associated with cannibalism. For the second half of the grant, she will return to the U.S. to work with Dr. Stephen Shuster at Northern Arizona University, where they will be testing and parameterizing the model using cannibalistic (and endangered) isopods.



Heather’s research at I.U. examined individual guppy behavior as a product of not only its own genes and the general environment it experiences, but also from the genes of social partners. Such “indirect genetic effects” (IGEs) are predicted to be particularly important in the evolution of social behavior, but are difficult to measure because the genetic component of the social environment in which individuals interact is variable. Using behavioral experiments and quantifying genetic variation with microsatellites she first demonstrated that designer guppies may be used in quantitative genetic studies of behavior, particularly studies of IGEs. She found that five strains of designer guppies respond appropriately to predatory cues and that the response varies among strains. She then demonstrated that the designer strains, which are predicted to be inbred, in fact display reduced genetic diversity compared to wild fish. Second, she investigated whether guppies, both outcrossed and inbred, respond to changes in social environment by testing individuals alone and in groups. Individuals, both inbred and outcrossed, responded to sometimes subtle differences in the specific social environment provided by their group by altering their behavior. Last, she conducted an explicit test of the importance of IGEs on guppy behavior. She demonstrated that the strain to which an individual belongs, the strain to which her social partners belong, and the specific behavior displayed by her social group all impact her behavior, allowing Heather to quantify the strength of IGEs acting on guppy behavior.

THE 14TH ANNUAL INDIANA UNIVERSITY ANIMAL BEHAVIOR CONFERENCE



CISAB's 14th Annual Animal Behavior Conference was held in the Frangipani Room of the Indiana Memorial Union April 23, 2007. We welcomed researchers from the University of Chicago, IUPUI, Emory, North Carolina State University, and Georgia State University. The plenary speaker, Michael J. Ryan, hailed from the University of Texas at Austin. Nineteen presentations and 26 posters covered a range of topics including endocrinology, neurobiology, social learning, ecology, human behavior and cognition, genetics, and sexual communication. IU departments and programs represented included: Departments of Anthropology, Biology, Chemistry, History and Philosophy in Science, Philosophy, Psychological and Brain Sciences, the Kinsey Institute, Institute for Pheromone Research, Program in Neural Science and the Center for the Integrative Study of Animal Behavior.

Much of the research was integrative by nature, but the broad range of topics highlighted the following areas of research:

Communication and Social Systems: Many organisms maintain a complex repertoire of communication to obtain reproductive partners, and/or maintain social groups. Research presented that this year's conference examined auditory, olfactory as well as visual communication in species including Tungara frogs, geckos, *Sceloporus graciosus*, hamsters and Guinea baboons.

Ecology and Environment: An organism's behavior is often determined by its association with its environment. Research established the influence of the environment on both bluebird plumage variation and damselfly phenotypic coloration. Both gulls and wasps used environmental cues for foraging. The behaviors of zebrafish populations varied with geographical distance and habitat variation. Rats were found to prefer spending time in areas with the most cover, while photoperiod changes were shown to influence reproductive and immune function in Siberian hamsters.

Endocrine Systems: Behavior often occurs in response to hormone levels. Testosterone was shown to be influential in determining parental care ability and plumage traits in birds. Both chronic stress and social defeat were associated with hormonal changes in rodents, but neuropeptides did not alter gonadal regression in Siberian hamsters.

Genetics: Topics in genetics included modeling, speciation and gene expression. One model suggested that mating frequency evolves as a cue to increase crossover frequency when advantageous and limit it when

disadvantageous. The speciation of two *Drosophila* sister species was examined. Research also showed the efficacy of using lentivirus vectors to alter gene expression in a variety of species.

History, Philosophy and Modeling: One cannot appreciate present scientific discovery without setting it in context. One presentation examined the importance of anecdotal evidence in the progression of science in the 19th century. New models of animal rationality and graph theory suggested new avenues of research.

Human Cognition and Behavior: As with other organisms, humans exhibit interesting behaviors. Using speed dating, one research project tested to see if humans, like other organisms, resort to mate copying. Another study suggested that human cognition may be the direct result of foraging behavior. Woman's preferences in men were also found to be influenced by the phase of their menstrual cycle.

Neurobiology, Physiology and Learning: The function of the nervous system was examined by many researchers. Estradiol was found to play a major role in motor function and neuroprotection in mice with Huntington's disease, while differences in bursting characteristics during behavioral engagement were found between wild mice and those with Huntington's disease. Sex differences were found in morphine analgesia receptors in rats, and male copulatory behavior was associated with contact between mother and pup, affecting development of nerves in the bulbo cavernosus. Learning experiments found that cowbird song learning was associated with contact with adult females. Neonatal maternal separation altered learning and memory in rats. Circadian activity patterns were found to entrain nicotine administration. Huddling in rats did not show an odor preference sensitivity period. In the nudibranch, *hermissenda*, conditioned inhibitory learning was influenced by arachidonic acid and lipoxygenase.

EXEMPLAR AWARD

This year's Exemplar Award, for a scientist with an outstanding career exemplifying the integration of different perspectives of animal behavior, was awarded to this year's plenary speaker, Michael J. Ryan, Clark Hubbs Regents Professor in Zoology at the University of Texas at Austin.



Dr. Ryan works with sexual selection and communication in the Tungara frog, integrating the topics of natural and sexual selection, auditory communication, ear physiology, neurobiology and artificial neural network modeling. He has been recognized as a Fellow of the Animal Behavior Society, the American Academy of Arts and Sciences and was a 1997 Guggenheim Fellow. He has numerous publications and has contributed an important body of knowledge to animal behavior research.

WILLIAM J. ROWLAND MENTORING AWARD 2007

Each year CISAB recognizes an IU graduate student whose mentoring of undergraduates reflects the example set by CISAB founding member, William J. Rowland. Bill acted as director of the REU program and helped unite faculty researchers with undergraduates as well as mentor 14 of his own REU students.



This year's award was presented to **Bronwyn Heather Bleakley**, PhD candidate in the Biology Department. She has mentored an REU student every year since 2001. For her research interests, see page 5.

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