Student **Research Opportunities**

SJU Saint Joseph's University

College of Arts and Sciences

Biology

Our **Philosophy**

Independent research by students is a key feature of the educational philosophy of the Biology department.
By learning how to ask and answer questions, design and perform experiments, analyze data and draw appropriate conclusions, students not only develop a knowledge base, but also the reasoning skills needed to actually "do" science.

The Biology faculty are committed to providing opportunities to engage in research for all who are interested. The benefits, both in terms of logical skills and the development of a deeper understanding of scientific principles in general, make research an excellent experience for all, even those not contemplating a career involving research.

Students can participate in research in three ways: for academic course credit, for pay (during the summer), or as volunteers. Those interested should take a look at the Department website for more information about faculty research areas and ongoing projects and contact the individual faculty members directly.

Student **Research**

In the last five years, student research has been published in:

Applied and Environmental Microbiology

Behaviour

Biochemical and Biophysical Research Communications

Geodiversitas

Journal of Bacteriology

Journal of Microbiology & Biology Education

Journal of Neuroscience

Journal of Parasitology

Journal of Zoology

Paleontologicheskiy Zhurnal

The Physics Teacher

Visual Neuroscience

PLoS One

Behavioural Processes

Entomological News

CBE Life Science Edcuation

eLife

Freshwater Science

Integrative Zoolog

In the last five years, student research has been presented at:

American Society for Cell Biology

American Society for Microbiology

American Physiological Society

Annual Drosophila Research Conference

Ecological Society of America

Freshwater Biology

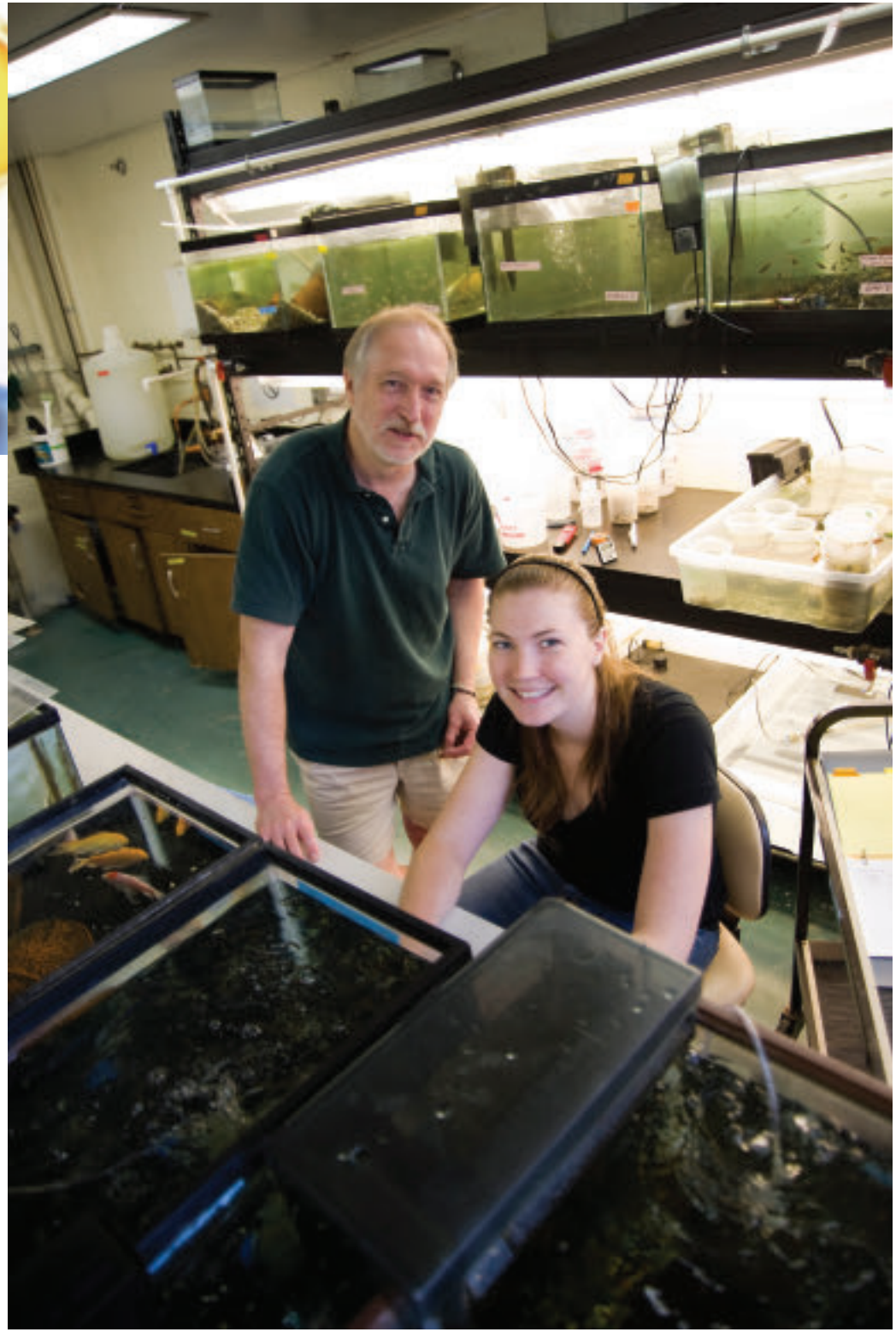
North American Black Fly Association

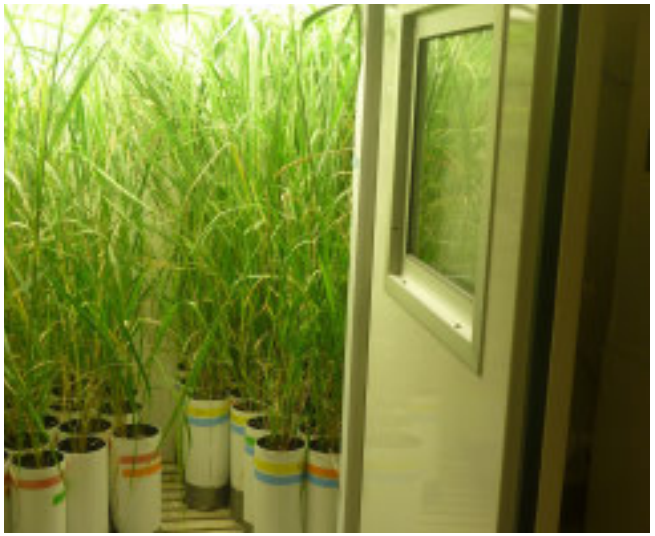
North Eastern Microbiologists: Physiology, Ecology and Taxonomy

Obruchev Symposium

Society for Integrative and Comparative Biology

Society of Nematology





Catalina Arango
Education:
Ph.D. Environmental Engineering, University of Massachusetts

Expertise:
Catabolite repression in bacteria, environmental microbiology

Dr. Arango's research focuses on *Sinorhizobium meliloti*, an agriculturally beneficial bacterium. *S. meliloti* can live in the soil as a free living organism, or in symbiosis with legumes, such as alfalfa, which makes it an interesting research model. Her research centers on elucidating the mechanism by which genes involved in diverse processes are controlled by catabolite repression. Through studying the regulation of genes for raffinose and lactose utilization, she and her students aim to understand the role of the Phosphotransferase system in catabolite repression. The Arango lab also does research in sustainable and affordable water treatment methods for households that do not have access to a clean water supply.

John Braverman, S.J.
Education:
Ph.D. Biology, University of California, Davis

Expertise:
Bioinformatics and evolutionary biology

Dr. Braverman's main areas of research are: population genetics, molecular evolution, and bioinformatics. His goal is to characterize and explain genetic variation observed within natural populations and among species. Using empirical (field collection and laboratory) and computer modeling and DNA sequencing he and his students test models of natural selection and their alternatives. In addition, he studies rates and patterns of molecular divergence to test the molecular clock and identify the processes responsible, and designs software to answer evolutionary questions about large genomic datasets. His study organisms range from fruit flies to tropical trees.

Shantanu Bhatt
Education:
Ph.D. Microbiology & Molecular Genetics Emory University

Expertise:
Understanding the molecular mechanisms of bacterial pathogenesis

Dr. Bhatt's research focuses on the regulation of gene expression in bacterial pathogens. Specifically, he is interested in understanding how the RNA-binding protein Hfq and its accompanying regulatory small RNAs control a disease-causing locus called the LEE in enteropathogenic *E. coli* (EPEC). Recently, Dr. Bhatt has initiated similar studies in the related but under-characterized pathogen *Escherichia albertii* by optimizing a genetic approach to mutagenize the bacterial genome. Future studies are directed at observing the consequences of such mutations on gene expression from the LEE. In Dr. Bhatt's lab students take a transdisciplinary approach by integrating techniques and tools from genetics, biochemistry, microbiology, and chemistry to understand the molecular basis of disease.

Jonathan Fingerut
Education:
Ph.D. Biology, The University of California, Los Angeles

Expertise:
Stream ecology and the biomechanics of larval dispersal

Dr. Fingerut researches how the movement of water shapes the behavior, morphology, and distribution of organisms living in aquatic ecosystems by drawing on theory and techniques from physics, engineering, and ecology. Through a combination of field research and careful manipulation of flow in the laboratory, his lab is able to identify the physical and behavioral mechanisms that control population distributions at scales ranging from mm's to 100's of meters.

Eileen Grogan
Education:
Ph.D. Marine Science, College of William and Mary

Expertise:
Paleontology and evolutionary development of vertebrates

Dr. Grogan's research focuses on evolutionary, developmental, and phylogenetic studies of early vertebrates using both extant and extinct forms. Particular emphasis is placed on the chondrichthyan (e.g. sharks, chimaerids) and bony fishes of the Bear Gulch Limestone, a fossil deposit renowned for its high quality preservation and diversity. Studies range from anatomy, developmental biology, ecology and preservation, to the formal identification of new fossil forms and cladistic analyses of their interrelationships. Ongoing research includes histological analyses of mineralized cartilage and what this infers about the biology of the fish and the evolution of vertebrate skeletal tissues.

Christina King Smith
Education:
Ph.D. Biological Sciences, University of Maryland, Baltimore County

Expertise:
Cell and organelle motility; actin dynamics

Dr. King-Smith's research interests center on understanding mechanisms of intracellular organelle transport in eukaryotic cells. As a model system, her lab uses retinal pigment epithelial (RPE) cells from the eyes of fish. Fish RPE cells contain numerous melanin pigment granules (melanosomes) that undergo mass migration in response to light. RPE cells can be isolated and cultured in vitro, allowing study of the cytoskeletal mechanisms that mediate melanosome motility.

Julia Lee-Soety
Education:
Ph.D. Immunology, University of Pennsylvania

Expertise:
Telomere maintenance by RNA-processing proteins

Dr. Lee-Soety is investigating mechanisms by which telomeres are maintained using baker's yeast as the model organism. Telomeres cap the ends of eukaryotic chromosomes and protect essential genomic information. If telomeres are not properly maintained, the cell may perceive the ends as damaged DNA and activate DNA damage signals which leads to cell cycle arrest, also known as cell senescence. My lab is interested in understanding how a RNA processing protein, Npl3, is involved in this maintenance. Mutant yeast cells that can no longer maintain telomeres and lack Npl3 function undergo rapid cell senescence and produce high levels of unusual non-coding telomere transcripts. We have evidence to show that Npl3 may regulate the expression of these transcripts and want to understand the mechanism and significance of this regulation.

Dr. Edwin Li
Education:
Ph.D. Chemical Engineering University of Rhode Island

Expertise:
Membrane structure and assembly, protein-protein assembly.

Dr. Li's research area focuses on understanding the physical and chemical principles governing the interaction of membrane proteins. Of particular interest is the interaction of fibroblast growth factor receptors and mucin proteins. Understanding these interactions is important because many cellular processes are regulated by them. Furthermore, diseases may arise when these interactions are not controlled properly due to mutations or overexpression of the membrane protein. Thus, these studies may provide useful information towards the development of better therapeutics.

Scott McRobert
Education:
Ph.D. Genetics, Temple University

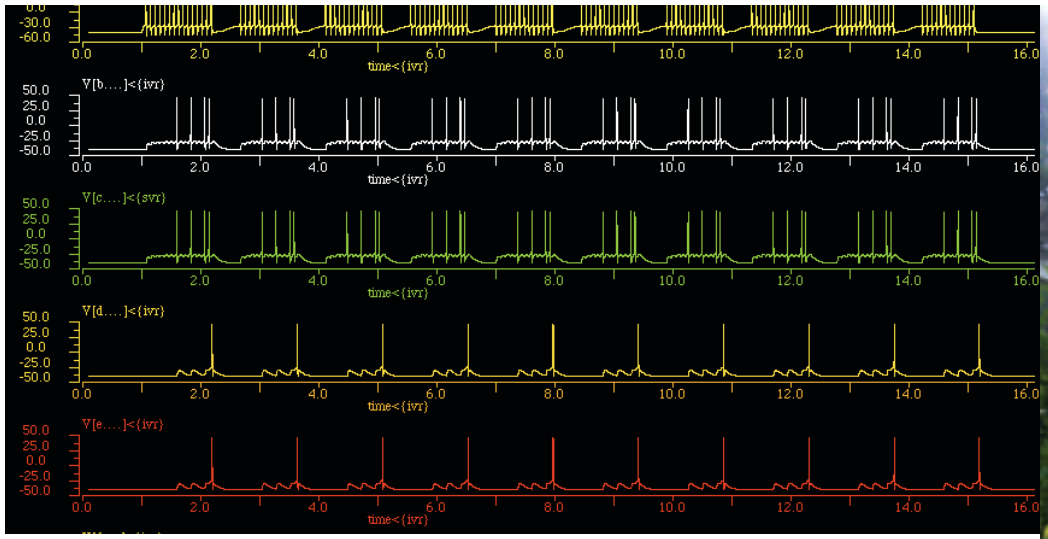
Expertise:
Animal behavior, ecology and evolution in exotic and endangered species

Dr. McRobert's research is directed at understanding the genetic, ecological, and evolutionary foundations of animal behavior. Animals utilized in his work include insects, fish, amphibians, and reptiles. These animals are housed in the Biodioversity Laboratories, which serve as home to hundreds of different species. Some of the work utilizes 'model species' such as Drosophila, and some of the work focuses on species that are listed as threatened or endangered. As part of their conservation research the laboratories hold Assurance Colonies of turtles that are on the brink of extinction.

Matthew Nelson
Education:
Ph.D.Biology, New York University

Expertise:
Physiology, Behavioral Genetics and Neurobiology

Dr. Nelson's research is focused on understanding the cellular and molecular nature of complex behaviors, such as sleep. To accomplish this, his lab studies the model organism *Caenorhabditis elegans*, a microscopic roundworm, whose sleep behaviors are controlled by similar genes and neurochemistry underlying human sleep. *C. elegans* is easily maintained in the lab and genetically tractable, making this a powerful system for identifying new pathways regulating sleep and other behaviors. His lab uses a combination of techniques common in the following disciplines: Molecular Biology, Genetics and Animal Behavior.



Karen Snetselaar

Education:
Ph.D.
Plant Pathology,
University of Georgia

Expertise:
Fungal pathogens of plants, microscopy

Dr. Snetselaar's recent work revolves around the fungus *Ustilago maydis*, which causes smut disease of corn plants. She is currently undertaking an ecological study to determine how the fungal spores survive in the soil. In addition, her students are using microscopic techniques to study the host-pathogen interface the fungus establishes with the corn plant. Finally, her lab has isolated dozens of *U. maydis* mutants with developmental defects that prevent them from infecting plants. She and her students are using molecular, genetic, and microscopic methods to analyze these mutants to learn more about this disease-causing fungus.

Clint Springer

Education:
Ph.D.
Plant Physiology,
West Virginia University

Expertise:
Global climate change and plant physiology

Dr. Springer's lab focuses on plant physiological ecology and plant responses to global changes in climate and atmospheric carbon dioxide. His research examines plant responses to changes in [CO_2] and other global change phenomenon such as global temperature and water availability. He and his students are especially interested in the response of plant traits that are relevant to plant evolution such as flowering time and reproduction. A major area of this research is aimed at elucidating the molecular mechanisms that account for these elevated [CO2]-induced changes in flowering time using techniques based in traditional plant physiology, molecular genetics, and functional genomics.

For more information, contact us:

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