MSRIP 2016 Faculty Research Projects

The following faculty research projects are organized by colleges, and then alphabetically by department. Students are encouraged to look at related fields, as well as within their major departments for research projects, which might be interesting to them. For example, the research project in the Theater department might also be interesting to sociology or education majors.

Bourns College of Engineering

Bioengineering

Faculty Mentor: **Dr. Huinan Liu**
Research Setting: Lab
Research Project: Dr. Liu's Biomaterials and Nanomedicine Lab research involves design, fabrication and evaluation of novel biomaterials for tissue regeneration, controlled drug delivery, and medical implant/device applications. Medical applications of nanomaterials and nanotechnology are actively explored through both fundamental studies and applied research. Materials studied in the lab include polymer, ceramic nanoparticles, polymer/ceramic nanocomposites and biodegradable metals. Students will be involved in developing novel materials that stimulates stem cells toward nerve regeneration, or bone/cartilage regeneration. Students will acquire lab skills and gain experience in material synthesis, characterization, electron microscopy, x-ray spectroscopy, optical emission spectrometry, fluorescence microscopy, bacterial culture, and mammalian cell culture studies. Previous outstanding undergraduate student researchers in Liu lab have co-authored scientific publications and/or presented their work at national scientific conferences.

Chemical and Environmental Engineering and Material Science

Faculty Mentor: **Dr. Bryan M. Wong**
Research Setting: Lab
Research Project: Computational simulation of materials science.

Faculty Mentor: **Dr. Ruoxue Yan**
Research Setting: Lab
Research Project: Optical biosensors.

Electrical and Computer Engineering

Faculty Mentor: **Dr. Elaine Haberer**
Research Setting: Lab
Research Project: Students working with Dr. Haberer will be working on projects based on synthesizing and assembling of nanoscale materials (i.e. semiconductors, metals, etc.) using biological molecules such as peptides and proteins.

Mechanical Engineering

Faculty Mentor: **Dr. Guillermo Aguilar**
Research Setting: Lab
Research Project: Dr. Guillermo's research involves biomedical optics and fluid mechanics.

College of Humanities, Arts, and Social Sciences

Economics

Faculty Mentor: **Dr. Richard Arnott**
Research Setting:
Research Project: Mathematical models of rush-hour traffic dynamics, the solution of which entail computation. Talent in applied mathematics and experience in numerical methods is required for this project.

Psychology

Faculty Mentor: **Dr. Rachel Wu**
Research Setting: Lab, Library and field
Research Project: The CALLA Lab at UC Riverside is dedicated to conducting research on how we learn from infancy to older adulthood. Our goal is to better understand cognitive development and cognitive aging and to use cognitive development strategies to help people maximize their potential for learning new skills at any age. We use neural (EEG) and behavioral (eye-tracking, accuracy/reaction time) responses to investigate how infants and adults differ in their approaches to finding and learning about relevant information. Our research program has two components: 1) measuring adults' use of previously acquired knowledge and tracking the development of this ability from infancy, and 2) applying infant and child learning strategies to mitigate cognitive decline during aging. Using infant learning to inform adult learning and vice versa has the greatest promise to lead to discoveries about optimal learning strategies that can be applied throughout the lifespan.

Religious Studies

Faculty Mentor: **Dr. Amanda Lucia**
Research Setting:
Research Project: Immigrants and religion; Asian religions; NRMs, Gurus, Yoga, New Age/Spirituality.

Sociology

Faculty Mentor: **Dr. Aldalberto Aguirre Jr.**
Research Setting: Library and field
Research Project: Dr. Aguirre's research engages topics of immigration and higher education. His work focuses largely around social inequality, the sociology of education, and critical race theory.

College of Natural and Agricultural Sciences

Biology

Faculty Mentor: **Dr. Theodore Garland, Jr.**
Research Setting: Lab
Research Project: Behavior, physiology, and neurobiology of lines of mice that have been selectively bred for high voluntary wheel running. Students will gather behavioral data and analyze how this data relates to the physiology of the mouse and to the mammal as a species. Publications on these mice can found here:

http://biology.ucr.edu/people/faculty/Garland/Experimental_Evolution_Publications_by_Ted_Garland.html.

Faculty Mentor: **Dr. Morris Maduro**
Research Setting: Lab
Research Project: Possible research areas include: 1) analysis of microscopy images by computer; 2) measurements of roundworm behavior; 3) testing roundworm growth on different bacteria

Botany and Plant Sciences

Faculty Mentor: **Dr. Meng Chen**
Research Setting: Lab
Research Project: Investigation of how plants respond to changes in their environmental light condition.

Faculty Mentor: **Dr. Amy Litt**
Research Setting: Lab
Research Project: 1) Gene function in dry and fleshy fruit development in the tomato family; 2) the genetic basis of unique flower colors and shapes in flower of hybrids in the tobacco genus; 3) population structure, diversity, and distribution of manzanita species in southern California.

Faculty Mentor: **Dr. Carolyn Rasmussen**
Research Setting: Field research
Research Project: Maize genetics and cell biology, such as using microscopy to analyze how normal and mutant plant cells divide.

Cell Biology and Neuroscience

Faculty Mentor: **Dr. Margarita C. Curras-Collazo**
Research Setting: Lab
Research Project: Role of VPAC2 receptors in adrenal and endocrine responses to chronic psychogenic stress; altered social and affective behavior as a result of electronic cigarette aerosol in adolescent mice; effect of developmental exposure to indoor flame retardants on the brain Renin-angiotensin-aldosterone system.

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Faculty Mentor: **Dr. Fedor Karginov**
Research Setting: Lab
Research Project: The main focus of Dr. Karginov's research is molecular biology of small RNAs/RNA-binding proteins. Our research focuses on understanding the overall mapping and principles of the interactions between mRNAs and their controlling factors - microRNAs and RBPs, and the interplay between these factors.

Entomology

Faculty Mentor: **Dr. Quinn McFrederick**
Research Setting: Lab
Research Project: 1) Are newly emerged bees really sterile? Due to metamorphosis, it is assumed that bees emerge as adults with sterile guts. Using culturing and PCR, we will determine if this is true. 2) Do lactobacilli digest pollen? Flower and bee-associated lactobacilli contain genes that digest pectin. Using sterile technique and sugar and protein assays, we will determine if these bacteria use resources in bee food provisions.

Nematology

Faculty Mentor: **Dr. Adler Dillman**
Research Setting: Lab
Research Project: The Dillman lab studies host-parasite interactions from both perspectives, using insect hosts as models. We are interested in how hosts recognize and initiate immune response to parasites and how parasites evade and/or suppress immunity. We study parasite host-seeking behavior and olfaction using parasitic nematodes. To investigate how parasites evade and/or suppress host immunity we are studying which proteins are involved in this process and are working to identify their targets.

From the host perspective we study how nematode parasites are recognized and the immune response their presence elicits. To do this we use a variety of insect hosts. As part of this work we study host immunity generally using bacterial pathogens, nematode parasites, and other immune insults such as cancer. In studying immunity we differentiate the relative roles of resistance, the ability of the host to reduce or eliminate pathogen burden, and disease tolerance or the ability of the host to manage the effects of infections.

Division of Biomedical Scinces

Biomedical Sciences

Faculty Mentor: **Dr. Ilhem Messaoudi**
Research Setting: Lab
Research Project: Research efforts in the Messaoudi laboratory are focused on three general areas: 1) the impact of age on immune response to viral infections: 2) modulation of immune function by nutritional intake and sex steroids leels; and 3) uncovering mechanisms of pathogenesis during infection with emerging and re-emerging infectious agents.

For further information on the Messaoudi lab, please visit:

https://medschool.ucr.edu/faculty_research/faculty_profiles/bio.html?page=messaoudi_ilhem.html