MSRIP 2020 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.

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BOURNS COLLEGE OF ENGINEERING

Bioengineering

Faculty Mentor: Elena Kokkoni
Research: Human - Robot Interaction, Biomechanics, Assistive Technology, Human Motor Learning and Behavior, Rehabilitation Science.

Faculty Mentor: Joshua Morgan
Research: Senescence, aging biology of cells, tumor microenvironment.

Faculty Mentor: Victor Rodgers
Research: Medical Devices.

Chemical and Environmental Engineering

Faculty Mentor: Haizhou Liu
Research: Water treatment and purification technologies.

Faculty Mentor: Kandis Leslie Abdul-Aziz
Research: Sustainable Chemistry.

Faculty Mentor: Yujie Men
Research: Occurrence, biotransformation, and impact of emerging organic contaminants (EOCs), Development and transmission of antibiotic resistance under environmentally relevant exposure to EOCs, Biotransformation of per- and poly-fluoroalkyl substances (PFASs).

Chemical Engineering and Materials Science

Faculty Mentor: Michael R. Zachariah
Research: 1. Fabrication of nanocomposites by 3-D printing methods for application to advanced energetic materials. 2. Ultra-fast mass spectrometry and thermal imaging to understand reaction dynamics in propellants and other highly reactive systems. 3. Evaluation of the reactive of individual nanoparticles for energy applications.

Chemical & Environmental Engineering; Materials Science & Engineering; and Department of Physics & Astronomy

Faculty Mentor: Bryan Wong
Research: (1) Computer simulations of chemistry, materials, and physics, (2) artificial intelligence, (3) mathematics.

**Electrical and Computer Engineering**

Faculty Mentor: Daniel Wong  

Faculty Mentor: Hossein Taheri  
Research: Experimental and theoretical optics and photonics, nonlinear optics, biomedical optics.

Faculty Mentor: Konstantinos Karydis  
Research: Robotics.

Faculty Mentor: Salman Asif  
Research: Machine learning, signal and image processing, computational imaging.

**Material Science; Mechanical Engineering**

Faculty Mentor: Chen Li  
Research: Materials Science, materials focused machine learning.

**Material Science; Mechanical Engineering; Physics**

Faculty Mentor: Sinisa Coh  
Research: Computational materials science.

**Mechanical Engineering**

Faculty Mentor: Hideaki Tsutsui  

Faculty Mentor: Jum Sheng  
Research: MRI compatible neurosurgical headframe, neurovascular surgical robot.

Faculty Mentor: Marko Princevac
Research: Fluid mechanics.

Faculty Mentor: Mona Eskandari
Research: Finite element modeling, biomechanics research, microscopy imaging. Lung tissue experiments and modeling.

**Mechanical Engineering; Materials Science and Engineering**

Faculty Mentor: Alex Greaney
Research: Computational modeling of materials and/or machine learning prediction of materials properties.

**Mechanical; Materials Science; Electrical Engineering and Physics**

Faculty Mentor: Luat Vuong
Research: Title: Vibrations of surface water on metal oxide nanoparticles: understanding cooperative molecular dynamics in photocatalysis.

**COLLEGE OF HUMANITIES, ARTS AND SOCIAL SCIENCES (CHASS)**

**Art History; Comparative Literature**

Faculty Mentor: Johannes Endre
Research: German and European Visual Art and Literature, 1700s-1900s; Critical Theory; Aesthetics (will not be on campus).

**Comparative Literature and Foreign Languages**

Faculty Mentor: Jonathan Hall
Research: global visual culture; global queer cultural studies; film studies; critical theory; Japanese literature and history.

**Hispanic Studies**

Faculty Mentor: Claudia Holguin
Research: Spanish in the US and the borderlands.
Faculty Mentor: **Covadonga Lamar Prieto**
Research: Spanish in the US, Spanish in California, Historical Spanish in California, Migration and Spanish *(will not be on campus).*

**History**

Faculty Mentor: Jonathan Eacott
Research: Britain, British Empire, India, Colonial America, World War I.

**Media and Cultural Studies and Gender & Sexuality Studies**

Faculty Mentor: **Amalia Cabezas**
Research: Feminist movement in Latin America and the Caribbean Sex worker movement in Latin America and the Caribbean.

**Political Science**

Faculty Mentor: **Jana Grittersova**
Research: International finance.

Faculty Mentor: **Marissa Brookes**
Research: Labor, unions, transnational activism, globalization, transnational corporations, workers' rights.

**Psychology**

Faculty Mentor: **Aerika Lloyd**
Research: Our lab explores how intersections of race, ethnicity, gender, and identity inform health and development for youth and young adults of color using quantitative and qualitative methods.

Faculty Mentor: **Cecilia Cheung**
Research: Parental socialization, children's academic motivation and engagement, STEM education, after-school activities, creativity, cross-cultural psychology *(Will be away from campus in July; a graduate student will be assisting in the supervision).*

Faculty Mentor: **Elizabeth Davis**
Research: Emotion regulation in childhood, physiology of stress and coping, bilingualism and emotional reactions/regulation.
Faculty Mentor: **Rachel Wu**  
Research: EEG, attention, learning, younger and older adults.

Faculty Mentor: **Rebkah Richert**  
Research: Young children’s learning from media.

Faculty Mentor: **Weiwei Zhang**  

**Sociology**

Faculty Mentor: **Adalberto Aguirre Jr.**  
Research: Immigration, Higher Education.

Faculty Mentor: **Victoria Reyes**  
Research: Reputation, empire, migration, culture, travel.

**University Writing Program**

Faculty Mentor: **Stephanie Fouseck**  
Research: Modernism, Latin-American Literature, Empathy / Affect Studies, Spirituality / meditation, Psychoanalysis, Magical Realism, Literature, Comparative Literature, British Literature.

**University Writing Program; English**

Faculty Mentor: **Mathew Bond**  

**University Writing Program; School of Business**

Faculty Mentor: **Corinne (Cori) Knight**  
Research: Religion in the US, American religious history, religion and pop culture, comics and graphic novels, insurance and pop culture.
Biochemistry

Faculty Mentor: Paul Larsen
Research: Improvement of carbon fixation and photosynthesis in plants.

Botany and Plant Sciences

Faculty Mentor: Darrel Jenerette
Research: 1) Urban vegetation and water use; 2) desert soil and plant chemistry.

Faculty Mentor: Jim Baird
Research: Turfgrass field research including: breeding for drought resistance and winter color retention; water conservation; salinity management; and pest management.

Chemistry

Faculty Mentor: Chia-en Chang
Research: Computational/theoretical chemistry and biophysics. Computer-aided molecular design.

Faculty Mentor: Kevin Kou
Research: Natural product synthesis; catalysis; developing new organic synthesis reactions.

Faculty Mentor: Richard Hooley
Research: Biosensing, biomimicry.

Faculty Mentor: Timothy Su

Earth and Planetary Sciences

Faculty Mentor: Wei Liu
Research: The role of ocean in climate change and climate variability.
**Evolution, Ecology, and Organismal Biology**

Faculty Mentor: **Alan Brelsford**  
Research: Evolutionary genetics of ants and birds.

Faculty Mentor: **Christopher Clark**  
Research: hummingbird migration, hummingbird flight.

Faculty Mentor: **Marko Spasojevic**  

Faculty Mentor: **Theodore Garland**  
Research: Evolution of voluntary exercise in mice: behavior, anatomy, physiology, and neurobiology.

Faculty Mentor: **Wendy Saltzman**  
Research: neurobiology of parental behavior.

**Entomology**

Faculty Mentor: **Chow-Yang Lee**  
Research: Insecticide resistance in German cockroaches and bed bugs.  
Faculty Mentor: **Erin Rankin**  
Research: Floral visitation patterns: influence of direct and indirect interactions among visitors, Channel Islands pollinator ecology.

Faculty Mentor: **Monique Rivera**  
Research: ant mutualisms, insect behavior, applied ecology, agriculture/integrated pest management.

Faculty Mentor: **Quinn McFrederick**  
Research: We study pollinator conservation via symbiosis. Possible research projects include competition assays of different microbes to determine whether they help each other or inhibit each other, determining the host range and virulence of different bee pathogens, and investigating how microbes are transmitted on flowers.

**Environmental Sciences**

Faculty Mentor: **Elia Scudiero**
Research: Soil mapping, geophysics, GIS, remote sensing.

Faculty Mentor: **Hoori Ajami**  
Research: Groundwater monitoring, hydrologic modeling.

Faculty Mentor: **Francesca Hopkins**  
Research: Greenhouse gas emissions on dairies, Greenhouse gas emissions from urban sources, Mapping methane emissions, Measuring atmospheric ammonia, Measuring air toxics near oil and gas facilities.

Faculty Mentor: **Peter Homyak**  
Research: Effects of atmospheric nitrogen deposition on soil nutrient cycling; soil science.

Faculty Mentor: **Ray Anderson**  
Research: crop water use, soil health, regional hydrology, micrometeorology.

**Mathematics**

Faculty Mentor: **Bradley Burdick**  
Research: Combinatorics (graph theory), topology, or geometry.

Faculty Mentor: **Heyrim Cho**  
Research: Mathematical modeling in biology, Computational biology, Mathematical Oncology, Uncertainty Quantification.

Faculty Mentor: **Larry Harper**  
Research: My specialization is combinatorics (the study of finite and discrete structures). Combinatorics is a relatively young subject and intimately connected to Computer Science. I have many interesting problems to share, but prefer to talk to a prospective student before selecting one to work on. Also, I would like to start off with a week or two on problem-solving strategies. My own current project is to decide whether the largest rank in the ideal transform of the Boolean lattice is a maximum size antichain.

Faculty Mentor: **Qixuan Wang**  
Research: Mathematical biology.

Faculty Mentor: **Weitao Chen**  
Research: mathematical biology, numerical methods for differential equations.
**Microbiology and Plant Pathology**

Faculty Mentor: Katherine Borkovich
Research: Functional genomics (high throughput phenotyping, metabolomics, fluorescent microscopy) in a model fungal system.

**Molecular, Cell and Systems Biology**

Faculty Mentor: Garret Anderson
Research: Molecular Neuroscience, Neural Circuit Development and Plasticity.

Faculty Mentor: Jingsong Zhang
Research: Research Setting: lab
Possible research project(s): atmospheric chemistry kinetics, air pollution monitoring, trace gas detection, chemical instrument development, optical spectroscopy and mass spectrometry studies of chemical reactions.

Faculty Mentor: Nicole zur Nieden
Research: Birth defects in the skeleton, epigenetic regulation of osteogenic differentiation, stem cell pluripotency and metabolism.

Faculty Mentor: Todd Fiacco
Research: astrocyte-neuronal interactions and role of astrocytes in disease including stroke, epilepsy, and Alzheimer's disease.

**Physics and Astronomy**

Faculty Mentor: Chun Hung (Joshua) Lui
Research: Optical Spectroscopy of 2D materials.

Faculty Mentor: Jory Yarmoff
Research: Surface Physics.
GRADUATE SCHOOL OF EDUCATION (GSOE)

Faculty Mentor: **Parissa Clark** (lecturer)

Faculty Mentor: **Katherine Stavropoulos**

Faculty Mentor: **Robert Ream**
Research: How the association between educational trajectories and health outcomes varies by race/ethnicity and social class.

Faculty Mentor: **Tasha Iglesias**
Research: Hip Hop Pedagogy, Culturally Relevant and Responsive Pedagogies and Leadership, Foster Youth in Higher Education.

SCHOOL OF MEDICINE

**Internal Medicine**

Faculty Mentor: **Michale Basch**
Research: clinical rotations in the office and hospital.

**Psychiatry**

Faculty Mentor: **Kimberley Lakes**
Research: ADHD, Autism, Child neurodevelopment, child psychology *(No lab space available).*

**Social Medicine, Population and Public Health**

Faculty Mentor: **Andrea Polonijo**
Research: vaccination, HIV testing, prosocial behavior, focus groups, qualitative data analysis, quantitative data analysis.
Faculty Mentor: **Brandon Brown**  
Research: HIV and aging, HPV vaccine uptake and barriers, research ethics.

**SCHOOL OF PUBLIC POLICY**

Faculty Mentor: **Mehdi Nemati**  
Research: Water management and economics in California  
Recycled water use trends and pricing in California.

**DIVISION OF BIOMEDICAL SCIENCES**

Faculty Mentor: **Casey Gries**  
Research: Microbiology, Bacteriology, Infectious diseases, Staphylococcus aureus.

Faculty Mentor: **Djurdjica Coss**  
Research: Endocrinology and Neuroscience.

Faculty Mentor: **Monica Carson**  
Research: neuroinflammation. [https://microglia.ucr.edu](https://microglia.ucr.edu)

Faculty Mentor: **Sika Zheng**  
Research: Molecular Cellular and animal studies of brain development.