2022 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: Elena Kokkoni
Research: Assistive Technology, Pediatric Rehabilitation, Child-Robot Interaction, Movement Biomechanics
https://profiles.ucr.edu/app/home/profile/elenak

Faculty Mentor: Huinan Liu
Research: 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.
https://profiles.ucr.edu/app/home/profile/huinanl

Faculty Mentor: Giulia Palermo
Research: CRISPR-Cas9 mechanism, computational bioengineering, biophysics, genome editing
https://profiles.ucr.edu/app/home/profile/giuliap

Computer Science and Engineering

Faculty Mentor: Ahmed Eldawy
Research: Geospatial data exploration and visualization. This project involves building real data science applications that process geospatial data, i.e., location data. Examples include crime and traffic data in California, agricultural applications, and social media analysis. The specific application will depend on the availability and interest of the participant. We will use big data

systems, such as Spark and AsterixDB. Students with a background in Java, SQL, HTML, and Javascript, will be able to apply their knowledge in this project.
https://profiles.ucr.edu/app/home/profile/eldawy

Electrical and Computer Engineering

Faculty Mentor: Salman Asif
Research: Machine learning, computer vision, computational imaging (more information available at https://www.ece.ucr.edu/~sasif)

Faculty Mentor: Ryan Cheng
Research: Solving the Landau-Lifshitz-Gilbert equations to explore unique physical properties in various magnetic materials and magnetic heterostructures. Electrodynamics, statistical mechanics, and certain numerical techniques will be used. Students majoring in physics are preferred. **GPA 3.5 or above.**

Faculty Mentor: Elaine Haberer
Research: Researchers have begun to harness the extraordinary capability of biology to make a variety of devices by integrating peptides or proteins which are able to bind technologically significant materials into the structural proteins of viruses. The approach has allowed the realization of unique device geometries, as well as the opportunity for enhanced performance and functionality. Current efforts in our lab are focused on using biomolecules to synthesize new, multi-component nanoscale materials and devices to address challenges in the area of solar power generation, photocatalysis, and biosensing.
https://profiles.ucr.edu/app/home/profile/haberer

Faculty Mentor: Konstantinos Karydis
Research: Robotics
https://profiles.ucr.edu/app/home/profile/karydis

Faculty Mentor: Jianlin Liu
Research: Semiconductor materials and devices
https://profiles.ucr.edu/app/home/profile/jianlin

Faculty Mentor: Shaolei Ren
Research: Optimizing machine learning models on tiny devices.
https://profiles.ucr.edu/app/home/profile/shaolei

Materials Science and Engineering

Faculty Mentor: Elaine Haberer
Research: Researchers have begun to harness the extraordinary capability of biology to make a variety of devices by integrating peptides or proteins which are able to bind technologically significant materials into the structural proteins of viruses. The approach has allowed the

realization of unique device geometries, as well as the opportunity for enhanced performance and functionality. Current efforts in our lab are focused on using biomolecules to synthesize new, multi-component nanoscale materials and devices to address challenges in the area of solar power generation, photocatalysis, and biosensing.
https://profiles.ucr.edu/app/home/profile/haberer

Faculty Mentor: Bryan Wong
Research: computational simulations of materials
https://profiles.ucr.edu/app/home/profile/brwong

Mechanical Engineering

Faculty Mentor: Chen Li
Research: Phonon Model Optimization
https://profiles.ucr.edu/app/home/profile/chenli

Faculty Mentor: Jonathan Realmuto
Research: Soft Robotics, Rehab/Assistive/Wearable Robotics, Human Sensorimotor Behavior
https://profiles.ucr.edu/app/home/profile/jrealmut

Faculty Mentor: Jun Sheng
Research: Design, fabricate, and control continuum robots with applications to surgery, rehabilitation, and agriculture.
https://profiles.ucr.edu/app/home/profile/juns

COLLEGE OF HUMANITIES, ARTS AND SOCIAL SCIENCES

English

Faculty Mentor: Corinne (Cori) Knight
Research: American religious history, American history, American literature, pop culture, comics/webcomics/graphic novels, disability and accessibility in higher education, disaster preparedness/mitigation
https://profiles.ucr.edu/app/home/profile/cknig002

Faculty Mentor: Richard Rodriguez
Research: Latinx studies; film and visual culture; queer studies; popular music
https://profiles.ucr.edu/app/home/profile/rickyr

Ethnic Studies

Faculty Mentor: Paul Green

Research: Educational politics, social policy, law, race, segregation, desegregation, integration, educational opportunity for poor youth and children of color. Historically Black/African and African American Catholic schools and Historically Black Colleges and Universities
https://profiles.ucr.edu/app/home/profile/pgreen

Hispanic Studies

Faculty Mentor: Claudia Holguin Mendoza
Research: Spanish linguistics, Sociolinguistics, Critical Literacy and bilingualism
https://profiles.ucr.edu/app/home/profile/cholguin

Faculty Mentor: Covadonga Lamar-Prieto
Research: Spanish in the US/ California; Bilingualism in social media
https://profiles.ucr.edu/app/home/profile/covad

Faculty Mentor: Carlos Varon Gonzalez
Research: Spanish and Latin American Culture, political philosophy, popular culture (soccer, music)
https://profiles.ucr.edu/app/home/profile/cvarongo

Media and Cultural Studies

Faculty Mentor: Richard Rodriguez
Research: Latinx studies; film and visual culture; queer studies; popular music
https://profiles.ucr.edu/app/home/profile/rickyr

Psychology

Faculty Mentor: Elizabeth Davis
Research: children's emotional functioning, psychopathology, emotion regulation, physiology
https://profiles.ucr.edu/app/home/profile/eldavis

Faculty Mentor: Rachel Wu
Research: Cognitive aging, COVID-related well-being
https://profiles.ucr.edu/app/home/profile/rachelw

Faculty Mentor: Tuppett Yates
Research: Risk and resilience among adversity-exposed children and adolescents; Foster youth research
https://profiles.ucr.edu/app/home/profile/tuppett

Sociology

Faculty Mentor: Adalberto Aguirre, Jr.
Research: critical race theory, immigration, higher education
https://profiles.ucr.edu/app/home/profile/aguirre

COLLEGE OF NATURAL AND AGRICULTURAL SCIENCES

Earth and Planetary Sciences

Faculty Mentor: Heather Ford
Research: Key words: Geophysics; Seismology; Crust; Mantle; Earthquakes. The student would be able to select from a range of topics, all of which involve utilizing seismic methods. Possible projects include (but are not limited to) 1) looking for evidence of changes to near surface structure following earthquakes in California, Hawaii or Alaska, 2) generating a catalog of seismicity in Wyoming and South Dakota, 3) generating models of crustal thickness across Wyoming and South Dakota using seismic data, or 4) work with a graduate student to explore to relationship between volcanism and partial melt in the mantle beneath the western U.S. All projects require the use of MATLAB or similar software, but can be designed for students with minimal experience in coding. Students will work with both the PI as well as a graduate student, and the specific project can be easily tailored to fit the interests of the student. The only requirements are an interest in better understanding the internal structure of the Earth using seismic methods.
https://profiles.ucr.edu/app/home/profile/heatherf

Faculty Mentor: Gareth Funning
Research: Earthquakes and faulting; Remote sensing/satellite imagery; Seismology and data mining
https://profiles.ucr.edu/app/home/profile/gareth

Entomology

Faculty Mentor: Alec Gerry
Research: Diversity of blood feeding flies (biting midges) in the western United States
https://profiles.ucr.edu/app/home/profile/alecg

Environmental Sciences

Faculty Mentor: Peter Homyak
Research: Effects of wildfires on soil nutrient cycling and greenhouse gas emissions and air pollutants
https://profiles.ucr.edu/app/home/profile/phomyak

Faculty Mentor: Elia Scudiero
Research: Remote Sensing, GIS, Agriculture, Precision Agriculture, Agronomy, Ag Tech
https://profiles.ucr.edu/app/home/profile/elias

Evolution, Ecology and Organismal Biology (EEOB)

Faculty Mentor: Kurt Anderson
Research: Freshwater ecology, conservation, population and community ecology, mathematical and computer modeling.
https://profiles.ucr.edu/app/home/profile/kurta

Faculty Mentor: Joel Sachs
Research: 1. Understanding how plants select beneficial bacterial symbionts from the soil.
2. Investigating the mechanisms of superior bacterial inoculants to improve crop sustainability.
https://profiles.ucr.edu/app/home/profile/joels

Mathematics

Faculty Mentor: Qixuan Wang
Research: Mathematical biology, multi-scale modeling, growth and regeneration, applied dynamical system, cell fate decisions
https://profiles.ucr.edu/app/home/profile/qixuanw

Physics and Astronomy

Faculty Mentor: Miguel Arratia
Research: See info about my group here: https://arratialab.ucr.edu/. Detector development for future experiments at the Electron Ion Collider. This will involve working in the lab at UCR. Data analysis of simulation data for the future Electron-Ion Collider. This will involve python programming, and may include artificial intelligence techniques.
https://profiles.ucr.edu/app/home/profile/miguela

Faculty Mentor: Ryan Cheng
Research: Solving the Landau-Lifshitz-Gilbert equations to explore unique physical properties in various magnetic materials and magnetic heterostructures. Electrodynamics, statistical mechanics, and certain numerical techniques will be used. Students majoring in physics are preferred. **GPA 3.5 or above.**

Faculty Mentor: Flip Tanedo
Research: Dark matter
https://profiles.ucr.edu/app/home/profile/flipt

Faculty Mentor: Bryan Wong
Research: computational simulations of materials
https://profiles.ucr.edu/app/home/profile/brwong

SCHOOL OF BUSINESS

Faculty Mentor: Thomas Kramer
Research: My research interests are in the area of consumer behavior / consumer psychology, and focus on how irrational beliefs, such as superstitious, magic, or karmic beliefs impact consumer decision-making. However, I'm willing to serve as mentor for any research topic in the area of consumer behavior that has implications for marketing strategy or public policy.
https://profiles.ucr.edu/app/home/profile/tkramer

Faculty Mentor: Marlo Raveendran
Research: Formula 1 data project using machine learning
https://profiles.ucr.edu/app/home/profile/marlor

SCHOOL OF EDUCATION

Faculty Mentor: Katherine Stavropoulos
Research: Neuroscience and autism spectrum disorder, clinical diagnosis and autism spectrum disorder. My lab uses electrophysiology to measure brain activity in children with and without autism spectrum disorder. We focus on the reward system. I am also the assistant director of the SEARCH Center, which provides free screening and diagnosis for children in the Inland Empire.
https://profiles.ucr.edu/app/home/profile/katherst

SCHOOL OF MEDICINE

Biomedical Sciences

Faculty Mentor: Scott Pegan
Research: antiviral and anti-nerve agent therapy development. Crimean-Congo Hemorrhagic fevers virus, coronavirus
https://profiles.ucr.edu/app/home/profile/scottp

Social Med Population & Public Health

Faculty Mentor: Ann Cheney
Research: childhood asthma; early childhood obesity risk
https://profiles.ucr.edu/app/home/profile/acheney

SCHOOL OF PUBLIC POLICY

Faculty Mentor: Mehdi Nemati

Research: Environmental Economics, Water resources economics
promoting sustainable and cost-effective strategies for addressing water-related issues, such as water scarcity/drought. His policy-oriented research program focuses on economic issues associated with urban/municipal water use and water conservation programs, including alternative pricing structures (e.g., budget-based tiered rates and drought pricing), and rebate programs (e.g., turfgrass removal); direct and indirect potable water reuse; design of enforcement and monitoring strategies; incentives for the adoption of conservation practices and technologies
https://profiles.ucr.edu/app/home/profile/mehdin