



Our faculty recruitment for the Undergraduate Research Experience is still underway. The list below includes faculty who have been confirmed (numbered list) and faculty whose confirmation is pending (alphabetized list). Please make sure to review the faculty mentors listed in both lists and come prepared to discuss your top 3-5 placement options (include at least one or two confirmed professors and one or two potential professors).

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College of Engineering and Computer Science

Mechanical Engineering

1. Sagil James (confirmed)

Research Interests: Research areas include advanced manufacturing, 3D printing, smart and intelligent manufacturing, and clean-energy manufacturing. Several projects are currently being undertaken. The focus of the projects is to study and develop smart technologies needed to reduce the time and cost required to translate design innovations into commercial processes and products.

Desired Preparation for the lab: No additional preparation is required.

2. Salvador Mayoral (confirmed)

Research Interests: Ground vehicle aerodynamics, vortex dynamics, experimental fluid mechanics, high-performance computing, and the hydrodynamics of marine life.

Desired preparation for this lab: Dr. Mayoral will train students on working with OpenFOAM so that they can set-up and run CFD simulations.

Civil & Environmental Engineering

B. Garrett Struckhoff (confirmed)

Research Interests: My current research interests are bioremediation of contaminated soil and groundwater, biofuels, and greenroofs.

Desired preparation for this lab: Chemistry or biology knowledge will be helpful.

Computer Engineering

F. Ankita Mohapatra (confirmed)

Research Interests: Her research interests are embedded systems, printable electronics, signal analysis and optimization.

Desired preparation for this lab: Students should have a basic knowledge of working with microcontrollers and programming with C/C++, if possible. The student must also have an interest and motivation to work with embedded systems.

E. Rakesh Mahto (confirmed)

Research Interests: My research interests include ASCL design, low power design, reconfigurable FPGA design, photovoltaics, renewable energy and mixed signal design and testing.

Desired preparation for this lab: Some courses related to C and C++ programming should be sufficient.

C. Yu Bai (confirmed)

Research Interests: Dr. Bai’s research interests include neuromorphic computing, FPGA design, nano-scale computing system with novel silicon and post-silicon devices, and low power digital and mixed-signal CMOS circuit design.

Desired preparation for this lab: No additional preparation is required. I will take the responsibility to ensure that the students have sufficient background during the summer research activities to fully benefit from their participation in the projects.

Computer Science

G. Christopher Ryu (confirmed)

Research Interests: Artificial intelligence and machine learning.

Desired preparation for this lab: Data structures, Python, Calculus, Linear Algebra; optional background: ability to play musical instruments.

K. Sampson Akwafuo (confirmed)

Research Interests: His research interests include Computational Epidemiology, Contagion Modelling, optimization of disasters and disease outbreaks' response logistics, and the development of approximation algorithms. His current focus is on using machine learning models to predict potential outbreaks of diseases in specific localities, modeling intervention strategies for Neglected Tropical Diseases (NTD) in Sub-Saharan Africa, and other Low- and Middle-Income Countries (LMICs).

Desired preparation for this lab: Information to follow.

L. Doina Bein (confirmed)

Research Interests: Machine Learning and **Data Science**, Automatic Dynamic Decision-making, Computational Sensing, Distributed Algorithms, Energy-efficient Wireless Networks, Fault Tolerant Data Structures, Fault Tolerant Network Coverage, Graph Embedding, Multi-modal Sensor Fusion, Randomized Algorithms, Routing and Broadcasting in Wireless Networks, Secure Network Communication, Self-stabilizing Algorithms, Self-organizing Ad-hoc Networks, Supervised Machine Learning, Urban Sensor Networks, Wireless Sensor Networks.

Desired preparation for this lab: C/C++ programming.

College of Natural Sciences and Mathematics

Biological Science

3. Alison Miyamoto (confirmed)

Research Interests: We are interested in how proteins on the surface of mammalian cells communicate with each other and with their environment. Specifically, we are studying: 1) the mechanism of Notch signaling (Notch is conserved in all animals, required for proper development of the embryo, and defects in Notch signaling are associated with birth defects and cancer), and 2) how MAGP2, a protein of the extracellular matrix (ex. cartilage, bone), affects the activity of at least two different signaling pathways. We are also involved in a collaborative project tracking the localization of a RNA splicing factor, PTBP1, that is important to neural cell maturation.

Desired preparation for this lab: We will train students in all required techniques.

4. Danielle Zacherl (confirmed)

Research Interests: The Zacherl lab's research interests center around topics in marine ecology including larval behavior, settlement and recruitment dynamics, population connectivity, restoration ecology, and native-non-native species interactions.

Keywords: Marine Ecology, Marine Population Connectivity, Restoration Ecology, Marine Invertebrates.

Desired preparation for this lab: An interest in marine ecology or restoration ecology.

5. Maria Soledad Ramirez (confirmed)

Research Interests: My research focuses on mechanisms of antibiotic resistance, their dissemination and evolution, and their impact on the morbidity and mortality of bacterial infections. The increase in infections caused by antibiotic-resistant bacteria are a serious threat to human health, and the problem has attracted the attention of diverse government and agencies that are trying to establish strategies to increase research and design of new therapies. In the past few years, we have explored various aspects of a major nosocomial pathogen -*Acinetobacter baumannii*- that has a particular ability to acquire antimicrobial resistance traits and survive in the hospital environment. In addition, recognizing the importance of interactions among multiple pathogens and pathogens with the host, our lab expanded the scope to study pathogen-pathogen interaction such as *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Burkholderia cepacia* complex, as well as, pathogen-host interactions exposing *A. baumannii* to different human fluids.

Desired preparation for this lab: No preparation/skills required. We will provide the corresponding training and knowledge required for a dedicated and enthusiastic student.

6. Misty Paig-Tran (confirmed)

Research Interests: functional anatomy, biomechanics, and biomaterials

Desired preparation for this lab: interests in marine biology or engineering that would like to get a very hands-on approach working with a new bio-inspired water filter

7. Nilay Patel (confirmed)

Research Interests: Niclosamide is an FDA-approved drug that is being considered as an adjuvant chemotherapeutic agent for cancer treatment. Our collaborators have synthesized compounds similar to niclosamide and our goal is to characterize how these compounds reduce cell proliferation. We have used microarray technology to identify which genes are differentially regulated by these compounds and we plan to evaluate role of these genes using cellular and molecular biology techniques such as quantitative PCR, immunocytochemistry, overexpression, knock-down along with drug treatments, and CyQuant cell proliferation assay.

Desired preparation for this lab: No additional preparation required.

8. Parvin Shahrestani (confirmed)

Research interests: We study the evolution and genetics of health-relevant traits, such as longevity and immune defense. Our lab uses a fruit fly model system.

Desired preparation for this lab: We will train students in all aspects of the experiments.

Chemistry & Biochemistry

9. Allyson Fry-Petit (confirmed)

Research Interests: Research interests are in solid state inorganic chemistry, focused on the rational design of new materials through the use of data mining, synthesis, structural characterization and optical and vibrational probes.

Desired preparation for this lab: Interest in biochemistry and/or chemistry.

10. Andrew Petit (confirmed)

Research interests: The Petit lab uses computational chemistry to answer fundamental questions about the mechanisms through which chemical reactions take place as well as photochemistry (i.e. what happens after molecules absorb light and become excited).

Desired preparation for this lab: This project will be a good fit for students who are planning to major in chemistry, biochemistry, or physics. It would be good if the student has completed either general chemistry or introductory physics. Experience with organic chemistry would be useful but not necessary. Experience with calculus and/or coding are helpful but not required.

11. Joya Cooley (confirmed)

Faculty research interests: The Cooley Lab is a solid-state inorganic chemistry lab interested in structural and functional materials. Urban heat islands, such as Los Angeles, are overall hotter than surrounding rural areas because of infrastructure (such as buildings) absorbing heat and driving up energy costs. We are interested in developing "cool" pigments, pigments that not only display pleasing colors, but can also reflect heat away from buildings. We use a combination of traditional synthesis in a furnace and a novel, rapid synthesis in a domestic kitchen microwave.

Desired preparation for this lab: Have taken at least 1 semester of General Chemistry

12. Maria Linder (confirmed)

Research interests: Mammalian copper and iron metabolism, focusing on the structure, function and regulation of proteins associated with these elements. Current emphasis is on copper transport within the blood plasma (particularly a new small copper carrier we have discovered), mechanism of uptake by cells, and excretion of copper via the bile and urine, in conditions of copper overload (which naturally occurs in dogs) as well as in pregnancy and with estrogen intake/exposure. With iron we are studying the mechanism by which iron stored in a large protein, ferritin, is made available to cells and organs when needed. Studies use a broad variety of approaches from cell culture models, mutated mice and rats and tracer radioisotopes, to isolation, sequencing and characterization of proteins, as well as manipulation of mRNA/protein expression.

Desired preparation for this lab: Interest in biochemistry and/or chemistry.

13. Michael Groves (confirmed)

Research interests: We work to understand how chemical reactions take place on surfaces and develop the tools necessary to quickly and accurately predict them. Our current projects include understanding the role of molecular handedness over metal alloy surfaces as well as hydrogen peroxide synthesis over modified graphene structures. We are also using machine learning algorithms to develop automated, and intelligent global optimization search protocols for organic systems which are designed to increase the performance of the search for thermodynamically favorable structures. We intend to use them to search for novel modified graphene surfaces.

Desired preparation for this lab: I will teach the students all the computer programming they need to work effectively in the lab.

H. Nicholas Salzameda (Confirmed)

Research interests: We are involved in two areas of research: the synthesis of novel peptide catalysts for asymmetric carbon-carbon bond forming reactions and the discovery of biologically active molecules for disruption of protein-protein interactions, focusing on targets related to human health. Both of these research objectives are centered on solid phase reaction methodology.

Desired preparation for this lab: Students must have completed General Chemistry I and General Chemistry II.

14. Niroshika Keppetipola (confirmed)

Research Interests: My laboratory studies the Polypyrimidine Tract Protein (TPB), an RNA binding protein that plays an important role in regulating the production of proteins from the genetic code in DNA (cellular gene expression). The addition of extra chemical groups to the PTB protein (chemical modification) has been correlated with uncontrolled growth in many cells, including cancer cells such as leukemia. Modifying RNA binding proteins that control mRNA composition allows cells to regulate gene expression not only at the level of DNA but also at the level of RNA.

Desired Preparation for this lab: Students should have taken introductory biology and general chemistry courses and earned a B or higher.

15. Stevan Pecic (confirmed)

Research interests: One of our research interests and assignments are focused on design, synthesis and evaluation of novel classes of acetylcholinesterase (AChE) inhibitors and their evaluation as potential therapeutics for Alzheimer's disease (AD). AD is a debilitating neurodegenerative disorder in the elderly and according to the data from European Prevention of Alzheimer's Dementia, AD affects more than 40 million people worldwide and its prevalence is expected to double over the next 20 years. Moreover, AD is currently the fourth leading cause of death in people over 65 years old in the world, which makes it one of the major health, social, and economic concern of the society worldwide. One approach for AD treatment involves drugs that inhibit the activity of enzyme AChE- the main enzyme that metabolizes the neurotransmitter acetylcholine Through traditional medicinal chemistry techniques, including *in silico* drug design, organic synthesis, structure-activity relationship (SAR) studies and *in vitro* biological evaluations, our goal is directed toward elucidation of the pharmacology and biochemistry of neurotransmitters and pathophysiology of AD. Read more at www.PecicLab.com

Desired preparation for this lab: Interest in biochemistry and/or chemistry.

Geological Sciences

16. Matthew Kirby (confirmed)

Research interests: Professor Kirby uses lake and wetland sediment to reconstruct the history of California drought, floods, and fire over the past 10,000 years. Students have the opportunity to add important knowledge to CA's climate history with the objective to better inform future climate readiness.

Desired preparation for this lab: No additional preparation required.

17. Nicole Bonuso (confirmed)

Research interests: Invertebrate paleontology with an emphasis on the paleoecology of marine communities; combining field based research with laboratory work, including multivariate statistics, to explore the paleoecological variation of biotas at different temporal and spatial scales.

Desired preparation for this lab: No additional preparation required.

Mathematics

J. Roberto Soto (confirmed)

Research interests: Our research group focuses on questions they find interesting that can be modeled and explored with mathematics. Currently we have two projects.

Desired preparation for this lab: Students should love looking for patterns in data.

Physics

18. GWPAC: Jocelyn Read, Joshua Smith, and Geoffrey Lovelace (confirmed)

Research interests: Selected students will receive mentorship from three professors in the GWPAC lab. These faculty mentors include Jocelyn Read, a theoretical astrophysicist with a specialty in modeling sources of gravitational waves, especially neutron star dynamics; Geoffrey Lovelace, a theoretical gravitational physicist specializing in modeling sources of gravitational waves, such as colliding black holes, using numerical relativity; Joshua Smith, a gravitational-wave physics experimenter specializing in optics and characterization of the detectors and gravitational waves.

Desired preparation for this lab: A strong interest in physics, astrophysics, and gravitational waves. It would be helpful if incoming students have completed introductory physics, mechanics (e.g., the equivalent of our PHYS 211 or PHYS 225). Additional experience with computer code would be useful, but not necessary.

URE22 Prospective Faculty Mentors

Civil and Environmental Engineering (Prospective Faculty Mentors)

A. Pratanu Ghosh (Pending)

Research Interests: My research focusses on sustainability and durability of concrete structures using advanced experimental and numerical technologies. My research directs several innovative cutting edge non-destructive testing technology on concrete samples to evaluate different strength and durability problems in concrete structures. Currently, my students are involved to investigate the beneficial effect of Zeolite based high performance concrete (HPC) mixtures for future implementation in reinforced concrete bridges and pavements. They always enjoy hands-on experience in laboratory environment and they are also involved with different statistical analysis to determine service life of bridge decks and pavements. Earlier, my research students obtained TRB Eisenhower Fellowship, 2nd Prize in CSUF research competition. Every year, my undergraduate research students took part in CSUF student research competition, ECS Student Research showcase and presented their research in Southern California Undergraduate Student Conference (SCCUR).

Desired preparation for this lab: Students need to know basic statistical analysis and Excel and some basic lab training to conduct experiments. Our lab technician can help to provide adequate training to use the equipment.

Computer Engineering (Prospective Faculty Mentors)

D. Kiran George (Pending)

Research Interests: Bio-signal based assistive technology devices, Brain-computer interfaces, Digital wideband receivers, High-performance computing, and Pattern recognition techniques.

Desired preparation for this lab: Programming experience will be beneficial.

Mathematics (Prospective Faculty Mentors)

I. Anael Verdugo (Pending)

Research interests: mathematical modeling of disease transmission by using biology, computer programming, and differential equations.

Desired preparation for this lab: No additional preparation required.