

Our faculty recruitment for the Undergraduate Research Experience is still underway. The list below includes faculty who have been **confirmed** and faculty whose confirmation is **pending**. Please make sure to review all faculty mentors and come prepared to discuss your top 3-5 placement options (focusing on the confirmed professors). This document will be updated so check back.

<b>COLLEGE OF ENGINEERING AND COMPUTER SCIENCE.....</b>	<b>2</b>
<b>CIVIL &amp; ENVIRONMENTAL ENGINEERING .....</b>	<b>2</b>
<b>COMPUTER SCIENCE .....</b>	<b>2</b>
1. <i>Doina Bein (confirmed, updated) .....</i>	<b>2</b>
2. <i>Sampson Akwafuo (confirmed, updated) .....</i>	<b>2</b>
<b>ELECTRICAL &amp; COMPUTER ENGINEERING .....</b>	<b>2</b>
3. <i>Ankita Mohapatra (confirmed, updated) .....</i>	<b>2</b>
4. <i>Jaya Dofe (confirmed, updated) .....</i>	<b>3</b>
5. <i>Rakesh Mahto (confirmed, updated).....</i>	<b>3</b>
6. <i>Yu Bai (confirmed) .....</i>	<b>3</b>
<b>MECHANICAL ENGINEERING .....</b>	<b>4</b>
7. <i>Darren Banks (confirmed, updated) .....</i>	<b>4</b>
8. <i>Sagil James (confirmed, updated) .....</i>	<b>4</b>
9. <i>Salvador Mayoral (confirmed, updated).....</i>	<b>4</b>
10. <i>Yong Seok Park (confirmed, updated) .....</i>	<b>4</b>
<b>COLLEGE OF NATURAL SCIENCES AND MATHEMATICS .....</b>	<b>5</b>
<b>BIOLOGICAL SCIENCE .....</b>	<b>5</b>
11. <i>Alison Miyamoto (confirmed).....</i>	<b>5</b>
12. <i>Bill Hoese (confirmed, updated) .....</i>	<b>5</b>
13. <i>Maria Soledad Ramirez (confirmed, updated) .....</i>	<b>6</b>
14. <i>Nilay Patel (confirmed, updated) .....</i>	<b>6</b>
15. <i>Parvin Shahrestani (confirmed, updated) .....</i>	<b>7</b>
<b>CHEMISTRY &amp; BIOCHEMISTRY .....</b>	<b>7</b>
16. <i>Allyson Fry-Petit (confirmed, updated).....</i>	<b>7</b>
17. <i>Andrew Petit (confirmed, updated).....</i>	<b>7</b>
18. <i>Joya Cooley (confirmed, updated) .....</i>	<b>7</b>
19. <i>Michael Groves (confirmed, updated) .....</i>	<b>8</b>
20. <i>Niroshika Keppetipola (confirmed, updated).....</i>	<b>8</b>
21. <i>Stevan Pecic (confirmed, updated) .....</i>	<b>9</b>
<b>GEOLOGICAL SCIENCES .....</b>	<b>9</b>
22. <i>Sean Loyd (confirmed, updated).....</i>	<b>9</b>
<b>MATHEMATICS.....</b>	<b>10</b>
23. <i>Anael Verdugo (confirmed, updated) .....</i>	<b>10</b>
<b>PHYSICS.....</b>	<b>10</b>
24. <i>Anton Peshkov (confirmed, updated) .....</i>	<b>10</b>
25. <i>Geoffrey Lovelace (confirmed, updated).....</i>	<b>10</b>
26. <i>Jocelyn Read (confirmed, updated) .....</i>	<b>11</b>
27. <i>Joshua Smith (confirmed, updated).....</i>	<b>11</b>
<b>PENDING FACULTY – NOT YET CONFIRMED.....</b>	<b>12</b>
A. <i>Sudarshan Kurwadkar, Civil &amp; Environmental Engineering (pending).....</i>	<b>12</b>
C. <i>Yun Tian, Computer Science (pending) .....</i>	<b>12</b>
D. <i>John Faller, Electrical &amp; Computer Engineering (pending).....</i>	<b>12</b>
E. <i>Kiran George, Electrical &amp; Computer Engineering (pending).....</i>	<b>12</b>
F. <i>Nina Robson, Mechanical Engineering (pending).....</i>	<b>12</b>
G. <i>Kristy Forsgren, Biological Science (pending) .....</i>	<b>12</b>
J. <i>Leigh Hargreaves, Physics (pending).....</i>	<b>12</b>

## College of Engineering and Computer Science

### Civil & Environmental Engineering

No confirmed faculty at this time.

### Computer Science

#### 1. Doina Bein (**confirmed, updated**)

**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:** Experience with coding – any language/C.

**Helpful, but not required interest/knowledge in:** C++/Python/Java programming; data structures; trigonometry; calculus.

#### 2. Sampson Akwafuo (**confirmed, updated**)

**Research Interests:** 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:** No additional preparation required.

### Electrical & Computer Engineering

#### 3. Ankita Mohapatra (**confirmed, updated**)

**Research Interests:** 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, programming in any language, and Excel, if possible. The student must also have an interest and motivation to work with embedded systems.

**Helpful, but not required interest/knowledge in:** embedded systems; C/C++/Python programming

#### 4. Jaya Dofe (**confirmed, updated**)

**Research Interests:** Research interests include design obfuscation, side-channel analysis of encryption algorithms, fault attack analysis, and emerging technologies with an emphasis on hardware security and trust.

**Desired preparation for this lab:** Students do not need any additional preparation. I will provide them with sufficient background knowledge.

**Helpful, but not required interest/knowledge in:** Embedded systems; Excel; Python; microcontrollers; comfortable working with basic tools.

#### 5. Rakesh Mahto (**confirmed, updated**)

**Research Interests:** My research interests include ASCII 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, knowledge of microcontrollers should be sufficient.

**Helpful, but not required interest/knowledge in:** Embedded systems; Excel; experience in coding (any language); lab experience; working with basic tools; algebra-based/intro/mechanics physics; data structures.

#### 6. 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.

## Mechanical Engineering

### 7. Darren Banks (confirmed, updated)

**Research Interests:** My research is on the use of optical cavitation for small-scale fluid control and heat transfer enhancement. Will use high-speed video and other methods to measure the dynamics of cavitation bubbles induced by a focused continuous-wave laser.β

**Desired preparation for this lab:** Trigonometry.

**Helpful, but not required interest/knowledge in:** Excel; coding (any language/Python); data structures; calculus; identifying patterns in data; statistical analysis; microcontrollers; physics (intro/algebra-based); lab experience; comfortable with basic tools or experience in a machine shop;

### 8. Sagil James (confirmed, updated)

**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.

### 9. Salvador Mayoral (confirmed, updated)

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

**Desired preparation for this lab:** No additional preparation is required. Dr. Mayoral will train students on working with OpenFOAM so that they can set-up and run CFD simulations.

### 10. Yong Seok Park (confirmed, updated)

**Research Interests:** My research interest lies in creating design artifacts and conducting stress analysis. My current project involves studying and designing an electric vehicle structure that increases occupant safety in front and side collisions.

**Desired preparation for this lab:** intermediate level proficiency in Solidworks and ANSYS programs.

**Helpful, but not required interest/knowledge in:** embedded systems; Excel; experience with coding – any language; trigonometry; linear algebra; calculus; basic/advanced statistical analysis; physics (intro, algebra-based, or mechanics); statistics/probability.

## College of Natural Sciences and Mathematics

### Biological Science

#### 11. 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. Completion of cell or molecular biology.

**Helpful, but not required:** completion of introductory biology, general chemistry 1/2/lab.

#### 12. Bill Hoese (confirmed, updated)

**Research Interests:** We are investigating two non-native avian species that have escaped from the pet-trade and established themselves in southern California. The Pin-tailed Whydah, originally from Africa, is an obligate brood parasite and must lay its eggs in the nests of other birds. One potential host species is the Scaly-breasted Munia, originally from Asia, and closely related to native host species for the Pin-tailed Whydah. This summer we will be tracking nesting behavior of the munia and looking for potential parasitism by whydahs. Research activities will involve outdoor surveys and observations throughout the summer. Participants must be interested in outdoor work and willing to spend long hours outside under challenging conditions.

**Desired preparation for this lab:** Ideal students will be seeking field-based experience and should be interested in studying animals and animal behavior. Prior research experience is NOT required.

### 13. Maria Soledad Ramirez (**confirmed, updated**)

**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 additional preparation is required. We will provide the corresponding training and knowledge required for a dedicated and enthusiastic student.

### 14. Nilay Patel (**confirmed, updated**)

**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. Our preliminary data shows that b-catenin levels are rapidly reduced after drug treatments. We are using site-directed mutagenesis and PCR-based cloning approaches to make mutant version of b-catenin and its regulatory kinase, GSK3. These plasmids will be transfected into HEK293 or HeLa cells in combination with drug treatments. If downregulation of b-catenin is essential for mediating the drug's effect, then certain mutant will allow cells to proliferate despite drug treatment. Techniques used for this project include cell and molecular biology techniques such as cloning, cell culture, transfection, drug treatments, CyQuant cell proliferation assay, RNA isolation, and quantitative PCR.

**Desired preparation for this lab:** Knowledge of Excel, trigonometry, linear algebra, identifying patterns in data, basic statistical analysis; completion of introductory biology, cell or molecular biology, general chemistry 1 & 2 and lab.

**Helpful, but not required interest/knowledge in:** data structures; advanced statistical analysis; completion of statistics/probability; organic chemistry.

### 15. Parvin Shahrestani (confirmed, updated)

**Research interests:** We study the evolution and genetics of health-relevant traits. Currently we are investigating the three-way relationships among longevity, immune defense, and gut microbes in fruit flies.

**Desired preparation for this lab:** No additional preparation required. We will train students in all aspects of the experiments.

## Chemistry & Biochemistry

### 16. Allyson Fry-Petit (confirmed, updated)

**Research Interests:** Research interests are in solid state inorganic chemistry, focused on the rational design of new materials that can aid in cleaner energy. Students will have an opportunity to learn to synthesize new solids and test their ability to catalyze reactions.

**Desired preparation for this lab:** Interest in biochemistry and/or chemistry; passed general chemistry 1 & lab.

### 17. Andrew Petit (confirmed, updated)

**Research interests:** The Petit lab uses computational chemistry to understand photochemistry, that is, chemistry that occurs after a molecule absorbs light and becomes excited. Current research interests include developing structure-function relationships in photobases, determining the mechanism of light-driven organic reactions involving reactive intermediates, and modeling the photochemistry of the atmospherically relevant radicals NO and OH.

**Desired preparation for this lab:** Interest in chemistry, biochemistry, or physics; completed general chemistry 1 & 2; and are familiar with Excel.

**Helpful, but not required interest/knowledge in:** organic chemistry, physics (mechanics or algebra-based); calculus; Linux OS; identifying patterns in data; coding.

### 18. Joya Cooley (confirmed, updated)

**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

### 19. Michael Groves (**confirmed, updated**)

**Research interests:** Are you interested in uncovering the secrets of the physical world and developing cutting-edge technology? Join the Groves Research Group! We use machine learning and computational methods to predict the behavior of new materials and catalysts. Our research spans from synthesizing hydrogen peroxide using 2D materials to exploring ultrawide bandgap semiconductors for high-powered electronics. But that's not all - we also collaborate with other universities and institutions to discover how we can break C-C bonds electrochemically, synthesize specific chiral enantiomers for pharmaceuticals, and even improve how we teach physical chemistry.

**Desired preparation for this lab:** No additional preparation required. I will teach the students all the computer programming they need to work effectively in the lab.

**Helpful, but not required interest/knowledge in:** Python; Linux OS; identifying patterns in data; interest in biochemistry or chemistry.

### 20. Nirosika Keppetipola (**confirmed, updated**)

**Research Interests:** RNA binding proteins play an important role in cellular gene expression. We are interested in understanding how the addition of chemical groups such as phosphates and acetates to RNA binding proteins modulate their function. We use a combination of molecular biology, biochemistry and cell biology to study how chemical modifications alter RNA binding protein function.

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



## 21. Stevan Pecic (**confirmed, updated**)

**Research interests:** Our over-arching goal is developing aptamer-based biosensors (Aptasensors). Aptamers are single stranded DNA (ssDNA) molecules that can bind to a variety of targets with high specificity and affinity. Aptamers are in general more stable and easier to produce compared to antibodies and these characteristics make them suitable for designing sensitive biosensors that can be integrated into wearable devices for point-of-care diagnostics. This cutting-edge and exciting biomedical project is an interdisciplinary effort between Biochemistry and Engineering departments. In the first phase, we will try to identify the most common motifs in aptamers binding to steroids. In the second part of the project, the knowledge from the first phase will be used to predict the aptamer sequence required to bind to the steroid of interest (e.g., cortisol), prepare a biosensor and test it in a cortisol solution using a fluorescence-based assay. To accomplish the first phase, students will be trained on tools such as MEME, APTANI, Pymol and Python Programming language. They will also be taught how to do literature survey and prepare databases for inputs to the programming model. In the second half of the project, they will be trained on using wet labs for fluorescence assays and preparing calibration curves for biosensor sensitivity.

**Desired preparation for this lab:** experience with coding – any language.

**Helpful, but not required interest/knowledge in:** Interest in biochemistry and/or chemistry; Excel; coding (any language, C, C++, Java, Python); Linux OS; data structures; identifying patterns in data; basic statistical analysis; lab experience; biology – intro, cell or molecular; general chemistry 1/2/lab.

## Geological Sciences

### 22. Sean Loyd (**confirmed, updated**)

**Research Interests:** Dr. Loyd and his students explore how microorganisms lead to the formation of limestone and other minerals. They employ a variety of geochemical and microscopic techniques to characterize these relationships. Ultimately, mineral production can result 1) in economic deposits of important resources and 2) from the degradation of fossil fuels.

**Desired preparation for this lab:** No additional preparation required.

## Mathematics

### 23. Anael Verdugo (confirmed, updated)

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

**Desired preparation for this lab:** Passed algebra-based physics, calculus.

**Helpful, but not required interest/knowledge in:** coding (any language, especially Python); identifying patterns in data; basic or advanced statistical analysis.

## Physics

### 24. Anton Peshkov (confirmed, updated)

**Research Interests:** My lab is performing experimental research in two areas. On one hand we are exploring the physics of collective motion of the nematodes (worms), on the other hand we study the physics of granular materials such as powders and grains. A purely Python programming project (without lab work) is also possible with the goal of developing an image analysis software to extract particle and nematodes positions and orientations using machine learning and artificial intelligence.

**Desired preparation for this lab:** No additional preparation required.

**Helpful, but not required interest/knowledge in:** any coding language (especially Python); trigonometry; linear algebra; calculus; physics (intro or mechanics); basic or advanced statistical analysis; identifying patterns in data; microcontrollers; lab experience; hands-on experience with basic tools or being in a machine shop.

### 25. Geoffrey Lovelace (confirmed, updated)

**Research interests:** Gravitational-wave source modeling using numerical relativity, especially binary black holes.

**Desired preparation for this lab:** No additional preparation required.

**Helpful, but not required interest/knowledge in:** a strong interest in physics, astrophysics, and gravitational waves; passed physics (intro or mechanics); coding.

## 26. Jocelyn Read (**confirmed, updated**)

**Research interests:** My research group focuses on neutron star astrophysics, gravitational waves, dense nuclear matter, data science and statistical inference, interpreting signals measured by the Laser Interferometer Gravitational-wave Observatory (LIGO), and designing future gravitational-wave observatories like Cosmic Explorer.

**Desired preparation for this lab:** Strong interest in physics, astrophysics, or gravitational waves.

**Helpful, but not required interest/knowledge in:** coding (any language/Python), Linux OS, data structures, trigonometry, linear algebra, calculus, identifying patterns in data, basic/advanced statistical analysis/statistics, physics (algebra-based, calculus-based, intro, mechanics), data structures.

## 27. Joshua Smith (**confirmed, updated**)

**Research interests:** Experimental optics and gravitational-wave detection.

**Desired preparation for this lab:** No additional preparation required.

**Helpful, but not required interest/knowledge in:** coding in any language/Python; trigonometry; calculus; identifying patterns in data; basic statistical analysis; interest in physics/astrophysics/gravitational waves; lab experience.

## Pending Faculty – Not yet confirmed

A. Sudarshan Kurwadkar, Civil & Environmental Engineering (**pending**)

C. Yun Tian, Computer Science (**pending**)

D. John Faller, Electrical & Computer Engineering (**pending**)

E. Kiran George, Electrical & Computer Engineering (**pending**)

F. Nina Robson, Mechanical Engineering (**pending**)

G. Kristy Forsgren, Biological Science (**pending**)

J. Leigh Hargreaves, Physics (**pending**)