

# **SAMUELI SCHOOL OF ENGINEERING HOMECOMING**

## **SELF-GUIDED LAB TOURS 1:00 – 2:00 p.m.**

### **Department of Chemical and Biomolecular Engineering (CBE) Labs**

- **Ardoña Research Group - Laboratory of Biomimetic and Adaptive Materials**
  - The Ardoña Research Group at UC Irvine develops responsive and adaptive biomaterials, which are useful in creating model platforms for unraveling biological mechanisms that involve action potential propagation and cellular echanotransduction in contractile tissues. They work with biomacromolecules to create innovative materials that can probe or transduce signals at the cell-material interface.
- **Laboratory of Biomolecular Engineering**
  - Faculty: Han Li, Nancy Da Silva, Szu-Wen Wang
  - The Li, Wang, and Da Silva research labs at UCI engineer microorganisms to convert renewable resources into valuable chemicals through multidisciplinary projects, and engineer innovative nanomaterials for biotherapeutics. This work aims to contribute to a more eco-friendly and health-smart future by developing more sustainable and effective methods for producing bioplastics, fuels, and pharmaceuticals.
- **Electrochemical Engineering Labs**
  - Faculty: Iryna Zenyuk, Plamen Atanassov, and Voja Stamenkovic
  - Study electrochemical technologies for clean energy conversion, such as fuel cells, electrolyzers, batteries. Our goal is to use electrochemical technologies to decarbonize energy and industrial sectors by 2050.

### **Department of Civil and Environmental Engineering (CEE) Labs**

- **The Institute of Transportation Studies at UC Irvine (ITS-Irvine)**
  - The Institute of Transportation Studies at UC Irvine is an organized research unit, established to foster research, education, and training in the field of transportation.
- **Water-Energy Nexus (WEX) Center**
  - The UC Irvine Water-Energy Nexus Center promotes fundamental and applied research at the water-energy nexus in partnership with industry. Our research activities focus on water quality, reclamation, reuse, environmental quality and power/energy use and efficiency in the water processing sector: extraction, treatment, conveyance.
- **Center for Hydrometeorology and Remote Sensing (CHRS)**
  - Building Global Capacity for Forecast and Mitigation of Hydrologic Disasters through the development of means to extend the benefits of space and weather agencies' vast technological resources, which are untapped, into applications that can assist hydrologists and water resource managers worldwide and through equitable access to relevant information.

## Department of Electrical Engineering and Computer Science (EECS) Lab

- **HERO Lab**
  - Principal Investigator: Professor Hung Cao
  - The HERO Lab is the only one in the School of Engineering and amongst the few at UCI that has a vivarium. We use zebrafish for studies of cardiology, genetics, and drug screening.
- **Nanophotonics Lab**
  - Principal Investigator: Professor Maxim Shcherbakov
  - This lab studies how light interacts with tiny objects, so tiny that you cannot see them with your bare eyes. What happens to photons in the nanoworld? How can you build a quantum computer with all that? Come and find out!
- **Advanced Photonic Devices and Systems Lab**
  - Principal Investigator: Professor Ozdal Boyraz
  - This lab present optical chips for small scale devices, and also Lidars and optical communication devices. You can witness 3D measurement of an object with 2cm resolution at 15km distance.
- **Robot Ecology Lab**
  - Faculty: Dean Magnus Egerstedt, Ruoyu Lin, Alex Nguyen, Efrain Mendez, Riwa Karam
  - The Robot Ecology Lab studies swarm robotics and in the lab lots of small robots are driving around, forming shapes and solving problems in a distributed manner.

## Department of Materials Science and Engineering Lab

- **Biomimetics and Nanostructured Materials Lab**
  - Principal Investigator: Professor David Kisailus
  - The Kisailus Biomimetics and Nanostructured Materials Lab at UC Irvine is a multidisciplinary research group that leverages blueprints from biological structures and their synthesis pathways to develop advanced multifunctional materials for a broad range of applications including energy conversion and storage, environmental remediation and structural materials.
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## Department of Mechanical and Aerospace Engineering (MAE) Labs

- **Magnetic Microsystems and Microrobotics Laboratory**
  - Principal Investigator: Professor Camilo Velez Cuervo (<https://camilovelez.site123.me/>)
  - What would you do with robots the size of plankton? Our vision is to create a swarm of functional autonomous robots, each the size of a bacterium, working together to solve complex problems independently, such as wastewater treatment. We aim to enhance the autonomy and functionality of these micro-robots through advanced research in manufacturing techniques for magnetic materials and complex microsystems, including sensors and actuators. Our lab also specializes in characterization and fabrication of magnets and electromagnetic materials at micro scale.

- **Rehabilitation and Augmentation Lab**

- Principal Investigator: Professor Sasha Voloshina
- Research at the Rehabilitation and Augmentation Lab at UC Irvine centers on creating assistive devices that improve human mobility, both within clinical settings and real-world scenarios. We are particularly interested in developing wearable technology aimed at enhancing rehabilitation and gait training after motor impairment. Our work also includes advancing wearable devices for improved health monitoring and user interactions.

- **The Clean Energy Institute ([www.cleanenergy.uci.edu](http://www.cleanenergy.uci.edu))**

- Principal Investigator: Jack Brouwer, Vince McDonell, Scott Samuelsen, Iryna Zenyuk, Voja Stamenkovic
- The Clean Energy Institute at UC Irvine elevates and facilitates collaborations and industry connections for UCI's world class engineering and physical science research teams to discover and create needed clean energy technologies and solutions. We are a platform for energy science and engineering, the advancement to real-world application of clean energy technologies, and public education in support of the breakthroughs required to enable a post-fossil fuel energy future.

- **UCI Flight Projects Lab**

- Principal Investigators: Professors Jacqueline Huynh, John C. Larue, David Copp
- Home of the DBF (Design, Build, Fly), Cargo Plane, and UAV Forge projects, this lab is where aeronautics engineering happens at UCI. **Cargo Plane** - Cargo Plane is a senior design project competing in the International SAE Aero Design competition. Per parameters provided by SAE, we will be designing and building an electric RC cargo airplane that will be carrying a payload of soccer balls and metal plates. Our focus is to generate high lift at low velocities and create a high payload to plane structure ratio optimizing for a greater flight score in competition. **Design, Build, Fly** - Design Build Fly is an annual competition hosted by the American Institute of Aeronautics and Astronautics (AIAA). Each year, AIAA publishes a new set of rules for the DBF competition. **UAV Forge** is a multidisciplinary engineering senior design project with a focus on designing, building and programming unmanned aerial vehicles.

- **UCI Vehicle Performance Engineering Lab**

- Principal Investigators: Professor Michael McCarthy, Professor Tryphon Georgiou, Professor Penghui Cao
- Home of the ICE, Baja, Electric Racecar, and Solar Car projects
- **Baja SAE Racer** - The UCI Baja SAE team competes yearly in the Baja SAE West Collegiate Design Competition hosted by the Society of Automotive Engineers. Each year the team develops a brand-new single-seat off-road vehicle for the competition based on research into the dynamics of off-road vehicles and a critical analysis of the previous year's car. The yearly competition hosts 100 collegiate teams from across the world and consists of a series of static and dynamic events culminating in the 4-hour, 100 car wheel-to-wheel endurance event.

- **Formula SAE Electric Racecar** - The goal of this project is to design, manufacture, and test a formula-style electric racecar for the Formula SAE intercollegiate competition. This project allows for cross functional collaboration between students giving them the experience to work with individuals of the different engineering backgrounds ranging from software to aerospace engineering.
- **Formula SAE Internal Combustion Racecar** - The goal of the UC Irvine Internal Combustion Formula SAE (FSAE-IC) Team is to research, design, build, and test a formula-style car to win the FSAE competition. FSAE is an annual competition that hosts 80 teams, all consisting of students, from across the globe and they compete against each other in a series of dynamic and static events. Teams are scored based on their performance, with the top teams earning scores of 850+ points.
- **Solar Car** - UCI Solar Car team must design, construct, and raise funds for a fully powered solar racecar that surmounts the scrutinizing process for the American Solar Challenge, a cross-country endurance race for solar cars around the world. As the first established solar car team at UCI, we hope to build a solid foundation for a solar racing team that will continue to engineer sustainable vehicles for many years to come.
  
- **UCI Rocketry Lab**
  - Principal Investigators: Professor Mark Walter, Professor Xian Shi
  - The Rocket Project is currently working towards launching our Preliminary Test Rocket (PTR) in the FAR Dollar per Foot Challenge (DPF) Challenge. Our Preliminary Test Rocket (PTR) is designed to break the current altitude record of 13,000 ft for university-built liquid rockets. Propelled by our PTE engine, its lightweight aluminum/ carbon fiber body will soar to an estimated 30,000 feet and be safely recovered on the ground using a two-stage parachute system.
  
- **UCI Makerspace**
  - Principal Investigator: Ben Dolan
  - The UCI Makerspace encompasses a woodshop, electronics and assembly area, and FabWorks. The Makerspace offers a space where users can design and fabricate almost anything, providing access to a host of machines and technical staff ready to offer machine training and design help. Among the Makerspace's prosumer grade (above consumer grade) equipment are 3-D printers and scanners, networked computer-controlled milling machines, laser cutters, electronics development and diagnostics equipment, industrial sewing machines and more. The Makerspace offers expanded opportunities for those interested in hands-on, advanced-manufacturing experience and creates a hub where creativity can propel next-generation technologies.