

University of California, Santa Barbara
ICB Summer Biotechnology Undergraduate Research Experience
Program Dates: June 22 – August 14, 2020
Application Deadline: March 3, 2020

Research Internship in Science and Engineering

The Institute for Collaborative Biotechnologies (ICB) at the University of California, Santa Barbara is seeking motivated undergraduate science and engineering majors for an 8-week summer research experience.

This internship program is open to UCSB undergraduates and California Community College students, who will work in teams of two under the guidance of UCSB faculty and graduate student lab mentors, who will provide training and support.

Trainees will gain first-hand experience in scientific investigation in a dynamic, collaborative research environment. In addition to research, the trainees will participate in weekly group meetings to develop oral presentation skills, attend special seminars, and present their results at an end-of-the-summer poster session.

About ICB

To learn more about the faculty and research of the Institute for Collaborative Biotechnologies, please visit: www.icb.ucsb.edu

To learn about previous intern research projects, please visit: www.icb.ucsb.edu/outreach-apprenticeship-programs

The Institute for Collaborative Biotechnologies supports a broad range of multidisciplinary research in areas including Psychology, Computer Science, Physics, Chemistry and Biochemistry, Chemical Engineering, Biology, Computer Engineering, Mechanical Engineering, Bioengineering and Materials Science.

Program Details

The ICB Summer Research Program will run from June 22 – August 14, 2020. Approximately 6 internships will be awarded. The stipend is \$4,500 total for 8 weeks. The internship is a full-time commitment and participants are not allowed to attend summer courses during the program. No housing is provided.

The selected participants will work in teams of two—one UCSB student and one CC student. Each team will be selected to work on one of the projects listed below:

Prof. Javier Read de Alaniz, UCSB Chemistry
"DASA-based Photochromic Materials for Load-bearing Applications: Emulating Nature's Design to Build Light-addressable Actuators"

The ability for materials to change properties and/or functions in response to external stimuli is intrinsic to biological systems; however, incorporating such advantageous properties into useful materials represents a significant scientific and engineering challenge. The goal of this project is to develop a new approach to create light-activated artificial muscles from a novel class of photochromic materials. The summer internship may take several directions, such as: 1) determining how molecular design and polymer architecture influence the ability of these novel molecules to generate and bear loads; or 2) investigating how properties such as modulus, toughness, strength, architecture, etc. influence light-stimulated volumetric changes of these polymeric materials. Relevant majors: chemistry, physics, mechanical engineering.

Prof. Barry Giesbrecht, UCSB Psychological & Brain Sciences
"Global States and Cognitive Priority Control"

Perception and cognition determine the way we see and act on our environment. Developing methods to monitor and detect changes in perceptual and cognitive states to optimize soldiers' performance is of critical importance to the U.S. Army's strategy. This project will investigate the effects of global behavioral states (e.g., motivation, arousal, fatigue, sleepiness) on perception and cognitive priority control, building on our past findings that have shown that even modest changes in physical state (e.g., riding a bike) have selective effects on behavioral performance in cognitive tasks (e.g., target detection, visual search). Relevant majors: neuroscience, psychology, engineering.

Prof. Michelle A. O'Malley, UCSB Chemical Engineering
"Engineering Sense-and-Respond Enzyme Complexes for Bioproduction"

Extraction of sugar is the rate-limiting step in converting untreated biomass into value-added products through microbial fermentation. Both anaerobic fungi and anaerobic bacteria have evolved to produce large multi-cellulase complexes, referred to as cellulosomes, which are powerful machines for biomass deconstruction. To date, only bacterial cellulosomes have been explored for bioprocessing. However, fungal cellulosomes have evolved unique abilities to hydrolyze more recalcitrant biomass, host a wider range of enzymatic diversity, and are able to "shuffle" their enzyme domains on demand in response to external queues. This project will merge proteomic characterization with sequencing and molecular modeling to learn how fungal cellulosomes are assembled and rearranged in their native system. Relevant majors: chemical engineering, bioengineering, chemistry.

Student Eligibility

This competitive research program is open to undergraduates who are US citizens or permanent residents, 18 years or older. Students must be enrolled full-time at UC Santa Barbara or at a California Community College. UCSB students must have a GPA of 3.5 or higher; CC students must have completed a minimum of 12 transferrable semester units in science, mathematics or engineering at the program start.

Application Requirements

A complete internship application packet will include the following:

1. **A Complete Application**
2. **A Statement of Interest** explaining your research interest, background, and how this internship fits into your career goals. Your essay should be typed and a maximum of one page long.
3. **A Copy of your Unofficial Transcript**
4. **One Letter of Recommendation** from a course instructor, TA, or employer who is familiar with your scientific skills.

All items may be sent via e-mail to outreach@icb.ucsb.edu. Attachments should be in Microsoft Word, Adobe PDF, or JPG format. Please include your last name as part of the name file for all attachments.