GENERAL INFORMATION
Program sponsor: Princeton Environmental Institute
Position number: E1AVA
Project title: Biotechnology for Renewable Energy and Sustainable Manufacturing
Organization/research group: Avalos Lab
Primary location(s) of internship: Princeton University, Hoyt Labs
Additional cities and/or countries to be visited (if applicable): n/a
Note: If this internship is located in a country with an International SOS risk rating of High or Extreme, final candidates must participate in a travel review process overseen by the Travel Oversight Group (TOG), and obtain safety guidance prior to departure. The University reserves the right to revoke support and funding for travel at any time there has been a significant deterioration in the safety and security conditions surrounding travel arrangements, or in the sector of the country, or countries, where travel is to occur.

FACULTY SPONSOR(s)/HOST INFORMATION
Name(s): Jose Avalos
University Department(s): CBE/ACEE
E-mail: javalos@princeton.edu
Website: https://scholar.princeton.edu/jlagroup
Phone: 609-258-9881

INTERNSHIP/RESEARCH PROJECT INFORMATION
Internship/project description:
Several opportunities (1-3) exist to carry out 8-12 weeks of original research in the area of biotechnology to address challenges in energy and the environment. The intern(s) will work on developing microbial strains (yeast or bacteria) to genetically engineer their metabolisms for the production of biofuels or chemicals. This will involve assembling metabolic pathways for the biosynthesis of products of interests and deleting genes for enzymes that compete with the pathway of interest. Interns may be involved in developing or applying genetically encoded biosensors to monitor the metabolic activity of cells and facilitate high throughput strain screening. They may also be involved in constructing optogenetic circuits to dynamically control fermentations with light. Interns will carry out microbial fermentations, and analyze products with chromatography.

Student’s role and responsibilities:
Interns will work closely with a PhD student and postdoc in the lab. They will pay attention to all lab safety matters, and follow standard lab procedures. They will take careful notes of their experimental design, results, and conclusions. They will follow best practices to safeguard lab materials and equipment. They will catalog (According to lab procedures) the microbial strains and plasmids they develop, and preserve them in cryogenic stocks. They will report results to the PI.
Internship/project learning objectives:
Interns will gain hands on experience in different aspects of modern biotechnology. They will learn how to clone genes and assemble metabolic pathways in different types of genetic vectors. They will learn how to genetically engineer microbial stains to introduce engineered metabolic pathways, as well as delete genes that compete with the pathway of interest. They will carry out microbial fermentations and run analytical tests to measure concentrations of products made. Depending on the project, interns may learn about biosensors, optogenetic, biochemical characterizations, or protein engineering.

PROGRAM REQUIREMENTS

Academic background and any course pre-requisites:
Student must be enrolled in CBE, MOL, or CHM

Technical skills:
Some lab skills are preferred

Additional training(s):
General lab safety and Biolab safety courses from EHS

Equipment:
Lab computers are available, but students are encouraged to bring their own laptop.

Physical demands:
none

Language abilities/competencies (if applicable): none

Additional information about the internship/project:
Participating students will be required to complete lab safety and biosafety trainings prior to the start of the internship.

INTERNATIONAL TRAVEL REQUIREMENTS (if applicable)

Visa(s) required? Yes [ ] No [ ]
Research permit/pass required? Yes [ ] No [ ]
Immunizations required? Yes [ ] No [ ]

INTERNSHIP/PROJECT SUPERVISOR(S)

Name and title of primary supervisor: Jose Avalos, Assistant Professor
Email: javalos@princeton.edu Phone: 609-258-9881

Name and title of additional supervisor, if applicable: n/a
E-mail: Phone:

PROGRAM DATES AND FUNDING INFORMATION

Weekly Stipend: $500 Number of Positions Available: 1-3
Tentative Start Date (mm/dd/yyyy): 06/10/2019 Number of Weeks: 8-12
Tentative End Date (mm/dd/yyyy): 08/16/2019 Note: PEI funding is for full-time work, 35 hours per week minimum, and for a period of at least 8 continuous weeks.

Application Deadline: January 11, 2019