GENERAL INFORMATION
Program sponsor: Princeton Environmental Institute
Position number: E1COH
Project title: Clean, Small Fusion Reactors
Organization/research group: Princeton Plasma Physics Laboratory (PPPL)
Primary location(s) of internship: Princeton, NJ (PPPL)
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): Samuel Cohen
University Department(s): Astrophysical Sciences
E-mail: scohen@princeton.edu
Phone: 609 243 3185
Website: https://w3.pppl.gov/ppst/index.html

INTERNSHIP/RESEARCH PROJECT INFORMATION
Internship/project description:
Fusion energy may provide a safe and pollution-free source of power, primarily for the electrical grid. Our research efforts focus on scientific and technical aspects of relatively small, ca. 1 MW, fusion reactors that can burn advanced fuels, i.e., reactors that emit few neutrons. Such reactors would have fewer radioactivity, material degradation, and the associated safety and cost problems. We are presently operating the second research device at Princeton to investigate the plasma physics of one candidate advanced-fuel reactor called the field-reversed configuration (FRC). These reactors have applications in the fields of spacecraft propulsion, distributed power grids, and mobile power sources. Previous interns have performed theoretical and experimental research on technical and scientific problems faced by FRC reactors and also have performed historical, philosophical, and policy research into the beginnings, implications, and acceptance of these ideas.

Student’s role and responsibilities:
The roles and responsibilities assigned to students would depend on their backgrounds, skills and career goals. Students with interests in computational activities could work on modeling the plasma physics of energy extraction, current drive, fusion power production, or plasma heating. Those with experimental interests could measure properties of magnetic/electric field probes being used in the experiment. Those with interests in policy could study the impact of such energy sources on global issues.
Internship/project learning objectives:
- The research will begin with a week-long course on plasma physics, help at PPL and attended by about 30 other interns who will perform research primarily aimed towards much larger fusion devices.
- At the conclusion of the internship, a detailed written report is required. The students should expect to give (brief) weekly summaries of their progress and at least 1 detailed oral presentation towards the end of the summer.

PROGRAM REQUIREMENTS

Academic background and any course pre-requisites:
E&M is needed for those doing experimental or theoretical research. For those doing historical, philosophical, or policy-related research one year of courses in those departments is needed.

Technical skills:
see above

Additional training(s):

Equipment:
all students must bring a laptop

Physical demands:
none

Language abilities/competencies (if applicable): none

Additional information about the internship/project:
See website https://w3.pppl.gov/ppst/pages/ugrad_interns.html for example(s) of previous intern reports and projects. Look for students for whom I was the advisor. Selected students will be required to complete lab safety and workplace safety trainings prior to the internship beginning.

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: Samuel Cohen
Email: scohen@princeton.edu
Phone:
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: 3
Tentative Start Date (mm/dd/yyyy): 06/04/2018
Number of Weeks: 10
Tentative End Date (mm/dd/yyyy): 08/10/2018
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