

Pennsylvania State University

Undergraduate Research Experience Programs for Summer 2018

Bushveld - AfricaArray REU

Students participating in the Penn State Bushveld - AfricaArray REU will spend 6 summer weeks at Penn State and 3 weeks in South Africa studying the Bushveld Igneous Complex. At 2.055 billion years old, the Bushveld is the world's oldest and largest mafic igneous complex. Nonetheless, the total volume of the complex remains poorly constrained, partly because most of the intrusion remains underground, and partly due to the unknown association between the Bushveld and several other nearby intrusions of similar age. Student projects will contribute to assessment of the total volume of this ancient igneous complex using geophysical and geochemical methods. All students will conduct field work and laboratory or computational analysis and give a poster presentation of their research projects.

Website: <http://www.personal.psu.edu/mdf12/Site/Bushveld%20REU.html>

Contact: Dr. Maureen Feineman, mdf12@psu.edu

Climate Science REU

Summer research positions are available in the area of climate science as part of a Research Experiences for Undergraduates (REU) program, funded by the National Science Foundation and sponsored by the Department of Meteorology and Atmospheric Science. These positions are for ten weeks, 40 hours per week, and are suitable for undergraduates from a variety of majors, including atmospheric science, chemistry, ecology, engineering, geology, mathematics, oceanography, and physics. Mentors for the program are drawn from five departments and three colleges. The climate system involves highly complex interactions among the atmosphere, oceans, cryosphere, lithosphere, and biosphere, unraveling the mechanisms that control the Earth's climate is one of the most intellectually challenging scientific problems of the day. Students will gain first-hand knowledge of the climate system and mechanisms that influence it through research that may involve fieldwork, laboratory experiments, numerical modeling, and data analysis. Potential research topics include floods and droughts, regional and global climate change, terrestrial, wetland, and marine carbon cycling, tropical cyclones, atmospheric waves, and storm tracks, weather and climate risk, storm surge, atmospheric aerosols, and paleoclimate reconstruction. Students will learn how to communicate research results through report writing and a final presentation. Unique aspects of this REU program include opportunities to create a short video highlighting one's own research and presenting research findings at a national scientific conference. Preference will be given to rising juniors and seniors considering a career in climate research. Underrepresented groups are strongly encouraged to apply.

Website: <http://micromet.psu.edu/reuclimate/>

Contact: Dr. Raymond Najjar, rgn1@psu.edu, 814-863-1586

Dr. Jon Nese, j2n@psu.edu, 814-863-4076

Critical Zone Observatory Research Experiences for Undergraduates

Students participating in Shale Hills CZO research will pursue interdisciplinary questions in critical zone science. The Critical Zone has been defined as the outermost layer of the Earth's surface from the tops of the tree canopy to the bottom of groundwater aquifers. This is the living skin of the earth that supports terrestrial life. Earth surface processes of interest include the effects of fractures on water flow and regolith formation, the importance of tree roots on carbon cycling and soil formation, the biological impacts on weathering, the controls of solute concentrations versus discharge, the controls on land-air-ecosystem coupling, and the importance of macropores. At the SSHCZO, the team includes nine faculty members from three colleges (ESM, EMS, and Engineering) who work together with their graduate students at three sub-catchments within the Shaver's Creek Watershed. Undergraduates will learn and apply field and laboratory techniques used to quantify the rates of fluxes and flows of water, energy, gas, solutes, and sediments. Students will participate on teams learning about the formation, evolution, structure, and function of the Critical Zone in a temperature, forested landscape in central Pennsylvania.

Website: <http://ecosystems.psu.edu/research/labs/root-ecology/research/active/shale-hills>

Contact: Dr. Susan Brantley, sxb7@psu.edu

Interdisciplinary Materials & Physics REU

Funded by the National Science Foundation and sponsored jointly by the Department of Physics and the Center for Nanoscale Science, the Interdisciplinary Materials and Physics REU sponsors students nationwide who are curious about materials research across a broad range of topic areas. Majors of applicants frequently include, but are not limited to, chemistry, physics, materials, science, and all branches of engineering. Participants experience the challenge and excitement of a career in research, working closely with a research faculty member and their graduate students. Professional development activities include science outreach, education, and communication training with The Franklin Institute science museum in Philadelphia and others.

Website: <http://sites.psu.edu/physicsreu/>

Contact: Dr. Kirstin Purdy Drew, krp15@psu.edu , 814-863-6778

Department of Chemistry Summer Undergraduate Research Program

The Penn State Department of Chemistry Summer Undergraduate Research Program hosts undergraduate students with support from both the National Science Foundation Division of Chemistry and the 3M Foundation. The Chemistry Department at Penn State University was recently ranked among the top 10 departments and is a major research facility with 36 research faculty and more than 200 graduate students. Undergraduates who are majoring in chemistry, biochemistry, chemical engineering etc. and have an interest in research in chemistry are eligible. While there is a focus on energy-related research for some of the available positions, other openings are unlimited in their topic area. Applications for summer 2016 will open October 20th, 2015.

Website: <http://chem.psu.edu/undergrad/reu>

Contact: Dr. Tiffany Mathews, tam276@psu.edu , 814-865-4543

Integration of Biology & Materials REU

Chemical Engineers, with a solid background in material and energy balances and a diverse exposure to the natural and physical sciences, will play an essential role in developing materials that mimic biological structures and/or properties, materials and processes that are inspired by biological systems, synthetic materials that incorporate biological components, and materials produced using biological systems. Students will participate in a range of research projects involving the generation or improvement of biomolecular materials. Hosted by the Chemical Engineering Department and funded by the National Science Foundation, the Integration of Biology and Materials REU provides a variety of research opportunities for participants. Students will participate in discussions on the importance of oral and written presentation in scientific research and on graduate school programs in Chemical Engineering. We welcome applications from students with majors in chemical engineering, chemistry, materials science, and physics who attend diverse institutions (including Liberal Arts Colleges).

Website: <http://www.che.psu.edu/reu/>

Contact: Dr. Manish Kumar, mxk64@psu.edu , 814-865-7519

Summer Research Opportunities Program (SROP)

Hosted by the Office of Graduate Educational Equity Programs (OGEEP), the Summer Research Opportunities Program (SROP) is designed to interest talented undergraduate students from underrepresented groups in academic careers and to enhance their preparation for graduate study. Based upon individual interests, each participant engages in an intensive research experience with faculty mentors in all disciplines across the University, culminating with a major paper and presentation of their project at the Penn State SROP Symposium. Professional development programs, field trips, and social activities are also included in the experience.

Website: <http://www.gradschool.psu.edu/diversity/srop/>

Contact: Office of Graduate Educational Equity Programs (OGEEP), 814-863-1664

Summer Translational Cardiovascular Sciences Institute (STCSI)

The Summer Translational Cardiovascular Sciences Institute (STCSI) is dedicated to the training of undergraduate students who are interested in conducting research on cardiovascular disease. Cardiovascular disease is the number one killer of Americans, and the situation likely will get worse given the current obesity and diabetes epidemics. Our goal is to provide a new generation of scientists and physicians with comprehensive research training and educational experiences to address this problem.

Website: <https://sites.google.com/site/psustcsi2013/>

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