Summer Research Opportunities at MSU for Current Students

Brought to you by the Office of Undergraduate Research and Creative Activity

[1]STEM

[2]Social Science

[3]Arts and Humanities

[4]Interdisciplinary

American Society for Pharmacology and Experimental Therapeutics Summer Undergraduate Research Fellowship (ASPET SURF)

The ASPET Summer Undergraduate Research Fellow (SURF) awards introduce undergraduate students to pharmacology research by utilizing mentored research experiences to heighten student interest in careers in research or related health care disciplines. Participants receive a $4500 stipend for this 10-week program.

Research areas: pharmacology, toxicology, drug development, environmental health

BEACON REU

Students engage in summer research either at Michigan State University in East Lansing, Kellogg Biological Station (KBS) in Michigan, or Friday Harbor Laboratories (FHL) in Washington. All have strong field components and active integrated summer REU programs. Students pursue empirical evolutionary research with a strong field component, attend evening seminars on BEACON research, participate in professional development workshops (including Responsible Conduct of Research), and present results of research at regional and national meetings. Students are invited/expected to attend a bi-annual BEACON Congress and present results of their research there as well. Participants receive a $6000 stipend for this 10-week program.

Research areas: evolutionary biology, computer science and engineering

Biomedical Research for University Students in Health Sciences (BRUSH)

The National Institutes of Health (NIH) National Heart Lung and Blood Institute and Michigan State University (MSU) sponsor the BRUSH Summer Research Program at MSU for undergraduate and veterinary students interested in the biomedical sciences and research-related careers. The goal of this program is to provide hands-on research exposure and graduate or professional school preparation opportunities for individuals who are from populations underrepresented in biomedical research. Participants receive a $4800 stipend + room and board for this 11-week program.

Research areas: heart/lung/blood health, hypertension, immunotoxicology, tuberculosis, asthma, health effects of air pollutants

Cross-Disciplinary Training in Sustainable Chemistry and Chemical Processes REU (SCCP REU)

Participants in this REU program will engage in faculty-mentored research projects aimed towards developing more sustainable chemical products and processes to benefit society. These leading-edge projects will cut across the boundaries of the traditional organic,

inorganic, biological, analytical and physical chemistry disciplines. Students will be involved in all aspects of the research enterprise, from project design, to conducting experiments and analyzing data, to reading and discussing relevant scientific papers, and finally to preparing text and graphs for eventual publication in a peer-reviewed scientific journal. Philosophically, this program is designed to teach you about conducting scientific research and to help prepare you for postgraduate education or to enter the workforce through development of your problem-solving skills, chemical literature and information skills, laboratory safety skills, communication skills, team skills and ethics. Participants receive a $4500 stipend + room and board + travel budget for this 10-week program.

Research areas: green synthesis, polymer membranes for water purification, water quality monitoring, eco-friendly coatings, energy-related materials, advanced imaging and spectroscopy of materials and surfaces, computational approaches for understanding and predicting material properties

Engineering Summer Undergraduate Research Experience (EnSURE)

EnSURE is an "internship in graduate school" and provides participants with an early opportunity to become involved in research by working with faculty mentors in one of eight Engineering departments. As part of EnSURE, students work full-time on a substantive, faculty-guided research project and participate in professional development activities, including attending weekly seminars and completing periodic writing assignments. Participants receive up to $5000 in pay for this 10-week program.

Research areas: biomedical engineering, biosystems and agricultural engineering, chemical engineering and materials science, civil and environmental engineering, computational mathematics, science, and engineering, computer science and engineering, electrical and computer engineering, mechanical engineering

GeoPATH Communities and Future Earth Scientists (GeoCaFES)

GeoCaFES is a summer “bridge” program that supports and promotes future scientists with Latin American heritage to build community, gain research experience, and explore Earth Science careers. The GeoCaFES community also provides mentoring and professional development during the program and beyond. Participants receive a $5000 stipend for this 10-week program.
Research areas: experimental mineralogy, geodesy, paleoclimatology, geocognition, spatial science and climate, geomicrobiology

Great Lakes Bioenergy Research Center Summer Undergraduate Research Program (GLBRC SURP)

Explore if bioenergy research is a right fit for you! The Great Lakes Bioenergy Research Center's Summer Undergraduate Research Program at Michigan State University provides students with the opportunity to become engaged in an active research program in a scientific laboratory on the MSU campus in East Lansing, MI. Participants are engaged in a research program across multiple disciplines and attend field trips to learn more about bioenergy research outside of the lab. Participants receive a $5000 stipend for this 10-week program.

Research areas: biochemistry, plant biology, genetics, microbiology, ecology, crop sciences

Institute for Cyber-Enabled Research Advanced Computational Research Experiences for Students (ICER ACRES)

ICER ACRES is a Research Experience for Undergraduates (REU) in computational and data science. This REU is coordinated by Michigan State University's Department of Computational Mathematics, Science and Engineering (CMSE), in partnership with the Institute for Cyber-Enabled Research (ICER). Research projects provided though ICER ACRES focus on the development and enhancement of algorithms, models, and software for applications in multiple research areas that require high-performance computing resources. Participants receive a $6000 stipend, a housing allowance, and a travel allowance for this 10-week program. *MSU students accepted if funds available.

Research areas: computational chemistry, biology, astrophysics, mathematics, big data science, earth/climate sciences

Michigan – Louis Stokes Alliance for Minority Participation Summer Undergraduate Research Academy (MI-LSAMP SURA)

The MI-LSAMP Summer Undergraduate Research Academy (SURA) is hosted in collaboration with the Michigan State University Summer Research Opportunity Program (MSU SROP), the Engineering Summer Undergraduate Research Experience (EnSURE) and the Research Experiences in Mathematics (REM) program and is designed to provide a comprehensive research training and enrichment experience. The 8-week MI-LSAMP SURA helps prepare undergraduate students for graduate study through intensive research experiences with faculty mentors as well as academic enrichment activities.

MSU Physics and Astronomy REU

The MSU Department of Physics and Astronomy and its research groups offer internships for up to 12 undergraduate students. The program is funded by the National Science Foundation (NSF). The program includes a weekly series of professional and career development workshops and organized social activities and excursions; these provide an

informal atmosphere where students can get to know each other and a range of Physics-Astronomy faculty and staff. At the end of the program, students will present their research results as a poster and also submit a "practice" NSF Graduate Fellowship application. To maximize interactions between students, all students are housed in the same building. Students receive a $6000 stipend, room and board, and a travel budget for this 10-week program.

Research areas: accelerator physics, astrophysics, biophysics, computational physics, condensed matter physics, low temperature physics, nanoscience, nuclear physics, particle physics, physics education, psychoacoustics, theoretical physics

Michigan State University Summer Research Opportunities Program (MSU SROP)

The Summer Research Opportunities Program (SROP) is a gateway to graduate education at Big Ten Academic Alliance universities. The goal of the program is to increase the number of underrepresented students who pursue graduate study and research careers. SROP helps prepare undergraduates for graduate study through intensive research experiences with faculty mentors and enrichment activities. Participants receive a competitive stipend, room and board, and a travel budget for this 10-week program.

Research areas: physics, computer science, conservation biology, forestry, biomedical engineering, human resources, public health, kinesiology, community sustainability, epidemiology, Caribbean studies, integrative biology, political science, economics, community psychology, physiology, biosystems engineering, chemical engineering, nursing, neuroscience, climate change, biochemistry (from 2020 cohort, inexhaustive list)

NIEHS Summer Research Program at MSU

This program provides a research experience in environmental toxicology and health with an emphasis on the mechanisms of action of environmental toxicants. A minimum of seven undergraduate students with science majors benefit from this experience. The remaining positions will be available to any student. The focus of this research experience is on hypothesis-driven projects related to environmental health. The ultimate goal is to encourage under-represented minority students to enroll in Ph.D. programs in environmental health or allied biomedical sciences. This experience will provide students' exposure to environmental toxicology and health, allow them to network, and develop a sense of community with other under-represented minority undergrads. A long-term outcome is increasing the number of under-represented minority scientists in the biomedical/environmental health sciences. Participants receive a $4000 stipend, room and board, a travel budget, and health insurance for this 10-week program.

Research areas: environmental health and toxicology, neurobiology/neuroscience

Plant Genomics @ MSU REU

The Plant Genomics @ MSU REU Program provides high quality research and training experiences for undergraduates. Participants are embedded within a research group at Michigan State University and undertake a mentored research project with the overall aim of providing an experience akin to that undertaken by a first-year graduate student. In addition to a research project, students participate in a range of professional development activities that includes workshops and seminars designed to enhance their scientific and professional skill sets as well as provide information on graduate school and careers within STEM disciplines. Participants receive a $5750 stipend, room and board, and a travel budget for this 10-week program. *MSU students accepted if funds available.

Research areas: biology; biochemistry; biotechnology; chemistry; bioinformatics; computational sciences

Research Education Program to Increase Diversity in Health Researchers (REPID)

The REPID Program through support from the National Institutes of Health- National Heart, Lung and Blood Institute (NIH-NHLBI), provides a short-term research training and enrichment experience for Michigan State University undergraduate/graduate/medical health professional students from under-represented, minority, and disadvantaged (URMD) groups. The goal is to inspire these students to pursue research careers in health-related areas of Cardiovascular, Pulmonary and Hematologic disciplines. The REPID Program is designed to increase the number and diversity of researchers in health-related research by providing an inspiring and supportive environment for accomplishment and advancement. This program's inspiration is to challenge the existing problem of diversity and health disparities in Biomedical/Clinical Research and Clinical Practice, and to foster career development for motivated individuals from URMD students at Michigan State University. Participants receive $1000 in partial tuition coverage for a required class (MED 492 – Basics and Methods in Biomedical Research, 2 credits), a $4000-$7000 stipend for summer research (depending on student level), $500 in travel funds for scientific conferences, a $100-$1500 room and board stipend, and $1000 for lab supplies for this 12-week program.

Research areas: pulmonary/cardiovascular/hematological health and disease

Sociomobility REU

Each summer, ten students will be selected to work with teams of sociomobility researchers on original, interdisciplinary, collaborative research projects at the intersection of engineering and the social sciences. Student cohorts will be recruited with emphases on technical and social diversity, and the program will leverage existing campus resources as part of a robust initiative. The program will allow participants to play an active and meaningful role in a series of multi-disciplinary projects under the direction of faculty from

various departments and programs. These projects will be developed collaboratively with a diverse range of public and private industry stakeholders while supplementing ongoing campus-wide mobility research efforts. Participants receive a competitive stipend, room and board, and a travel budget for this 10-week program. *MSU students accepted if funds available.

Research areas: workforce impacts of automated vehicles (AVs); driver behavior during AV operation; short- and long-term safety impacts of AVs; ethics, morality, and legal implications of AVs; evaluating the environmental impact of AVs; addressing transportation challenges and AV opportunities for persons with disabilities; health impacts of autonomous vehicles; advancement of intervehicle communications; assessing public perceptions and acceptability of AVs using social media linguistic analysis; AVs as one among many future disruptive technologies in civil infrastructure

Summer Undergraduate Research Institute in Experimental Mathematics REU (SUREIUM REU)

Lyman Briggs College at Michigan State University hosts a summer Research Experience for Undergraduates (REU) in mathematics. This program is supported by Michigan State University (MSU), the National Security Agency (NSA), and the National Science Foundation (NSF). Students work with faculty at Michigan State University in the Lyman Briggs College, the Department of Mathematics, the Department of Statistics and Probability, and the Department of Computational Mathematics, Science, and Engineering. Participants receive a $4000 stipend for this 8-week program.

Research areas: combinatorial games on graphs, phase retrieval algorithms, combinatorial knot theory, Brownian motion and random fractals, mathematical physics

W.K. Kellogg Biological Station Ecological and Evolutionary Dynamics in a Changing World REU (KBS REU)

The NSF funded KBS REU Site "Ecological & Evolutionary Dynamics in a Changing World" gives students an opportunity to conduct full-time research in collaboration with outstanding faculty, postdocs and graduate students. Participants receive a $6325 stipend, room and board, a travel budget, and a research expense budget for this 11-week program.

Research areas: mechanisms by which natural selection on weeds and native plants produces adaption to a variable environment; function and response of microscopic organisms to their environment, fundamental and applied evolution/ecology/conservation biology, association between landscape diversity and species diversity, molecular and physiological mechanisms underlying adaption, community composition and species diversity under anthropogenic global change, genetic and genomic mechanisms of ecological adaptations, agricultural sustainability, biological and climate variability in

interactions among plants/insect herbivores/predators, factors that affect biotic interactions in ecological communities

W.K. Kellogg Biological Station Undergraduate Research Apprenticeships (KBS URA)

KBS offers an Undergraduate Research Apprenticeship (URA) Program featuring research positions with outstanding faculty, postdocs and graduate students. URA positions are part-time (research schedule is dependent on your KBS course schedule) and geared for undergraduate and community college transfer students with little to no previous research experience. To complement your hands-on research experience, URAs are required to take a course at KBS during the summer (3+ credits). KBS offers several field courses that combine classroom and outdoor research activities for a unique and engaging learning environment. Please note that URAs are responsible for covering their MSU tuition for the course(s) taken. Participants receive a $3000 stipend plus room and board for this 11-week program.

Research areas: mechanisms by which natural selection on weeds and native plants produces adaption to a variable environment; function and response of microscopic organisms to their environment, fundamental and applied evolution/ecology/conservation biology, association between landscape diversity and species diversity, molecular and physiological mechanisms underlying adaption, community composition and species diversity under anthropogenic global change, genetic and genomic mechanisms of ecological adaptations, agricultural sustainability, biological and climate variability in interactions among plants/insect herbivores/predators, factors that affect biotic interactions in ecological communities