



Summer 2014 Undergraduate Research Experience in Physics: *Materials and Modeling* at the University of Missouri

Announcement: The University of Missouri (MU) Department of Physics and Astronomy will host a Research Experience for Undergraduates (REU) Program, *Materials and Modeling*, supported by a grant from the National Science Foundation. MU has a very strong research program in this area, which includes both condensed matter physics and biophysics. The undergraduate student interns will be able to choose from a diverse array of topics depending on their interest and ability. The topics will include experiments, theory, and modeling and span a variety of research projects (see <http://physics.missouri.edu/reu-projects/>) with a good balance between experimental, numerical, and analytical components.

General Information: The Office of Undergraduate Research at the University of Missouri (MU) coordinates a number of summer research programs for undergraduates, including this physics research experience for undergraduates (REU) in materials and modeling. All programs run for 9 weeks (**Wednesday, May 28 - Friday, July 25**), with travel days being Tuesday, May 27 and Saturday, July 26. Students selected for these programs live in on-campus, air-conditioned housing (double rooms), and receive a meal plan, covered by the program. Summer interns also receive one hour of academic/research credit, travel to and from Columbia, and a stipend of \$4500.

Funds are available for approximately 10 non-MU students in physics (materials and modeling). An additional 50+ undergraduates from MU or in other programs will participate in all research and educational programming activities, creating a vibrant community of undergraduate researchers. Students will work on their own research project under the guidance of an MU faculty mentor and present their results at a poster Forum at the end of the summer (July 24th). Students become part of a research team that typically includes other undergraduate students, graduate students, lab technicians, and post-doctoral researchers. With 1,000 faculty members, over fifteen academic departments, and eight interdisciplinary programs and centers (all focused on the life sciences), MU is a great place for undergraduates preparing for a challenging career in physics and other sciences research and education! Our Columbia campus includes schools and colleges of Arts & Science; Agriculture, Food & Natural Resources; Engineering; Health Professions; Medicine; and Veterinary Medicine -- all within walking distance! MU is home to the nation's largest (10MW) nuclear reactor found on a college campus. The MU Research Reactor (MURR) provides advanced research opportunities for students and faculty in the neutron-related sciences and engineering and is an excellent facility for radiochemistry research.

Summer program alumni have entered graduate programs at California-Irvine, California-San Diego, Chicago, Colorado, Indiana, Iowa State, Michigan, Missouri, Purdue, Virginia, Washington University (St. Louis), and Wisconsin.

The Campus and Community: MU, the flagship campus of the University of Missouri system, is home to more than 34,700 students (7,700 in graduate and professional programs) and 2900 faculty. Columbia, midway between St. Louis and Kansas City, is a vibrant community with a population of more than 113,000. Columbia offers most of the benefits of large cities (restaurants, art, theater, music, and a variety of churches) and yet maintains the atmosphere and convenience of a small, diverse college town. There are numerous trails for walking, running, and biking, and a variety of city and state parks nearby.

Eligibility: Applicants are expected to have completed at least two years of full-time college enrollment prior to June 2014 and be pursuing a major in physics, engineering, biophysics or related fields. Students graduating prior to December 2014 are not eligible. **Students must be citizens or permanent residents of the U.S.** A minimum GPA of 3.0 (on a 4.00 scale) is required. This includes both a 3.0 or greater for the overall GPA and a 3.0 or greater for science and math courses. Participants must have completed calculus-based physics by the start of the program.

Application Information: The deadline for applying to these programs is **Saturday, March 1, 2014**. Students must complete the attached application form and provide an unofficial transcript (including fall 2013 grades); at least one letter of recommendation (two preferred); a personal statement including career plans, prior research experience (if any), and statement of research interests; and a resume. Completed application packets should be sent to Pam Cooper, Office of Undergraduate Research, 150 Christopher S. Bond Life Sciences Center, University of Missouri, Columbia, MO 65211. FAX: 573-884-9395. General questions can be directed to Pam Cooper (CooperPJ@missouri.edu, 573-882-5979) or Director Dr. Linda Blockus (BlockusL@missouri.edu). Questions about physics projects or faculty can be directed to Dr. Karen King (KingKar@missouri.edu)

Educational Programming: In addition to their research work, students participate in a full series of evening workshops and brown bag lunches designed to provide them with information about research, career preparation and options, and scientific ethics. Speakers from previous years have included MU faculty, a scientist from the Stowers Medical Institute, members of the National Academy of Science, clinical oncology researchers, science teachers, directors of graduate programs, and other scientists. Weekly specialty discussions provide opportunities for students to read articles relevant to the topics and engage in discussion with peers and faculty members. These specialty discussions are open to all students, regardless of program affiliation. A presentation on writing abstracts and designing posters is held in preparation for the poster Forum. Social activities also provide opportunities for participants to get to know each other and other members of the MU science community. A mandatory orientation session that includes team-building activities is scheduled for Wednesday, May 28th.

Faculty Mentors: Students should list up to 4 faculty/projects that they are interested in working with on their application. A short list of projects is listed below, with a full description of the projects and faculty mentors available at <http://physics.missouri.edu/reu-projects/>. Additional information can be found at <http://physics.missouri.edu/faculty/>.

Faculty Mentor	Project description	Research
Dr. Shi-Jie Chen	Modeling RNA folding	Theoretical
Dr. Paul Miceli	X-ray studies of nanostructured metals grown on silicon	Experimental
Dr. Peter Pfeifer	Tunable single electron memory	Experimental
Dr. Suchi Guha	Charge transport in polymer-based transistors	Experimental
Dr. Shubhra Gangopadhyay	Tunable Pt nanoparticle based single electron memory	Experimental
Dr. Gavin King	Single molecule approaches to membrane proteins	Experimental
Dr. Ioan Kosztin	Molecular dynamics: water transport in channel proteins	Theoretical
Dr. Sashi Satpathy	Computational condensed matter physics	Theoretical
Dr. Haskell Taub	Neutron scattering studies of model membranes	Experimental
Dr. Carsten Ullrich	Ultrafast optical processes in organic semiconductors	Theoretical
Dr. Giovanni Vignale	Spin-orbit interaction at oxide interfaces	Theoretical
Dr. Xiaoqin Zou	Modeling bio-molecular interactions	Theoretical

Office of Undergraduate Research

For more information about the summer opportunities for undergraduate research at MU, visit the website <http://undergradresearch.missouri.edu/>



Research Experience for Undergraduates in Physics: Materials and Modeling

Name _____

College/University _____

Major _____

Current Grade Level

☐ Sophomore ☐ Junior ☐ Senior

Date of Graduation

☐ Spring 2015 ☐ Spring 2016 ☐ Other _____
Are you a MARC student? ☐ Yes ☐ No

Date of Birth _____

Gender: ☐ Male ☐ FemaleCitizenship: ☐ United States ☐ Other _____Permanent Resident of the U.S.? ☐ Yes ☐ No

Resident of Missouri?

☐ Yes (eligible for in-state tuition) ☐ No

Racial/Ethnic Background(optional) _____

E-Mail Address _____

[print clearly so we can contact you!]

Address (where you live) while at school/ZipCode/Phone & Area Codes

Phone _____ Cell Phone _____

This address good until _____

Permanent Address/Zip Code/Phone

City with closest major airport _____

Eligibility:

Acceptance to the program is competitive.

At a minimum, students must:

- have completed at least two years of full-time college enrollment prior to June 2014 and be entering their junior or senior year of college
- be pursuing a major in physics, engineering, biophysics or related fields
- be citizens or permanent residents of the U.S.
- have earned a minimum GPA of 3.0 (on 4.00 scale) including both overall GPA and science/math GPA
- have completed calculus-based physics by the start of the program
- be interested in physics, including a possible career in physics

Students graduating prior to July 2014 are not eligible.

Please carefully review the faculty listings at the physics departmental web site:

<http://physics.missouri.edu/undergraduate-program/reu/reu-projects/>

List below 4 MU faculty members (in order of preference) whose research is of interest to you. Please check the application information to ensure that the faculty you list are participating in the program!

1 _____

2 _____

3 _____

4 _____

Questions concerning projects and/or mentors should be directed to Dr. Karen King (KingKar@missouri.edu), MU Department of Physics & Astronomy..

How did you learn of our program?

- ☐ faculty or other school official
☐ NSF REU Website
☐ internet search
☐ conference attendance (SACNAS, ABRCMS, etc.)
☐ other _____

Courses: Fall Semester 2013				Winter/Spring (current) Semester		
Dept.	Title	Credits	Grade	Dept.	Title	Credits
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Overall GPA: _____ on a _____ scale.

Previous Research Experience _____

Educational and Career Plans after Graduation _____

Plans for advanced degree(s): ☐ MA/MS ☐ PhD ☐ MD ☐ MD/PhD ☐ Unknown ☐ Other _____

Brief Summary of your Research Interests for this summer and beyond _____

Other comments: _____

Please include an unofficial transcript, personal statement, resume, and at least one letter of recommendation from a science faculty member (someone who has taught you or with whom you have worked). Two letters of recommendation are preferred. A resume is very helpful. If you handwrite your application, please PRINT CLEARLY.

Please return your application to Pam Cooper, Office of Undergraduate Research, 150 Bond Life Sciences Center, University of Missouri, Columbia, MO 65211. (Fax: 573-884-9395 or email: CooperPJ@missouri.edu) The deadline is Saturday, March 1, 2014, or until all spaces have been filled.