

## **Session T29: NSF's Research Experiences for Undergraduates (REU) Program: Overview and Perspectives**

**Session Chair and Summary: Cathy Mader, Hope College**

This focus session concerned the National Science Foundation's Research Experiences for Undergraduates Program. The perspectives of directors of REU programs, faculty who supervised undergraduates in REU programs, and students who participated in REU programs were presented. An overview of the program and a description of the recent REU Directors Workshop were also included.

### **Physics NSF-REU Site Director Workshop: What did we learn and what questions remain?**

Mario Affatigato, Coe College, Cedar Rapids, Iowa

Session T29 began with a presentation by Dr. Mario Affatigato, the PI of the Coe College Physics REU Site and a member of the steering committee for the NSF Physics REU Site Director Workshop. Dr. Affatigato spoke on the 2008 workshop, which was attended by representatives from 36 of the over 50 NSF Physics REU sites as well as representatives from several national professional societies for Physicists. The workshop format allowed participants to discuss both effective practices in the current REU programs as well as to learn more about effective practices in programs outside of the NSF REU Physics Sites. In particular, the participants learned about current results in assessment of undergraduate research experiences and programs that have increased the diversity in undergraduate research programs from other disciplines and discussed how to adapt/adopt these ideas for Physics REU sites.

While all of the REU sites share a common goal of providing excellent research experiences for undergraduates, the degree to which the sites have assessed the impact of the experience on their participants varies greatly. The workshop provided an opportunity for participants to learn about the results of the Survey of Undergraduate Research Experiences (SURE) from the lead investigator of SURE, Dr. David Lopatto of Grinnell College. Patrick Mulvey from the American Institute of Physics shared results relating to undergraduate research experiences from the recent survey of physics bachelor recipients. As the participants had hoped, most students reported that their undergraduate research experiences had a positive impact on their decisions to pursue STEM careers. The SURE results for physics students probed the importance of specific program details in terms of their impact on the students' experience.

There are a wide variety of types of REU sites. For example, while over 70% are hosted at PhD granting institutions, the remaining sites are hosted at primarily undergraduate institutions, masters-granting institutions, and non-degree granting institutions. Regardless of institution type, sites seem to receive a large number of applications each year, with nearly half of the sites reporting that they receive over 100 applications. Site directors were concerned about how to increase the reach of their programs to students that would otherwise not have access to undergraduate research experiences. Thus the newly instituted workshop steering committee was charged with trying to address questions related to student demand for physics REU experiences as well as ways in which the programs can work together to reach the largest number of students.

The initial efforts of this committee include preliminary data-gathering efforts to estimate the student demand for physics REU positions, efforts to publicize physics REU programs in general rather than as individual sites, ways to coordinate application/acceptance deadlines in order to optimize efforts at all sites and for all students, and finally creation of electronic resources to facilitate dissemination of information and discussion of issues amongst REU site directors. The electronic resources have been created, and work is ongoing on the other objectives.

A website with resources of interest to undergraduate research program directors and mentors, including presentations and reports from the NSF Physics REU site director workshop, is available at <http://www.aps.org/programs/education/conferences/reu/resources.cfm>. Dr. Affatigato's presentation, as well as most of the presentations from this session, are also available at the website. Suggestions for additional resources are welcome. In addition, a listserv for those interested in discussing issues related to undergraduate research programs has been created. To join the listserv, please contact Cathy Mader ([mader@hope.edu](mailto:mader@hope.edu)).

In addition to Dr. Affatigato's summary presentation, the session included presentations by a variety of individuals involved in undergraduate research programs. Derek Padilla shared his perspectives as an alumnus of a Physics REU program. He spoke about the features of the program that helped to make it a success from his perspective (from the time he applied to the program to when he applied to graduate school). The summer research experience had a major impact on his career and educational choices. The connections he made that summer have also served as a resource for future advice and letters of recommendation to help him proceed in his educational career.

Dr. David Ernst shared his recommendations on how to recruit a more diverse group of students to participate in REU programs. His suggestions mirror what he has said about recruiting minority students to PhD program in a recent APS News Backpage article (<http://www.aps.org/publications/apsnews/200810/backpage.cfm>). His comments were quite consistent with Derek's student perspective: REU applicants should not be evaluated simply by the numbers (GPAs) but rather as an individual. Someone in the program needs to read the full package to identify students that will be good fits for the program based on letters from the applicant, transcripts, and letters of recommendation. However, once a student is selected, personal contact with the student either by the program director or the research mentor are key to successful recruitment and, in the long run, successful completion of the research experience. Once the program ends, continued contact with the student is also important, not only for future success of the student in STEM endeavors, but because their positive experience means that they will share the word about it with others that may apply to the program in the future.

Five other REU site directors also shared information about how their programs work:

- REU in Physics at Kansas State University: An Evolving Program by Dr. Kristan Corwin
- The REU Program From a PUI Perspective: Interdisciplinary Scientific Computation at Ohio Wesleyan University by Dr. Brad Trees
- Challenges and Opportunities in Interdisciplinary Materials Research Experiences for Undergraduates by Dr. Yogesh Vohra
- The Assessment of the Impact of REU Programs on Student Classroom Performance by Dr. Chris Hughes
- International Summer Research Program in Gravitational-Wave Physics operated by the University of Florida for the LIGO VIRGO Science Collaboration by Dr. Bernard Whiting

All five sites are very different and yet all provide valuable experiences for undergraduate physics majors. From interdisciplinary research programs to international programs, all of these programs fill important niches that reach different students. Members of the audience were able to ask questions and gather ideas about ways to improve their own programs. Other members of the audience asked questions about how to design REU site programs in hope of possibly creating new programs at their own institutions. To learn more, please look for the individual presentation slides at <http://www.aps.org/programs/education/conferences/reu/resources.cfm>.