Physics NSF-REU Site Director Workshop:
What Did We Learn and What Questions Remain?

Dr. Mario Affatigato
Physics Department, Coe College
Physics REU Leadership Committee
Motivation

Why is the REU program important?
Preaching to the choir.
UROs Were Important to Career Decisions

Source: NSF follow-up survey

Susan Russell, pan-REU workshop
UROs Attracted and Encouraged
High Degree Expectations

Percent of each NSF/STEM group who expected a PhD

| Source: NSF follow-up and STEM surveys |

Among STEM Students, Minorities Are (Fairly) Well-Represented in REU

Distribution is comparable to that of STEM bachelors degrees in 2000-2001

Source: NSF undergrad survey

Correlates of Increased Confidence

- Variety of research activities and intensity (hours/week) of the research experience
- Amount of time spent with faculty mentor
- How well prepared the student felt s/he was for the work s/he was asked to do
- Involvement in project design

Source: NSF undergraduate survey

Most STEM Majors—Especially Researchers—Became Interested in STEM as Kids

Percent of each group who became interested in STEM at each specified time

<table>
<thead>
<tr>
<th>Group</th>
<th>Not interested</th>
<th>As a kid</th>
<th>In high school</th>
<th>In college</th>
<th>Don’t remember</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td>4</td>
<td>11</td>
<td>58</td>
<td>48</td>
<td>8</td>
</tr>
<tr>
<td>Subjects</td>
<td>STEM researchers</td>
<td>STEM non-researchers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Students Are Not Very Well Informed About UROs, Especially Those at Other Institutions

Percent very satisfied

How well informed about UROs at your school 36
How well informed about UROs at other places 23

Source: NSF follow-up survey

Students Are Not Very Satisfied With the Variety/Relevance of UROs

Source: NSF follow-up survey

The pan-REU workshop
The History
September 21, 2005

Randy Duran
Mary Boyd
Andrew Cohen
Mario Affatigato
Pat Dixon
Charles Becker
Robyn Hannigan
Karen Sutherland
John Vetelino
Topics

**Symposium I:** Impact of the REU Program at the National Level

9:00 a.m.–12:00 noon
Session I.1, Room 375A:
*REU and National Need*
Speakers: Ben Oni and Diane Clayton, NASA Headquarters
Moderator: Mario Affatigato, Coe College

**Symposium II:** Impact of the REU Program on Students

1:00 p.m.–4:00 p.m.
Session II.1, Room 375A:
*Adding to the Student Experience*
Speaker: Earnestine Psalmonds, NSF
Moderators: Frances Van Scov, West Virginia University, and Karen Sutherland, Augsburg College

**Symposium III:** Running and Assessing REU Sites: Strategies and Models

Plenary Session and Breakfast, Room 1235
8:00–8:30 a.m.
Breakfast
Symposium I: REU and the National Need

Increasing the Pool

Summary recommendations (A):
1. Provide students with more and better information regarding summer research experiences.
2. Broaden the base of students by systematically reaching out to students who do not have ready access to those activities.
3. Provide opportunities for participation in research experiences early in students’ academic careers.
4. Create more interdisciplinary programs, and develop a formal structure to handle them.
5. Focus on maximizing the quality of REU participants, letting quantity be a secondary consideration.

Assessing and Aiding

Summary recommendations (B):
1. Track REU participants by sending a follow-up questionnaire twice yearly, perhaps using a dedicated website, for the three years following their summer research experience or until they have chosen their first career path.
2. Encourage development of site-specific electronic newsletters that could be distributed to past REU students.
3. When compiling statistics to assess the success of REU programs, carefully develop an operational definition of what constitutes persistence in science.
4. Fund post-REU activities of willing REU participants to a greater degree.
5. Encourage the inclusion of activities within REU programs that can help the students with the graduate school application process.
6. Foster and/or encourage partnerships with private industry, federal organizations, and professional societies.

Increasing Visibility

Summary recommendations (C):
1. Develop a mechanism by which individual programs can provide information that can be used judiciously by NSF to enhance the national visibility of REUs.
2. The NSF should find novel ways to enhance its role in increasing institutional commitment to REU programs.
3. The NSF should encourage the producers of national academic rankings to include undergraduate research programs as a criterion in their rating.
4. The NSF should publicize effective REU models involving partnerships between universities and foundations, corporations and other domestic and international institutions.
5. Wherever possible, REU sites should apply to interested research institutes, professional societies, and industries for supplemental support.
The Physics REU Site Directors Workshop

Pictures by Ken Cole
I. Background: Geographical distribution of NSF Physics REU Sites
I. Background data gathering

Did you participate in research as an undergraduate? (Site directors)

How long is your program?
I. Background data gathering

What is the highest degree awarded in the host department(s) of the site?

How large is your college or university?
I. Background data gathering

If you have an application deadline, what is your first deadline?

- February 15 or before: 29
- February 16 to February 28: 24
- March 1 to March 15: 41
- March 16 or after: 3

If you have an application deadline, what is your first deadline?
How many on-time, complete applications does your site receive each year?
II. Diversity issues

Having a diverse set of participants in an REU program is important.
II. Diversity issues

What do you believe is the biggest challenge in getting complete applications from underrepresented students for your program?
III. Two-year and other younger students

Comparison of whether two-year or rising sophomore college students had ever participated in REU site program.
IV. Effective practices

How are the actual REU scientific projects determined?

Exposure to ethics is important in an REU program.
IV. Effective practices

Do the students participate in a poster session at the end of the summer?

Do your students give an oral presentation?
What fraction of students are coauthors on peer reviewed articles?
And so…

Would you support forming the proposed leadership group?

The Physics REU site director leadership group members are:

- Catherine Mader, Hope College
- Theodore Hodapp, American Physical Society
- Mario Affatigato, Coe College
- David Ernst, Vanderbilt University
- Richard Galik, Cornell University
- Steven Turley, Brigham Young University
- Sherry Yennello, Texas A&M
- Eric Black, California Institute of Technology
- Thomas Kvale, The University of Toledo
- Brad Trees, Ohio Wesleyan University
What are the Steering Committee’s plans?
What are we doing?
The conditions

The Physics REU Leadership Committee was setup with the understanding that no REU funds would be invested in its operation. This is in contrast to the model of REU Steering committees in other divisions, where an REU site is given up and the corresponding monies are used to fund the Steering committee.
Collecting data

Do you see value in pooling application information in order to gather statistics about the application and acceptance process for REU students?

One of the outstanding questions for the Physics REU program is how well it serves the undergraduate student community. One measure relates to the difficulty of getting into a site, which in turn depends on the number of unique applicants per site. We have started to gather data to calculate this parameter.
Preliminary data

Number of Physics REU sites queried: 60
Number of responses: 19
Total number of applications: 3148
Total number of unique applicants: 1868

Data courtesy of Dr. Steven Turley
Another goal of the Physics Leadership Committee is inform different constituencies about the REU program. This includes students who may wish to participate; faculty and entities that may wish to apply to become sites; and faculty and staff at existing sites that may wish to learn about the overall program and obtain information about best practices.
Discussing issues

The idea of a common deadline for accepting offers seemed logical, but it is not simple. It has to be late enough to allow for conferences where REU sites do recruitment, but not too late. It also has to accommodate the schedules of different sites.

Would you like a common deadline for accepting REU offers on the first round?

The committee has also set up a wiki page for ongoing discussions between the members, and perhaps others in the future.
Conclusions

The Physics REU Site Directors Workshop was a success. It led to some initial data gathering on the REU programs, and to the establishment of a Leadership Committee. The Committee will continue efforts to gather data and explore ideas for common endeavors and guidelines.
Acknowledgments

We would like to thank the National Science Foundation for its longstanding funding and support, the Department of Defense (DoD-Assure), site directors, the REU student participants, and other partners of the REU program.
Thanks!