

Graduate Students as Mentors in Mathematics REUs

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The purpose of this article is to address the question: How can graduate student mentors improve Research Experiences for Undergraduates (REU) programs? A typical graduate student mentor is in the early stages of graduate study and is preferably an alumnus of the REU. Graduate student mentors often live with the REU students. Their jobs can range from giving mathematical suggestions to the students, to helping people find the grocery store, to generally assisting the REU director. A graduate student mentor requires a relatively modest amount of money (on the order of a few thousand dollars for a summer), so it is highly economical to employ such students. Funding for graduate students can be budgeted as participant support costs, not as senior personnel costs, to avoid overhead and other budgetary restrictions.

Below we will describe how graduate student mentors can benefit the REU students and directors, how being a graduate student mentor benefits the mentors themselves, and how graduate student mentors strengthen REU programs. We also believe that having graduate student mentors helps develop the next generation of REU directors.

The ideas in this article are based on a group discussion about graduate student mentors at the Conference on Promoting Undergraduate Research in Mathematics (PURM) in 2006. We have also relied heavily on our cumulative personal experiences. We have all participated in REUs as both students and graduate mentors, and one of us has also served as an REU director. Our experiences occurred at the REUs at Lafayette College, DIMACS at Rutgers University, the University of Dayton, the University of Minnesota–Duluth, and the University of Notre Dame. All of these programs except Lafayette have utilized graduate student mentors.

The article [1] contains more information on the same topic.

1. Direct benefits to the undergraduate researchers

Having a graduate student mentor gives the REU students another interested person with whom to discuss their math research. Another advisor for the REU students can provide a fresh mathematical viewpoint and thus effectively reduce the student/faculty ratio. Importantly, a graduate student mentor can sometimes be more useful to the REU students than additional faculty. Since the graduate student mentor is only a few years out of college, undergraduate students typically feel more

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comfortable asking certain kinds of questions, such as “What is a graph?” or “How do I microwave a potato?” Graduate student mentors are likely to understand which parts of mathematics will be confusing to beginners, and they can also give up-to-date career advice on issues such as taking the Graduate Record Examinations (GRE) and applying to graduate schools. Graduate student mentors provide unique and useful resources to the undergraduate students.

2. Direct benefits to the REU director

Graduate student mentors play a critical role in the scientific program of an REU. They can take responsibility for some of the more mechanical aspects of supervision, thereby freeing the REU director to focus on more substantive issues.

For example, they can help REU students with LaTeX, MATLAB, and other computer systems (depending on the graduate student mentors’ specific skills). Even more importantly, graduate student mentors can assist students in the preparation of reports or papers. Graduate student mentors can also help students with their presentation skills by organizing practice sessions before formal presentations. Graduate student mentors can relieve administrative burdens on the director by handling easily delegatable jobs, such as organizing field trips or other social activities, producing a program T-shirt, and maintaining the program website.

3. Direct benefits to the graduate student mentors

Advising undergraduate students is a chance to learn how to mentor, which is an important aspect of being an academic mathematician. Graduate students rarely have other opportunities to develop this skill. Graduate student mentors also learn more about the research process by helping others discover new mathematics. In particular, mentors develop the ability to ask interesting and insightful questions—a good skill for their own future research.

In the summer between undergraduate and graduate school, students are eligible for relatively few mathematically-related work opportunities. Serving as a graduate student mentor in an REU is one notable exception.

4. How graduate student mentors strengthen an REU program

Alumni serving as mentors help preserve institutional memory of successful features in the REU program from previous summers. Program alumni also enhance networking opportunities for REU students.

Graduate student mentors can help undergraduate students adjust to a new environment for the summer. Besides practical matters (“Where is the nearest grocery store?”), the mentors can also facilitate the social life of the program. By living with REU students, the graduate student mentors feel the social pulse of the program in a way that the director cannot. Interpersonal conflicts are more easily resolved when detected early. Smooth social interactions allow everyone to increase their mathematical productivity.

References

- [1] D. K. Biss and D. C. Isaksen, *Student mentors in the Duluth mathematics REU*, Council on Undergraduate Research Quarterly **19**, no. 4, 163–167, June 2000.

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