

## Chapter 4

# Outcomes of PFF Programs

What do graduate students do in PFF programs, and how do they benefit from them? Are the outcomes the ones anticipated? Are the outcomes worth the substantial effort needed to create clusters, establish new forms of mentoring, and engage faculty members in several program components? What are the experiences and outcomes for faculty members, the departments, and the disciplinary societies?

Extensive assessment has been done on PFF, including surveys of graduate student and faculty participants by the PFF staff, case studies by program directors, surveys and interviews with PFF alumni, interviews with society leaders and graduate deans, and surveys and participant observation by commissioned expert assessors.

The results are universally positive. For example, students report that, compared to their peers, they know more about the academic profession and the variety of institutions where they may work, they know more about teaching and learning, and they are more sophisticated in their understanding of faculty roles. Partner faculty benefit from the opportunity to work with advanced graduate students, are gratified to mentor a junior colleague, gain insights from seeing another person teach a portion of their course, and feel revitalized. Graduate faculty report learning about different kinds of institutions, the changing roles of faculty, and conditions in the job market, and they appreciate the education their students receive. Almost every graduate student and faculty member who has been queried has said they would recommend PFF to others.

## Views of the PFF Directors

In connection with the science and mathematics PFF project funded by NSF and the humanities and social science PFF project funded by The Atlantic Philanthropies, an independent assessment of PFF is being conducted. So far, questionnaires have been completed by sixty-five of sixty-seven PFF program directors and by thirty-three graduate deans. Questionnaires were sent to approximately 400 graduate and 450 partner faculty in spring 2002, and surveys will be sent in fall 2002 to approximately 4,000 graduate students who have participated in PFF.

Preliminary results from the surveys of directors of PFF programs and graduate deans are that 55 percent said their programs were “very successful,” and 42 percent reported them to be “somewhat successful”; none of the programs in science and mathematics were judged to be “not successful.” When asked what aspects of their programs contributed most to their success, the following responses were cited:

- ▲ “The combination of graduate students who see the need for PFF activities in their preparation and energetic faculty members who have taken the lead in providing them, is a self-motivating, self-propelling kind of synergy.”
- ▲ “Students really like the interdisciplinary discussions and emphasis on diversity throughout our seminar series.”
- ▲ “Our program promotes graduate student interaction, autonomy, and self-development. Individuals who emerge from the process are better able to act on and talk about their futures as scholars, teachers, and faculty members.”

- ▲ “Our students have at least two full-fledged mentorships during PFF. Our partner faculty have been very high quality. Many of them have had students every year or even every semester for five years.”
- ▲ “The program conveys to students that they are being prepared to be professionals in the full sense of the term.”
- ▲ “Support from chair, graduate dean, and provost. Enthusiasm of several students involved in the program. Cooperation with partners to make this a reciprocal, mutually beneficial arrangement.”
- ▲ “The fact that PFF activities are a formal, required part of our program, not an add-on.”

As we suspected when launching this project, PFF seems to be more difficult to obtain buy-in among science and mathematics faculty than faculty in other fields. Although project directors report that graduate faculty are generally supportive of PFF, faculty support and participation in PFF is weaker in the sciences and mathematics disciplines than in the humanities and social sciences or in the university-wide programs. Although 82 percent of directors agree or somewhat agree that PFF graduate students work closely with faculty at partner institutions, the level of participation of partner institutions in PFF programs in science and mathematics was judged to be lower than for the other PFF phases. In terms of visibility for PFF in their disciplines, 82 percent of the directors said that PFF sessions at conferences or meetings had either a significant (38 percent) or limited (44 percent) impact, and 68 percent indicated that stories in society newsletters had an impact on visibility. The directors of programs in the sciences and mathematics regarded the presentations and newsletter items as producing less visibility in their societies than did those in other fields or in university-wide programs.

These findings may be the result of fewer science students planning for academic careers or the greater external funding of research that makes any departure from research more problematic in the sciences than in the other disciplines. They also suggest that additional time, strategies, and effort may be necessary to convince scientists of the value of PFF. It is important for scientists to learn from fellow scientists about their actual experiences with PFF and the benefits such programs provide for their students.

## Views of Science and Mathematics Participants

The assessment report of this PFF program in science and mathematics, prepared by Veronica Thomas (Thomas 2002), contains additional details about the experiences and outcomes for participants. Thomas attended major PFF events, interviewed disciplinary society leaders, developed a series of related questionnaires for graduate students, graduate faculty, and partner faculty, sent them to cluster participants, and analyzed and summarized the results.

Thomas received 173 completed questionnaires: ninety-nine from graduate students, forty-two from graduate faculty, and thirty-two from partner faculty. Respondents were from thirteen of the nineteen clusters in this project. The results from Thomas's surveys are consistent with previous surveys with larger samples and from additional disciplines. She instructed cluster leaders who distributed the forms to include only "central participants," not individuals who may have participated in an isolated PFF activity or event.

Thomas's overall conclusion (2) is:

[T]he participants from the three key stakeholder groups (i.e., students, graduate faculty, and partner faculty) were very enthusiastic in their support of PFF, and they generally assessed the program quite positively.

The participants felt that the program had both unique and overlapping benefits for students, faculty, the graduate department, and the cluster institution.

## Experiences of Graduate Students and Alumni

The doctoral students in Thomas's study were 58 percent male and 68 percent Caucasian. Twenty-nine percent were enrolled in chemistry or biochemistry programs, 22 percent in physics, 22 percent in mathematics or computer science, 21 percent in biology, and 6 percent in other science fields. The following sections summarize the aggregated survey responses.

**Motives and expectations for participating.** Students were asked why they decided to participate in PFF. Typical replies include the following:

- ▲ “I have a strong interest in science education and I decided that PFF would provide me with educational opportunities that otherwise would not be available.”
- ▲ “I was curious to learn about liberal arts colleges” (or, in other cases, community colleges, or simply diverse institutions).
- ▲ “I thought it would help me decide what kind of job I wanted and prepare me for the job search.”
- ▲ “Some day I would like a job, a job that fits my desires. PFF can be informative, a résumé builder, and help with teaching skills.”

A few indicated that they had little choice, as they were “encouraged” or “asked” by a faculty member to participate, or even required by one department, which saw PFF as a way to launch a new teaching assistant development program. On the other hand, some said that their faculty were not

familiar with PFF and that they learned of the opportunity only through student friends.

Ninety-five percent of the graduate students indicated that their PFF program had, to date, “met” or “exceeded” their original expectations. Given the various reasons that students are attracted to PFF programs and the early stage of the programs, this represents a positive endorsement. Student responses also compare favorably to an earlier assessment (Pruitt-Logan, Gaff, and Weibl 1998).

**Most valuable activities.** In her evaluation, Thomas asked about which PFF activities were most valuable (2002, 13). Among aspects that students reported *valuing the most* are: the diverse learning experiences provided by the program; new knowledge gained from PFF seminars, conferences, and discussion sessions; networking opportunities; exposure to different types of institutions; and opportunity to work more closely with faculty.

**Obstacles.** Evaluations of PFF programs are not all positive, and Thomas’s assessment (2002, 15) inquired into the obstacles, which she summarized: “The biggest obstacles to participation in the PFF program cited by students centered around time constraints.” Other concerns were logistics and travel, lack of information and orientation, difficulty finding a mentor, and lack of awareness among the department faculty. These are all problems that, once identified, can be addressed. Time constraints were the most unforgiving of the problems. Nonetheless, one student seemed to sum up the sense of the group by saying, “The information learned is definitely worth the time invested.”

**Outcomes.** One outcome this study sought to examine was student interest in academic careers. Fifty-six percent of those surveyed reported that

their interest in a career in the academy increased as a result of their participation in PFF. One person put it this way:

I was fairly unhappy with teaching as a result of my experience as a TA. Over the course of this quarter, seeing some of the exciting things that people do in other institutions, seeing what their classes are like, and getting a feel about how the institutions worked reminded me why I had been interested in a teaching career initially. PFF was not the only reason for this change, but it certainly was influential in getting me more excited again.

Desire for an academic career remained about the same for 40 percent of students who responded, probably because so many began PFF with an interest in becoming a faculty member. Four percent reported that their desire for an academic career decreased. Although we do not know what contributed to their decreased interest, the realization that academic life was not attractive to them was an important lesson to learn at a time when they could easily make a change in their career trajectory.

Other outcomes are captured in the following student comments.

- ▲ “There are two aspects I have gotten out of the PFF program. The first is very practical and has included advice on résumé/CV preparation, a seminar on grant writing, etc. The second aspect, which is most important, is that as a result of the graduate students getting to know each other through PFF meetings, we have all become more interested in helping each other.”

- ▲ “It has helped me to gain self-confidence in my abilities.”
- ▲ “The kind of perspectives I was exposed to, I have not encountered anywhere else in the 4.5 years I have been at [this] University.”
- ▲ “The department has a pretty narrow view of our career options. This broadens them.”
- ▲ “I believe my generation of scientists, and even more so the students at my institution, do not have a sense of what the community they are entering is really about. I think they are curious and as a result respond well to the invitation for discussion of their future.”

**Recommendations.** All constituencies were asked whether they would recommend their PFF program to others, and the results were nearly unanimous. Of the 166 respondents, 165 would recommend PFF. This is similar to earlier surveys (Pruitt-Logan, Gaff, and Weibl 1998) in which 99 percent of graduate students, graduate faculty, and partner faculty said they would recommend PFF. This remarkable uniformity of opinion is seldom seen in survey research.

**Evidence from PFF alumni.** During the three years of PFF phase 3 programs, only a few graduate students received their degrees and secured academic appointments. The following individuals credit their experience in PFF as a contributing factor in their early career success: physicist Andi Pascarella from Colorado was hired at the University of Northern Iowa; biologist Faye Grimley from Cincinnati was hired as an assistant professor with a joint appointment at Tulane University in environmental health sciences and at Xavier University in biology; mathematician Joseph Evan from Binghamton joined the faculty at King’s College; chemist Jaimielee Cohen



from Queens became an assistant professor at Pace University; and computer scientist James Hauser from Cincinnati was hired as an assistant professor at Northern Kentucky University.

A survey (DeNeef 2002) of PFF alumni who are in faculty positions provides further insight. The DeNeef survey included individuals not just in the sciences and mathematics but also in the social sciences and humanities. A total of 271 alumni were surveyed, of whom 129 returned completed questionnaires. Twenty-five respondents were interviewed by telephone.

DeNeef concluded that PFF made a difference in the experiences of these individuals in three primary ways. First, the alumni report that because of their involvement in PFF, they believe their graduate student experience was qualitatively different—and better—than it might have been. Second, they believe that PFF experiences aided them in their job search, with PFF typically credited as a central reason they received their job offers. Third, they report that what they learned through PFF helped them as new faculty members to get off to a faster and surer start than their faculty peers.

One of the more surprising of DeNeef's findings is that PFF alumni are serving as resources to their new faculty colleagues. For example, Wendy Crone, a new faculty member in engineering at the University of Wisconsin, Madison, reported that "PFF provided me with a basket of tools that I am still trying out, tools that I can pick and choose from as the need arises." This is a common outcome among PFF alumni, according to DeNeef. But in Crone's case, because she has this "basket of tools," her peers are seeking her advice on various professional matters. "I have become a *de facto* mentor to my colleagues," she observed (DeNeef, 16).

## Faculty Members

**Expectations.** Thomas (2002) reports that 92 percent of the graduate science and mathematics faculty and all of the partner faculty said that their PFF program had met or exceeded their expectations. Further, the majority of graduate faculty reported strong support from their department chair and faculty colleagues. Seventy-five percent indicated that the support of the chair for PFF was positive, and 86 percent said that faculty support was positive. These perceptions differ from the students', several of whom reported that not many faculty knew about PFF or spoke favorably of it, and that they had to obtain information about PFF from other students.

**Graduate faculty benefits.** Graduate faculty members were asked about the benefits they derived from participating in PFF, and they gave a range of answers that have been typical since the beginning of PFF.

- ▲ “Deeper understanding of the roles and responsibilities of faculty members at various institutions, as well as enormously beneficial professional development.”
- ▲ “The opportunity to get to know some students quite well; to share my ideas on teaching and to learn from them.”
- ▲ “Enthusiasm of students.”
- ▲ “One of my senior doctoral students has just become the first successful faculty placement from our PFF program.”
- ▲ “Better understanding, communication with students involved. It also helped me to single out some glitches in our graduate program that we need to work on.”

**Partner faculty benefits.** Partner faculty, too, reported that they derived a number of benefits similar to those in previous reports.

- ▲ “Great contacts, teaching ideas from the seminars I have attended, and I get reinvigorated about my own teaching.”
- ▲ “My students benefit from hearing about topics in mathematics not included in our curriculum.”
- ▲ “Contact with professors from other institutions.”
- ▲ “Human resources (adjunct faculty, laboratory supervisors, etc.) for my department.”
- ▲ “Satisfaction from helping future faculty.”

Both groups of faculty reported becoming energized or revitalized by working with PFF graduate students and reconnected with the roots of their interest in an academic career.

**Department Benefits.** There is some evidence that academic departments also benefit from PFF. Thomas (2002) asked graduate students whether the existence of a PFF program had influenced their view of the quality of their department. Slightly over half, 55 percent, said it increased their positive regard for the department, while the remaining 45 percent indicated it had no effect.

In terms of recruiting high-quality students to the department, 55 percent of the graduate faculty reported that PFF would be “definitely useful”; the rest thought it “might be.” Some students said that PFF was a factor in their choice of a graduate program, and one volunteered it was a useful recruiting device. One student in chemistry stated that “The PFF program helps us to attract better graduate [students].”

Finally, a great deal of evidence indicates that PFF develops sophisticated and savvy students who are able to navigate the job search more effectively than their peers without PFF experience. This suggests that graduates of a department with a PFF program have a competitive advantage in their initial academic job search.

Although many people say PFF is “the right thing to do,” it also seems to have strategic benefits for departments that embrace it. It can strengthen the perceived quality of the department and aid in the recruitment and placement of students. Of course, additional empirical data are needed to confirm these initial observations.

## Growing Recognition of PFF

Researchers of graduate education and faculty careers are beginning to recognize the power of PFF programs. Ann Austin (2002) summarized the research evidence in an article titled “Preparing the Next Generation of Faculty: Graduate School as Socialization to the Academic Career.” She cites PFF as a “praiseworthy exception” to the common fact that graduate students have little exposure to different faculty cultures and expectations at different types of institutions. In a publication called *Heeding New Voices*, Eugene Rice and his colleagues (2000) interviewed over 350 graduate students and young faculty, including PFF participants. The authors called future faculty preparation programs “promising practices” that help graduate students to have realistic views of an academic career.

The evidence is far from complete, about the experiences of participants and the outcomes of PFF programs, but there is growing evidence that these programs, in general, have positive outcomes for doctoral students, graduate



faculty, partner faculty, and graduate departments. That is why a brochure published by the American Association of Physics Teachers (n.d. 7) declares,

The changes precipitated by PFF programs constitute a win-win-win strategy:

- ▲ Better preparation for the doctoral students,
- ▲ Better faculty candidates for the colleges and universities that hire them, and
- ▲ Stronger, more engaging programs for doctoral degree-granting departments.

The next chapter will examine challenges that need to be overcome if PFF programs are to be sustained and continue to be a winning strategy.