4. Summary and Conclusions

This study has collected and analyzed the wide range of activities that have been undertaken by the 120 young faculty who received support through the PFF program. PFF Fellows have made considerable progress in achieving each of NSF's four GPRA policy goals. Fellows have enhanced their capacity to conduct and disseminate research, contributed their expertise to both the public and private sectors, promoted increased representation of the traditionally underrepresented in scientific fields, and collaborated with researchers and scholars in other countries. In addition, they have also had an impact on education by enhancing the quality of instruction, supporting teacher professional development, and creating scientific enrichment opportunities for K-12 students.

PFF grants provided Fellows with a flexibility that many other grants do not.

PFF grants provided Fellows with a flexibility that many other grants do not. The open-ended structure of the program enabled young scientists to accelerate the pace of their work and to explore new frontiers. Comments from several fellows interviewed for this report clearly indicated that they considered this freedom to be one of the primary benefits of their award. PFF grants also provided the facilities and equipment essential to conduct experiments and make important discoveries. In addition, in the words of one Fellow, the security that PFF afforded allowed Fellows to create strategies for influencing local, state, and national science policy without fear of reprisals.

In addition, all of the Fellows used their PFF awards to maintain or expand educational activities. The PFF program has supported curriculum development efforts, both on a small scale that involved redesigning or developing individual courses, and on a larger scale that involved redefining entire course sequences or areas of specialization. Often, curriculum development efforts were aimed at building stronger connections between research and teaching. Fellows also contributed to improved achievement by participating in outreach activities involving K-12 teachers and students. Examples included providing pre- and in-service education to teachers, creating or coordinating special enrichment programs for K-12 science students, and participating in school-wide outreach activities aimed at generating interest in science and engineering careers. Fellows also promoted increased representation of the groups underrepresented in science and education fields. Female or minority students were drawn into PFF-supported research projects, provided opportunities to learn the fundamentals of research, and offered career guidance. In some cases, special minority programs were created and coordinated by Fellows.

This study has also provided NSF with fundamental insights about the benefits of providing a small cadre of accomplished young faculty with flexible and stable funding for an extended period. These activities, and the corresponding achievements, clearly transcended traditional improvements in teaching practices and research activities. In addition, interviews with a sample of Fellows suggest that the program's direct and indirect impacts (e.g., on teaching practices, on innovative research that leads to important discoveries, and on promoting careers in science and engineering) endure long after PFF funds expire.

The Foundation is continuing its commitment to support young faculty members. As it moves ahead, it will continue to face a series of choices about how best to support the young faculty of the 21st century. The process used to inform these decisions will benefit from a structured and standardized assessment of the different approaches that can be used to promote young faculty. The Foundation has recently taken two important steps to enhance the rigor of data collected about tenure-track faculty who receive NSF support. First, a study will obtain valuable information about the activities and achievements of tenure-track faculty who have received funding through CAREER and PECASE. Second, the Foundation's FastLane system, designed to obtain standardized data across *all* NSF programs, will collect some of the data needed to assess activities and impacts among future NSF-supported tenure-track faculty.

In addition to these important and timely activities, we recommend that a structured annual collection activity be developed specifically for programs that support young faculty (a number of NSF programs are electing to conduct additional annual collection activities to obtain information not covered by FastLane). Such a system would facilitate the Foundation's efforts to more reliably quantify and assess the range of activities and accomplishments among NSF-supported tenure-track faculty. It would also increase NSF's capacity to make timely and accurate reports to Congress about program impacts.

Finally, NSF might consider administering a slightly modified version of the CAREER survey to the 120 Fellows who were funded through PFF. This would enable the Foundation to assess the relative impacts of two programs that used diverse strategies to address a common purpose. Comparing activities and impacts across PFF and CAREER would provide timely insights on maximizing NSF's future support of young scholars.

In addition, interviews with a sample of Fellows suggest that the program's direct and indirect impacts endure long after PFF funds expire.

Appendix A:

Tenure-Track Faculty Who Received a PFF Grant

Presidential Faculty Fellows by Name

1992

NAME	INSTITUTION	DISCIPLINE
Chiye Aoki	New York University	Neurosciences
Morton Barlaz	NC State University	Environmental Engineering
Wolfgang Bauer	Michigan State University	Nuclear Physics
Gary Bernstein	University of Notre Dame	Electrical Engineering
Shira Broschat	Washington State University	Electrical Engineering
Carlos Castillo-Chavez	Cornell University	Applied Mathematics
David Culler	University of CA-Berkeley	Computer Architecture
Aaron Ellison	Mount Holyoke College	Marine Ecology
Jose Escobar	Cornell University	Mathematics
Erich Everbach	Swarthmore College	Mechanical Engineering
Lance Fortnow	University of Chicago	Computer Science
Susan Foster	University of Arkansas	(not available)
Peyman Givi	SUNY-Buffalo	Electrical Engineering
Louis Guido	Yale University	Electrical Engineering
Robert Hamers	University of WI-Madison	Chemistry
Lars Hernquist	University of CA-Santa Cruz	Astronomy/Astrophysics
Chris Jacobsen	SUNY-Stony Brook	X-Ray Optics
James Kadonaga	University of CA-San Diego	Biochemistry/Genetics
Louise Kellogg	University of CA-Davis	Geophysics
Mark Law	University of Florida	Computer Engineering
Mary Lowe	Loyola University	(not available)
Emir Macari	Georgia Inst. of Tech.	Civil Engineering
John Mitani	University of Michigan	Anthropology
Gerard Parkin	Columbia University	Chemistry
Theodore Rappaport	VPI	Computer Engineering
Rebecca Richards-Kortum	University of TX-Austin	Biomedical Engineering
Athan Shaka	University of CA-Irvine	Physical Chemistry
David T. Yue	Johns Hopkins University	Biomedical Engineering
Lucy Ziurys	Arizona State University	(not available)
David Zumbrunnen	Clemson University	Mechanical Engineering

Presidential Faculty Fellows by Name

1993

NAME	INSTITUTION	DISCIPLINE
Claire Aelion	University of South Carolina	Environmental Engineering
Joy Bergelson	University of Chicago	Ecology
Joel Blum	Dartmouth College	Geochemistry
Ronald Brisbois	Hamline University	Organic Chemistry
Ingrid Burke	Colorado State University	Ecosystem Ecology
Siu-Wai Chan	Columbia University	Materials Engineering
John Coulter	Lehigh University	Mechanical Engineering
Soura Dasgupta	University of Iowa	Systems Theory
Joseph DeSimone	University of NC-Chapel Hill	Polymer Chemistry
Brian Fabien	University of Washington	Mechanical Engineering
Ephrahim Garcia	Vanderbilt University	Dynamic Systems/Controls
Raymond Goldstein	Princeton University	Physics
Anne Grauer	Loyola University	Physical Anthropology
Wassim Haddad	Florida Inst. of Tech.	Mechanical Engineering
John Hamer	Purdue University	Molecular Genetics
Chung-Chieh Kuo	University of Southern CA	Scientific Computing
Thomas Kurfess	Georgia Inst. of Tech.	Mechanical Engineering
Hilary Lackritz	Purdue University	Chemical Engineering
Gilles Laurent	CA Institute of Tech.	Neurosciences
Susan McConnell	Stanford University	Developmental Neurobiology
Lenore Mullin	University of MO-Rolla	Computer Science
Margaret Murnane	Washington State University	Physics
Bruce Novak	University of CA-Berkeley	Polymer Chemistry
Robin Pemantle	University of WI-Madison	Mathematics
Zorana Popovic	University of CO-Boulder	Electrical Engineering
Jerry Prince	Johns Hopkins University	Biology
Stuart Shieber	Harvard University	Computer Science
Louis Tassinary	Texas A&M University	Psychophysiology
Quentin Williams	University of CA-Santa Cruz	Geophysics
Cheng Zhu	Georgia Institute of Tech.	Bioengineering

Presidential Faculty Fellows by Name

1994

NAME	INSTITUTION	DISCIPLINE
Sunil Agrawal	Ohio University	Mechanical Engineering
Thomas Anderson	University of CA-Berkeley	Computer Operating Systems
Brian Bershad	University of Washington	Computer Science/Engineering
Christopher Bowman	University of CO-Boulder	Chemical Engineering
Collin Leslie Broholm	The Johns Hopkins University	Physics
Curt Burgess	University of CA-Riverside	Cognitive Psychology
C.J. Chang-Hasnain	Stanford University	Electrical and Communications Systems
Gregory Chirikjian	Johns Hopkins University	Mechanical Engineering
James Clark	Duke University	Botany
Marcelo Gleiser	Dartmouth College	Physics
Andrew Granville	University of Georgia	Mathematics
Leslie Kaelbing	Brown University	Computer Science
Jon Kellar	SD School of Mines/Tech	Metallurgical Engineering
Bradley Lehman	Mississippi State University	Electrical Engineering
Jennifer Lewis	University of IL-Champaign	Materials Science
Yilu Liu	VPI	Electrical Engineering
Markus Meister	Harvard University	Neurobiology
Jun Ni	University of Michigan	Manufacturing Engineering
Chikaodinaka Nwankpa	Drexel University	Power Systems
Derrick Rollins	Iowa State University	Chemical Engineering/Statistics
David Schatz	Yale University	Immunobiology
Caro-Beth Stewart	SUNY-Albany	Molecular Evolution/Biochemistry
Lars Stole	University of Chicago	Economics
Lori Todd	University of NC-Chapel Hill	Environmental Sciences
Alan Willner	University of Southern CA	Electrical Engineering
Astar Winoto	University of CA-Berkeley	Molecular Biology
Peter Wipf	University of Pittsburgh	Chemistry
Charles Woodward	University of Wyoming	Physics/Astronomy
Xiao-Hai Yan	University of Delaware	Ocean Remote Sensing
John Zhang	New York University	Theoretical Chemistry

Presidential Faculty Fellows by Name

1995

NAME	INSTITUTION	DISCIPLINE
Christina L. Bloebaum	SUNY-Buffalo	Computer-Integrated Design Engineering
Margaret Carreiro	Fordham University	Ecology
Noel T. Clemens	University of Texas-Austin	Thermal Systems
Maria R. Coleman	University of Arkansas	Chemical Engineering
Xing-Wang Deng	Yale University	Molecular/Plant Ecology
Charalabos C. Doumanidis	Tufts University	Manufacturing Processes
Kathleen R. Foltz	University of California-Santa Barbara	Developmental Biology
Marija Gajdardziska-Josifovska	University of Wisconsin-Milwaukee	Condensed Matter Physics
Kenneth Y. Goldberg	University of California-Berkeley	Computer Sciences/Robotics
Jonathan H. Gruber	MIT	Economics
Janet G. Hering	University of California-Los Angeles	Environmental Engineering
Christopher R. Johnson	University of Utah	Computer Sciences
Peggy A. Johnson	University of Maryland-College Park	Civil Engineering
George W. Kling	University of Michigan-Ann Arbor	Ecosystem
Cato T. Laurencin	Medical College-Pennsylvania	Bioengineering
Jing Li	SUNJ-Rutgers	Material Sciences/Chemistry
Sheng Liu	Wayne State University	Mechanical/Aerospace Engineering
Gareth H. McKinley	Harvard University	Chemical Engineering
John W. Nielsen-Gammon	Texas A & M University	Meteorology
James S. Nowick	University of California-Irvine	Chemistry
Erin K. O'Shea	University of California-San Francisco	Biochemistry/Genetics
Mehmet C. Ozturk	North Carolina State University	Electrical Engineering
Athina P. Petropulu	Drexel University	Electrical Engineering
Daniel N. Rockmore	Darthmouth College	Mathematics
Margaret S. Saha	College of William & Mary	Development Neurobiology
David H. Salesin	University of Washington-Seattle	Computer Science & Engineering
John J. Salzer	Wesleyan University	Astronomy
Mats A. Selen	University of Illinois-Urbana-Champaign	Experimental Particle Physics
Jennie Si	Arizona State University	Electrical Engineering
Nancy B. Songer	University of Colorado-Boulder	Research in Science Education

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