



Applications Wanted: NSF Graduate Research Fellowships

Meredith Berthelson and Jennifer Slimowitz Pearl

Many students getting ready to graduate with their baccalaureate degree contemplate graduate studies or are planning to continue their education. One of the major obstacles can be funding: students who have just finished their undergraduate education may not want to add more tuition bills to the pile. If only there were a way to help them continue their education and execute some of the research that they wish to do. Ah, but there is! One of the most valuable funding mechanisms for mathematics and statistics graduate students is the National Science Foundation's (NSF) Graduate Research Fellowship Program (GRFP). The director of the Division of Mathematical Sciences at NSF, Sastry Pantula, stated, "[The] NSF Graduate Research Fellowship (or an Honorable Mention in the competition) is certainly a feather in any future scientist's cap! There are many well-qualified mathematics and statistics students in this country, and I would love to see many, many more of them take advantage of this excellent opportunity."

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What are the key elements of the fellowship? It is a five-year award that is worth US\$126,000. The NSF Graduate Fellow receives three years of support (usable over a five-year period). For each of these three years, the Fellow receives a US\$30,000 stipend, and the graduate institution receives a US\$12,000 educational allowance to cover tuition and all required fees. The Fellow also has access to international research opportunities and to supercomputing resources.

To be eligible, an applicant must be either a U.S. citizen, national, or permanent resident and be an early-career graduate student pursuing a research-based master's or doctoral degree in an NSF-supported field. In mathematical and statistical sciences, the following categories are included: Algebra, Number Theory, and Combinatorics; Analysis; Applied Mathematics; Biostatistics; Computational and Data-Enabled Science; Computational Mathematics; Computational Statistics; Geometric Analysis; Logic or Foundations of Mathematics; Mathematical Biology; Probability; Statistics; Topology; or Other (related fields not included in the list). Applicants must be planning to enroll in an accredited institution in the United States by the fall following the announcement of the award. Anyone who has already received a graduate degree is not eligible.

Adam Kapelner, Nicholas Brubaker, and Gina-Maria Pomann, three current NSF Graduate Fellows, hammer home the importance of some of these requirements. Adam received his bachelor's degree in mathematics and computer science at Stanford University and is currently working on his Ph.D. in

Tips for Students

To enter the competition, you need to submit a complete application via NSF FastLane (<https://www.fastlane.nsf.gov/grfp>). The application consists of a personal statement, description of previous research experience, proposed plan of research, and transcripts. In addition, three letters of reference must be submitted separately via FastLane by the reference writers. Reviewers evaluate the applications on the basis of the two National Science Board criteria: Intellectual Merit and Broader Impacts. For Intellectual Merit, you will need to demonstrate your academic capability and other conventional requisites for scholarly, scientific study. Details such as the ability to plan and conduct research, work on a team as well as independently, and interpret and communicate research are useful. To demonstrate Broader Impacts, convey how your research will contribute on a larger scale to society and the breadth of its audience. Will it encourage diversity, broaden opportunities, and allow participation of all citizens in science and research? If so, this should be evident to the reviewer. Examples of Broader Impacts activities may be accessed at <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

When preparing the application, you should be clear and specific so that the reviewer doesn't struggle as he or she is reading the application. Describe your experiences—whether they are personal, professional, or educational—that have been factors in your preparation and that have driven you to pursue graduate study. Be detailed about your involvement in any scientific research activities and what you learned from those experiences. If you have not been involved with any direct research, then describe any activities that you believe have prepared you to start research. Also, don't make the reader try to glean from your writing that you "could" be a leader in some capacity. Instead, describe your leadership potential directly. How do you see yourself contributing to research, education, and innovation? Provide the reviewers with a picture of your career aspirations and specific goals you hope to accomplish. You need to sell yourself in your application.

statistics at the Wharton School of the University of Pennsylvania. His research involves machine learning and model selection. He says the GRFP gave him time to immerse himself in his research and, as a result, to submit and publish his work in various journals. He is helping lead the charge in assisting interested students in his department with their applications to the GRF. When asked what advice Adam could give students applying to the GRF, he stated his best recommendation would be for candidates to describe their research experience. "Can you make an impact in science? You need to illustrate your potential in research." He also acknowledged that he heard about the fellowship through a friend who thought it might be beneficial when applying to graduate school.

Nicholas Brubaker is on track to graduate with his Ph.D. in applied mathematics in 2013 from the

University of Delaware. His research focuses on modeling soap films interacting with electric, magnetic, and gravitational fields. Nicholas attended Millersville University in Pennsylvania, where he received his bachelor's degree in mathematics with a focus on applied mathematics. As with Adam, the GRF has given Nicholas not only time to do his research but also the opportunity to publish two papers and to have another two manuscripts in review. Nicholas's advice to students interested in applying is to give yourself time and to keep trying. "Apply as many times as you can! If you don't get it the first time, don't get discouraged." He also stated that even if a student does not receive the GRF, the application process is still helpful, as it helps one plan for a graduate career.

Gina-Maria Pomann is pursuing her Ph.D. in statistics at North Carolina State University. Her research interests are functional data analysis with applications to magnetic resonance imaging and dynamic treatment regimens. She feels that the GRF, in combination with her AT&T Labs Fellowship, has allowed her to work on an array of different projects as well as with different mentors. Gina-Maria started out earning an A.S. degree from Middlesex County College and then transferred to the College of New Jersey, where she earned her bachelor's in mathematics with a minor in statistics. Gina first learned about graduate school and the GRF at the Mathematical Sciences Research Institute Undergraduate Program (MSRI-UP). MSRI-UP also took Gina and her fellow participants to a Society for Advancement of Chicanos and Native Americans in Science (SACNAS) conference, where the students were further informed about the GRF as well as other opportunities. Her advice to students seeking a GRF is, "Get as much undergraduate research experience as possible!" She states that her early research experiences helped her focus her research interests and helped her to write her GRF application.

For the official NSF solicitation, visit the Division of Graduate Education website http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=6201. For more information and tips from awardees and reviewers, go to the GRFP website at <http://www.nsfgrfp.org> or contact: 1-866-NSF-GRFP (673-4737), email: info@nsfgradfellows.org. For access to the online applications, user guides, and other official announcements, logon to the FastLane website at <https://www.fastlane.nsf.gov/grfp/>. The next deadline for applications for GRFs in the mathematical sciences is **November 13, 2012**.