

Competing for the NSF Graduate Research Fellowship

Why Apply?

- \$30,000 stipend for 12 months, for 3 years (over 5 year period)
- Free tuition (institution gets \$10,500)
- Can be taken just about anywhere, including outside US
- \$1,000 travel allowance
- TeraGrid supercomputer access
- Huge prestige (22 Nobel Prize winners)

Why Apply?

- Great way to begin to master the ins-and-outs of NSF
- This will be of lasting benefit to your future career as a professional scientist/engineer

When to Apply

- In senior year or as beginning grad student
- But, no later than 12 months of full time graduate study
- Can apply three times

For 2010

- About 1650 awards
- About 2700 honorable mentions
- Vast majority in engineering, life and physical science, math, computer science (some psychology and social sciences also)

For 2010

- Expected awards in
 - Engineering: 520
 - Life science: 420
 - Physics: 100
 - Chemistry: 100
 - CS: 120
 - Geology: 70
 - Math: 70
 - Other: 250

Your Chance of Success

- Award
 - 10% (same for all disciplines)
- Honorable Mention
 - 17% (same for all disciplines)

What's the Competition?

- Applicant is judged against students in same discipline and with the same level of seniority
- Applicant's institution doesn't matter -- being a student at USU doesn't disadvantage you (it might actually help)

Who Needs Harvard?

- In last 12 years, USU students have received 19 awards and 20 honorable mentions
- 20 in engineering, 8 in biology/ecology, 4 in CS, 3 in chemistry, 3 in physics, 1 math

NSF's Purpose

- Ensure vitality & diversity of technological workforce
- Enhance research, teaching, & innovation in science & engineering
- Maintain & advance technological infrastructure & national security

Eligibility

- Must have a BS or BA prior to fall semester
- Must enroll in a PhD or research-based MS program
- Must be a US citizen, US national, or permanent resident

You *will* Automatically Fail

- IF you don't follow *every rule* in the 14 page *Program Solicitation* and the 83 page *Applicant User Guide*
- http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=6201 (NSF)
- <http://www.nsfgrfp.org/> (ASEE)

You *will* Automatically Fail

- With a 10% success rate NSF looks for any excuse to reject an application
- Read *every* (relevant) word and follow *every* (relevant) instruction

Deadlines

- Depends on discipline
- Either first or second week in November
- Most material is submitted electronically by NSF's FastLane system (it's good and easy to use)
 - Exceptions: transcripts and GRE scores
- No later than 5 PM local time on deadline day
- Don't wait until the deadline day -- FastLane is notorious for delays on deadline days

What is Submitted?

- Personal information forms (by applicant)
- Field of Study (by applicant)
- Three essays (by applicant)
- Three reference letters (by writers)
- GRE scores (by ETS)
- Transcripts (by undergrad school(s))

Essays

- Personal Statement
- Previous Research Experience
- Proposed Plan of Research

Essays: Rewrite, Rewrite, ...

- Turn on (and attend to) your spell and grammar checker, please
- Eschew passivity!
- Have your essays critiqued by a *competent* reader -- don't take it personally

Essays: Don't be Foofy!

- *Foofy* -- Vague, evasive, betraying lack of mastery and confidence; exaggerated claim without evidence
- *Foofy example*: “Nanotechnology promises enormous economic benefits.”
- *Less foofy*: “Smith, writing in the Wall Street Journal, estimates that nanotechnology will have a \$100 billion impact on the world economy in five years [ref].”

Essays: Picky Rules

- 8.5x11 inch page size
- Times New Roman font
- 12 point font size
- 1 inch margins
- At least single spaced
- No more than two pages including references, citations, charts, and images

Personal Statement

- NSF Fellows are expected to become knowledge experts and leaders who can contribute significantly to research, education, and innovations in science and engineering.
- The purpose of this essay is to demonstrate your potential to satisfy this requirement. Your ideas and examples do not have to be confined necessarily to the discipline that you have chosen to pursue.
- You ***MUST*** provide specific details in this essay that address ***BOTH*** the NSF Merit Review Criteria of Intellectual Merit and Broader Impacts in order for your application to be competitive.

What is *Intellectual Merit*?

- The intellectual merit criterion includes demonstrated intellectual ability and other accepted requisites for scholarly scientific study, such as the ability (1) to plan and conduct research; (2) to work as a member of a team as well as independently; and (3) to interpret and communicate research findings.

What is *Broader Impact*?

- The broader impacts criterion includes contributions that (1) effectively integrate research and education at all levels, infuse learning with the excitement of discovery, and assure that the findings and methods of research are communicated in a broad context and to a large audience; (2) encourage diversity, broaden opportunities, and enable the participation of all citizens-women and men, underrepresented minorities, and persons with disabilities-in science and research; (3) enhance scientific and technical understanding; and (4) benefit society.
- Applicants may provide characteristics of their background, including personal, professional, and educational experiences, to indicate their potential to fulfill the broader impacts criterion.
- <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>

Personal Statement

- Describe any personal, professional, or educational experiences or situations that have prepared you or contributed to your desire to pursue advanced study in science, technology, engineering, or mathematics.
- Describe your competencies and evidence of leadership potential.
- Discuss your career aspirations and how the NSF fellowship will enable you to achieve your goals.

Previous Research Experience

- Describe any scientific research activities in which you have participated, such as experience in undergraduate research programs, or research experience gained through summer or part-time employment or in work-study programs, or other research activities, either academic or job-related.
- Explain the purpose of the research and your specific role in the research, including the extent to which you worked independently and/or as part of a team, and what you learned from your research experience.
- List any publications and/or presentations made at national and/or regional professional meetings.

Previous Research Experience

- If you have no direct research experience, describe any activities that you believe have prepared you to undertake research.
- You **MUST** provide specific details in this essay that address **BOTH** the NSF Merit Review Criteria of Intellectual Merit and Broader Impacts in order for your application to be competitive.

Proposed Plan of Research

- In a clear, concise, and original statement, present a complete plan for a research project that you plan to pursue while on fellowship tenure and how you became interested in the topic.
- Your statement should demonstrate your understanding of research design and methodology and explain the relationship to your previous research, if any.
- You ***MUST*** provide specific details in this essay that address ***BOTH*** the NSF Merit Review Criteria of Intellectual Merit and Broader Impacts in order for your application to be competitive.

Proposed Plan of Research

- Format: Include the title, key words, hypothesis, research plan (strategy, methodology, and controls), anticipated results or findings, and literature citations. If you have not formulated a research plan, your statement should include a description of a topic that interests you and how you propose to conduct research on that topic.
- In addition to review of the Intellectual Merit and Broader Impacts of your proposal, research topics discussed in your proposed plan will be used to determine eligibility. Refer to the Field of Study eligibility criterion in the program announcement.

A Very Helpful Website

- <http://rachelcsmith.com/academics/nfs.htm>

Graduate Record Exams

- General exams
 - Analytic writing
 - Verbal reasoning
 - Quantitative reasoning
- Taken by computer on campus essentially any time
- Subject exams
 - None in engineering or geology
- Paper exam taken in October or November

Graduate Record Exam Scores

- They say “optional” but they don’t really mean it
- Submit scores for both general exams and the subject exam (if available)
- Deadline: scores have to be at NSF by the last week in November
- Have to be submitted by ETS

Three Reference Letters

- Due first week in December
- Submitted electronically
- Focus has to be on research potential

Instructions for Letters

- 1. Please include the name of your department and institution, and tell us how long you have known the applicant, and in what capacity.
- 2. Using your knowledge of the applicant's past and current research experience and activities, please comment on his/her potential to (a) succeed in graduate school, (b) conduct original research, (c) communicate effectively, (d) work cooperatively with peers and supervisors, and (e) make unique contributions to his/her chosen discipline and to society in general.

Instructions for Letters

- 3. If you have known or supervised other NSF Graduate Research Fellows, please compare this applicant to them. Otherwise, please compare this applicant to other successful graduate students or senior undergraduates that you have known in your institution or through your interactions with other institutions.
- 4. Please comment on the broader impacts of supporting this applicant, including his/her leadership potential in the chosen field of graduate work and in general, as a member of the scientific/technical community.
- Please note that the more specific (as opposed to generic) a letter you can provide, the better it is for the candidate. If you are the candidate's research supervisor, then please comment on the originality of his/her proposal, and what role you played in assisting the student with the proposal. The NSF GRF review criteria are summarized below for your convenience.

Help your Letter Writer

- GIVE AT LEAST 6 WEEKS NOTICE
- Supply a CV & a transcript
- Supply copies of your (probably still evolving) essays
- Supply a bullet list of points he/she might write about

GOOD LUCK

- No pain, no gain
- The reward is worth it