National Science Foundation Graduate Research Fellowships
Tips for Compiling an Application

There are 3 important sources for information on the NSF GRF applications:

- the NSF GRF Program user-friendly website: http://www.nsfgrfp.org/;
- the official program solicitation: http://www.nsf.gov/pubs/2010/nsf10604/nsf10604.pdf;
- the application and instructions at Fastlane: https://www.fastlane.nsf.gov/grfp/Login.do.

What is an NSF GRF?

- Supports graduate study leading to *research*-based master's or doctoral degrees (clinical or practice-oriented degree programs are not eligible)
- For the early stages of graduate study: applicants *cannot have completed* more than one year of graduate study (but they can apply while in the first term of their second year in a graduate program)
- Applicants must be US citizens or nationals, or permanent resident aliens
- Eligible fields: Mathematical Sciences, Computer and Information Sciences, Social Sciences, Psychology, Geosciences, Life Sciences, Chemistry, Physics, Astronomy, Engineering.

NSF Graduate Research Fellowships consist of:

- Three years of support that can be extended over five years
- $30,000 Stipend per year
- International research opportunities
- Supercomputer access
- **Over 2000 NSF GRFs will be awarded for AY 2011-12**.

Components of an NSF GRF Application

- Personal statement essay
- Previous research experience essay
- Proposed plan of research essay
- Transcripts
- Three letters of reference

Essay format requirements:

- maximum length of each: **2 pages**, *including* all references, citations, charts, figures and images
- 8.5" x 11" page size
- 12 pt Times New Roman Font
- 1" margins on all sides
- single-spaced or greater

The two criteria that ***must*** be addressed in each essay (and should be addressed in the letters of reference): ***Intellectual Merit*** **and** ***Broader Impact.*** PLEASE NOTE: In the 2010 official program solicitation there is a ***new emphasis on global/international connections and engagement*** (if you have studied abroad, think about how to weave that into at least one of the required essays): "While applicants must enroll in a US-based institution, NSF encourages graduate students to establish collaborative relationships with international researchers. US

graduate students should have the opportunity to take advantage of expertise, facilities, data, and field sites located abroad; to develop an international network of collaborators early in their career; to address problems of a global nature that require international cooperation; and to be prepared to operate successfully in international teams as they join the US science and engineering workforce."

INTELLECTUAL MERIT

Points to address	***Questions posed in the official NSF GRFP Program Solicitation***
Significance of the research	"How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?"
Applicant's qualifications: academic record research experience publications/presentations	"How well qualified is the proposer (individual or team) to conduct the project?"
Originality and creativity of the research idea	"To what extent does the proposed activity suggest and explore creative, original, or potentially *transformative* concepts?"
Soundness and rigor of the methodology	"How well conceived and organized is the proposed activity?"
Demonstrate that you are in the appropriate institution/program to pursue the proposed plan of research	"Is there sufficient access to resources?"
Consider possibilities for international/global activities/connections	"If international activities are proposed, are the proposed activities relevant and do they benefit the applicant?"

BROADER IMPACTS

Points to address	***Questions posed in the official NSF GRFP Program Solicitation***
Benefits to education that will result from the proposed research; integration of research & education at all levels	"How well does the activity advance discovery and understanding while promoting teaching, training, and learning?"
Inclusion of and outreach to underrepresented and diverse groups	"How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?"
Enhancement of infrastructure for research and education	"To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?"
Plans to communicate the research effectively to broad audiences	"Will the results be disseminated broadly to enhance scientific and technological understanding?"
Potential benefits to society	"What may be the benefits of the proposed activity to society?"

Proposed Plan of Research Essay

"In a **clear**, **concise** and **original** statement present either a concrete research plan or a description of a researchable topic that interests you and how you would propose to conduct research on it. . . . **You MUST provide specific details in this essay that address BOTH the NSF criteria of Intellectual Merit and Broader Impacts."**

The parts of the essay: (use boldface headings to guide the reviewers to the required essay sections)

Title

Keywords

Hypothesis (State research question; describe research problem)

- Document the background to and justification for this study (cite the key literature)
- Demonstrate that the proposed research is
  - Significant
  - Original
  - Potentially transformative
- Questions to consider:
  - Does the proposed research address a significant problem or need?
  - What is its scope—local, national, global?
  - If the research proposed extends an established line of research, does the literature point to unsolved problems, knowledge gaps, contradictions in findings, or need for further study?
  - If the proposed plan is a creative concept, does it address NSF priorities, emerging trends, or global or interdisciplinary STEM issues?

Research Plan

- Explain methodology
- Describe strategy/techniques
- Controls
- Questions to consider:
  - Are the proposed methods rigorous?
  - Is the process/steps clear?
  - Is it doable?
  - Have you considered potential pitfalls or limitations?
  - Is your research plan appropriate for the research question or hypothesis?
  - Do you have the abilities to conduct the proposed research?
  - Are you in an institution/program/have faculty advisor that can provide the appropriate support for the research?

Anticipated Results/findings

Intellectual Merits and Broader Impacts

Literature Citations

Previous Research Experience Essay

You MUST provide specific details in this essay that address BOTH the NSF criteria of Intellectual Merit and Broader Impacts (efforts to advance scientific knowledge or education, support diversity, benefit society).

- Describe any scientific research activities in which you have participated (even those not related to your proposed research).
  - Describe undergraduate research experience or research in summer programs or part-time employment. Consider methods courses; projects and lab work; assistantships; employment; summer programs and internships; field research; study abroad or international engagement
- Explain the purpose of the research

    - What were the key questions, methodology, findings and conclusions?
- Describe your specific role and responsibilities in the research
    - Did you work independently or as part of a team? To what degree? (Show that you are self-motivated and self-disciplined, resourceful and creative at problem solving; capable of leadership but also a good collaborator—cooperative, reliable, contributing team member.)
- What did you learn from your previous research experience?
    - Mention special research skills/techniques you acquired--like programming, data analysis
    - Awareness of research ethics, responsible conduct of research protocols
    - Publications; presentations; any public outreach to diverse audiences?
- If you have no direct research experience, describe any activities/life experiences that you believe have prepared you to undertake research (if there good reasons why you were unable to acquire research experience, explain).
- If your research experience or skills are inadequate for your proposed research, state your willingness to learn the necessary methods/skills/technology and provide a past example of how you have been proactive in addressing gaps in your training
- At the end of the essay, list any publications, presentations, poster sessions made at national and/or regional professional meetings, awards, recognition, etc.
- Possible approaches to this essay:
    - Chronological description of research experiences
    - Describe your most meaningful research experience, then analyze what you learned, what it involved
    - Describe significant research skill(s) that you have acquired and how you applied it/them in the past

Personal Statement Essay

You MUST provide specific details in this essay that address BOTH the NSF criteria of Intellectual Merit and Broader Impacts.

"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." (Show, don't tell.)

- What are you passionate about in your research area and why? What motivates you? How motivated are you? Give evidence of your drive to acquire knowledge and skills beyond the classroom.
- Give evidence of your analytic abilities and insight
- Show your curiosity and creativity and resourcefulness in problem solving: your willingness to test new ideas, to risk failure and to learn from it
- What personal and individual strengths do you have?
- Describe your competencies
    - What transferable skills and other qualities do you have that will make you an exemplary professional? E.g., effective communication skills, self-discipline, good time management, proactive, aptitude for teamwork
- Give evidence of your leadership potential: what leadership skills and unique characteristics do you bring to your field?
- Discuss your career goals and how an NSF GRF would contribute to them: consider both intellectual merits and broader impacts

Note: The NSF GRF application is **submitted online** through *FastLane*.

For more information, see your faculty mentor and the **CUSE Fellowships Office**
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