

National Science Foundation Graduate Research Fellowship Program

Background on the NSF GRFP

- The purpose of this award is to support the graduate education of young scientists who have demonstrated potential for significant achievements in science and engineering research.
- The long-term goal of the program is to ensure the vitality and diversity of the scientific and engineering workforce. To this end, the NSF GRFP focuses on the *Intellectual Merit* and the *Broader Impacts* of the trainees they support (more on these below).
- Applicants are evaluated largely on their potential in science as an individual, not on the merit of the specific research plan.
- Currently, Fellows receive a stipend of \$34,000 and a cost-of-education allowance of \$12,000 to the degree-granting institution every year for three years, some funding for research travel and internships, and access to an NSF-maintained supercomputer.
- Applicants with Honorable Mention also receive access to the supercomputer.

Who can apply for an NSF GRF?

Eligibility

- Applicants must be U.S. citizens, nationals, or permanent residents.
- Applicants must be either in the final year of a bachelor's program, the first year of graduate studies, or at the beginning of their second year of graduate studies.
- Applicants may only apply to GRFP once while in a graduate degree program.
- Students with graduate degrees are not eligible (exception: it has been at least two years since receiving bachelor's, bachelor's-master's, or professional degree).

Applicants must be working in an area supported by the NSF:

- Trainees in the mathematical, physical, biological, engineering, and behavioral and social sciences, including the history of science and the philosophy of science.
- Research with goals directly related to human disease is not funded.

How do you apply for an NSF GRF?

Applicants must apply using FastLane (<https://www.fastlane.nsf.gov/fastlane.jsp>)

The application consists of two essays, 3 letters of recommendation, transcripts, and a resume.

All application materials are evaluated based on *Intellectual Merit* and *Broader Impacts*. The program solicitation strongly recommends using these terms for section headings in the essays.

Intellectual Merit: *the potential to advance knowledge.* How well-prepared are you to plan and conduct research, work independently and as a team, and interpret and communicate research?

Broader Impacts: *the potential to benefit society.* Have you demonstrated a commitment to serving your community through activities like mentoring, outreach, or developing resources that can broadly benefit society? The NSF is particularly interested in work that improves representation of underrepresented groups in STEM, increasing public scientific literacy, and promoting collaborations between academia and industry.

Proposed Plan of Research

The overall format is similar to the Specific Aims page of a longer grant, plus Broader Impacts. The page limit is 2 pages, including figures and citations.

The plan must be for *basic* research, not translational research. If the project has a translational element, it should be excluded or spun in a way that basic science is at the forefront (e.g. instead of studying cancer, use cancer cells as a model system to study a basic science topic).

The Proposed Plan of Research primarily functions to demonstrate your capacity to plan and communicate a research project – they’re funding *you* as a trainee, not the project itself. Don’t feel limited to proposing your actual thesis research.

GRFP Research Statements usually contain the following information:

- *Background* (usually one to two paragraphs)
 - This section might be titled “Intellectual Merit.”
 - Why is the overall topic interesting? What do we already know about the topic?
 - What is the gap in the research that your project will fill?
 - What training/resources make you particularly suited to address this question? (this can also go in a “Conclusion” section at the end of the essay)
- *Hypothesis / Overview of Aims* (usually one to three sentences)
 - Have a clearly defined experimental question that can be explored in 2-4 years.
 - In general, hypothesis-driven research is preferred over exploratory research.
 - Strive to make your aims interrelated but not interdependent (ask yourself: if Aim 1 fails, will I still be able to implement Aim 2?)
- *Aims* (half to the majority of the essay)
 - What is the motivation for answering this question?
 - What experiments are proposed? Unless you propose a novel or rare method, just naming the technique is usually sufficient. If you propose a novel or rare method, explain it enough to be understood and justify that you’ll be able to implement it (e.g. your lab has specialized expertise in the area)
 - What are the expected results and how will they be interpreted?
 - Think about any potential pitfall to the proposed experiments. If those pitfalls would be obvious to a reviewer, you should briefly state the possibility and propose a “backup” plan. If the pitfalls are unlikely (e.g. your lab has relevant expertise), but you have space to discuss them, addressing them will increase the reviewer’s confidence in your ability to anticipate and overcome experimental challenges.
- *Broader Impacts* (usually one paragraph)
 - Will this work benefit society by creating/improving a resource for use outside of academia? (this is where you can address translational applications of your work)
 - Will this work benefit society by improving participation of underrepresented minorities in STEM or improving public scientific literacy? (e.g. will you mentor junior scientists in the lab, present about your work to the public, etc?)
- *Citations*

Personal Statement and Prior Research Experience

This essay has a page limit of 3 pages and usually contains the following information, which can be organized in a variety of ways:

- *Personal background* (usually a few sentences to two paragraphs)
 - What motivated you to pursue research and/or this particular topic?
 - Can you demonstrate characteristics like determination, taking initiative, and commitment to diversity and inclusion?
- *Research experiences* (usually around half to a majority of the statement)
 - You might title this section “Intellectual Merit”
 - What motivated you to pursue each particular research topic?
 - What was the intellectual context of each research project? Why is this field/question important and interesting?
 - What did you do in each project? You should include a minimal amount of experimental detail, but enough for the reader to generally understand what approach you used. You should also be clear about whether you worked independently or within a team on this project (both are valuable!).
 - What was the outcome? This may take the form of explaining your results and how they impact the field, any presentations or publications that came out of the project, and/or a reflection on how the project contributed to your growth as a scientist (including how it led to the choice of subsequent research experiences).
- *Broader Impacts* (usually one third to about half of the statement)
 - Past outreach, mentoring, or teaching. In all cases, explain what motivated you to do this work, who you worked with, and what you did.
 - Future outreach, mentoring, or teaching. You should have relatively concrete goals for these activities (e.g. naming specific organizations that you’ll work within).
 - Any way in which your research has impacted the broader community, for example by contributing to a technology that can be used outside of academia.
 - Particularly emphasize any leadership roles in these activities.
- *Career Goals* (usually one sentence to one paragraph)
 - The NSF wants to fund future leaders who have a commitment to intellectual merit and broader impacts, so alluding to a general career path that acknowledges these two aspects is usually sufficient.
 - You do not have to want to become a professor, and you don’t have to be extremely specific! Discussing general career goals without a specific job in mind works well.

Formatting Guidelines for both Essays

- Standard 8.5" x 11" page size with 1 inch margins on all sides, no text inside 1 inch margins (no header, footer, name, or page number)
- Times New Roman font for all text, Cambria Math for equations.
- No smaller than 11-point font, except text that is part of an image.
- Single-spaced (approximately 6 lines per inch) or greater line spacing. Do not use line spacing options such as “exactly 11 point” that are less than single spaced.