National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)

The NSF GRFP award is intended to support the graduate education of young scientists who have demonstrated potential for significant achievements in science and engineering research, as part of the long-term goal 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).

As of 2024, Fellows receive a stipend of $37,000 and a cost-of-education allowance of $16000 to the degree-granting institution every year for three years, some funding for travel and internships, and access to an NSF-maintained supercomputer.

Applying for the NSF GRFP

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 you left the program, and you have not yet started a new graduate program).

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

- Mathematical, physical, biological, engineering, and behavioral and social sciences, including the history of science and philosophy of science.
- Research with goals directly related to human disease or maximizing food production (focus on plant pathology or food safety) is not funded. If this sounds like your research area, consult with someone at NSF and/or consider funding through the NIH or USDA.

Apply using Research.gov

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

Review Criteria

All application materials are evaluated based on *Intellectual Merit* and *Broader Impacts*. You should use these terms for section headings in both 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, increases public scientific literacy, and/or promotes collaborations between academia and industry.

Proposed Plan of Research Essay

This essay has a limit of two pages, including figures and citations. The essay 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.

The plan must be for *basic* research, not research intended to directly translate to human health or applied to agricultural or food safety purposes. If your project has a translational or applied agricultural element, exclude it or spin it in a way that focuses on basic science questions.

The Proposed Plan of Research usually contains the following information:

Background (usually one to two paragraphs)

- Why is the overall topic important? What do we already know about the topic?
- What gap in the field will your project address? Why is that gap important to fill?
- What training/resources make you particularly suited to address this question? (this content can alternatively go in a "Conclusion" section at the end of the essay)

Hypothesis / Research Question (usually one to three sentences)

- Articulate a clearly defined experimental question that can be explored in 2-4 years.
- In biology, 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?)

Research Approach (half to the majority of the essay; can be articulated as "Aims")

- What is the motivation for answering this question?
- What methods and analyses are proposed? Unless you propose a novel or rare method, 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). Get feedback from someone a little outside your field to decide how much detail to include. Explicitly state any controls that will be used.
- What are the expected results and how will they be interpreted? How will the results contribute to the overall goal of the proposal?
- Explain potential pitfalls to the proposed experiments and propose an alternative approach. 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?

Citations (can be very compact at the end of the essay)

Remember to sub-title one section "Intellectual Merit" and another section "Broader Impacts"!

Personal Statement and Prior Research Experience Essay

This essay has a 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)

- Use the subheading "Intellectual Merit" to signal this part of the essay
- What motivated you to pursue each research experience?
- What was the intellectual context of each research project? Why is this field and/or research 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 experiences 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)

- Use this subheading ("Broader Impacts") to signal this part of the essay.
- Past outreach, mentoring, or teaching. In all cases, explain what motivated you to do this work, who you worked with, and what your contribution was.
- 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 you may have had in these activities.

Career Goals (usually one sentence to one paragraph)

- NSF aims to fund future leaders committed to intellectual merit and broader impacts, so alluding to a career path that incorporates these two elements is usually sufficient.
- You do not have to want to become a professor, and you don't have to be extremely specific! Discussing your career values and general goals can also work well.

Formatting Requirements for both Essays

Standard 8.5" x 11" page size with 1 inch margins on all sides, no text inside 1 inch margins (do not header or footer for your name, page numbers, or citations).

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.