

NSF Graduate Research Fellowship Program

~ Proposed Plan of Research Guide Sheet ~

Here is what the reviewers need to learn from a 2 page essay:

- How does the research question or hypothesis address a significant problem or need?
- Have previous studies pointed to unsolved problems, contradictions, trends and emerging issues in this field or interdisciplinary area? Is there adequate background/justification/need for this study?
- How committed is the student to this research? Does he or she have the knowledge and abilities to lead the research and monitor progress? Work on a team? Is the writing definitive or tentative?
- Are the proposed methods rigorous and appropriate to the research problem? The process/steps clear?
- What is the mentor's field of expertise? How strong is the mentor's support for this research plan?
- Is this plan feasible for the time allotted? Adequate equipment, computers and other resources?
- What are potential pitfalls or limitations of this study? Has a contingency plan been outlined?
- What are the realistic implications and broader impacts of this work? Potentially [transformative research](#)?
- What is the "value" of this fellowship to the student? What new knowledge and skills will this student acquire? Will this experience support the student's long range career goals?

A Suggested Outline for a Research Plan

Title

Keywords (top of first page)

Introduction (purpose, importance, how you became interested)

Hypothesis (or specific research question or problem)

Research Plan (e.g., strategy, methods, controls, data analysis)

Anticipated Results (or findings)

Intellectual Merit and Broader Impacts

Statement Attesting to the Originality

Literature Citations (end of second page)

Tips:

- ✓ Follow instructions in GRFP FASTLANE precisely!
- ✓ Use terms germane to your discipline.
- ✓ Consult with your mentor on plan.
- ✓ Use **boldface** headings (examples left) to guide reviewers to the required essay sections.

Tip: Even if you have not yet formulated a research plan, your statement should include a scholarly discussion of a research topic and how you will finalize your research plan. You will have to convince the reviewers that you are prepared and qualified to conduct research. To be competitive, the bulleted list of reviewer questions (above) still applies!

Note: The literature citations are included in the 2-page limit. Carefully select key studies that show the importance of your work, lead to your hypotheses and support the rationale for your methods.

10-Step Strategy for Developing a Plan of Research

Step 1. Go to [NSF-GRFP Fastlane](#) page. Carefully review this year's [program announcement](#) instructions. Register and login to [Fastlane](#). Locate the **specific instructions on the plan of research** (essay). Note: The specific essay instructions are found only AFTER you login. Copy the essays instructions and save them. Follow the instructions precisely. Do not omit sections.

Step 2. Study the two judging criteria, intellectual merit & broader impacts.

Step 3. Review several articles from the top-tier journals in your field of study. This will help you learn how to write in a scholarly fashion, as well as cue you into the terms and tone used by scholars in your discipline.

TIP: Journal articles can illustrate how to organize a plan of research.

Step 4. Create notes about your research experiences. For your convenience, MU offers a [work sheet](#) (pdf) on its [NSF-GRFP page](#). Meet with your mentor to discuss your plan's feasibility and completeness.

Step 5. Format your two page document. You MUST include ALL of the required sections!

Step 6. Commence writing from your notes or work sheet. Remember to keep within the 2 page limit. Be selective with citations. **Tip:** Start with previous literature findings or your proposed methods. It will be easier to write the introductory paragraph *last*, when the details of your plan are complete. The introductory paragraph must be powerful and engage the reviewers. You need to convince them of your study's importance & potential in the first several sentences. .

Step 7. When you are finished, re-read the entire plan. Is it scholarly? Methods rigorous? Do you show “ownership” of this research plan? Did you follow the NSF directions and include all of the required elements? Will your methods find the answers to your hypotheses or research questions?

Step 8. Take the draft plan to your mentor (and statistician, if appropriate). Ask: Is the writing clear? Scholarly? Definitive? Are my methods sound? How can I improve the plan? Allow plenty of turn-around time for your mentor to review the plan and provide feedback (usually 1-2 weeks).

Step 9. Based on your mentor’s input, begin rewriting. Strive for a high degree of clarity and conviction in your writing. Be specific and succinct! The reviewer must be able to infer that you are prepared to conduct this research, and that your future mentor and graduate institution have resources to support you.

Step 10. Ask your mentor to read the final version of all three essays. Tip: Avoid repetition with your previous research essay. For example, on your research plan, you can note that your research is based on your previous work and that you are properly trained to use XZY equipment. Rather than repeat the details, use a cross reference such as “(see previous research essay).”

IMPORTANT: Scoring Criteria (This is how your essays will be judged)

“In considering applications, reviewers will be instructed to address the two Merit Review Criteria as approved by the National Science Board – Intellectual Merit and Broader Impacts (Grant and Proposal Guide, NSF 08-01). Applicants, therefore, must address each criterion in their written statements to provide reviewers with the information necessary to respond fully to both.” Source: [2010 NSF GRFP Announcement](#)

Two Questions Each Reviewer Must Answer:	<i>How the NSF defines the criteria:</i>
(1) What is the intellectual merit the proposed activity?	Intellectual Merit Criterion*: “How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?” Source: 2010 GRFP Announcement
(2) What are the broader impacts the proposed activity?	Broader Impacts Criterion**: “How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?” Source: 2010 GRFP Announcement

* “To evaluate the intellectual merit criterion, panelists will consider: the strength of the academic record, the proposed plan of research, the description of previous research experience, references, Graduate Record Examinations (GRE) General and Subject Tests scores, and the appropriateness of the choice of institution relative to the proposed plan for graduate education and research.” Source: [2010 GRFP Announcement](#)

** “To help panelists evaluate the broader impacts criterion, applicants should provide characteristics of their background, including personal, professional, and educational experiences, to indicate their potential to fulfill the broader impacts criterion.” Source: [2010 GRFP Announcement](#)



Tips : Essays will be judged by the *official* NSF scoring criteria of [Intellectual Merit and Broader Impacts](#)

To be highly competitive, you should also evaluate how your research proposal aligns with the NSF's [mission](#) and [investment priorities](#).

Also assess if your proposed research has the potential to lead to discoveries. This NSF language on transformative research is insightful:

Transformative Research. “Transformative Research involves ideas, discoveries, or tools that radically change our understanding of an important existing scientific or engineering concept or educational practice or leads to the creation of a new paradigm or field of science, engineering, or education. Such research challenges current understanding or provides pathways to new frontiers. Characteristics of transformative research are that it: a) challenges conventional wisdom, b) leads to unexpected insights that enable new techniques or methodologies, or c) redefines the boundaries of science, engineering, or education. Applicants are encouraged to submit applications that embody potentially transformative research. Source: [2010 NSF GRFP Announcement](#)

More information:

See the NSF page on [transformative research](#)

See NSF page on the [review criteria](#)

See NSF paper on [broader impacts](#)

Additional information on the GRFP review criteria may be found at http://www.nsfgrfp.org/how_to_apply/review_criteria

NSF’s Page Formatting Requirements

“Applicants must follow the instructions in the user guide and applicant module for completing each section of the application. The essays must be written using standard 8.5" x 11" page size, 12-point, Times New Roman font, 1" margins, and must be single spaced or greater. The Personal Statement, Previous Research Experience, and Proposed Graduate Study essays each have a maximum length of two pages, including all references, citations, charts, figures, and images. The Optional Program Eligibility essay is limited to one page. **Failure to comply fully with these requirements could eliminate the application from consideration by review panels.** Additionally, applications that are incomplete (missing required transcripts and/or reference letters, or that do not have "submitted" status by the application deadline) are ineligible for panel review. Applicants are advised to submit applications early to avoid possible FastLane system delays on the deadline dates.”

Source: [2010 NSF GRFP Announcement](#)