

National Science Foundation's 2014 Competition

Graduate Research Fellowship Program




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Overview Session

 **About the GRFP**

Provides 3 years of support *payable over 5 years*

Award value: \$132,000

- \$32,000 stipend per year *paid to student*
Fellowship travels with you to the US university of your choice.
- \$12,000 "educational allowance" *paid to institution*
Your graduate institution must waive your tuition during your GRFP tenure.

Fellows also have

- International research opportunities (GROW)
Graduate Research Opportunities Worldwide (select countries)
- Access to XSEDE resources
Extreme Science & Engineering Discovery Environment: www.xsede.org

The oldest graduate fellowship of its kind (1952), the GRFP is a highly prestigious, nationally-competitive fellowship. To date, more than 50,000 fellowships have been awarded.

 **GRFP Program Goals**

- 1) to select, recognize, and financially support **individuals** early in their careers with the demonstrated **potential** to be **high achieving** scientists and engineers, and
- 2) to **broaden participation** in science and engineering of **underrepresented groups**, including women, minorities, persons with disabilities, and veterans.

GRFP is a critical program in NSF's overall strategy to develop the **globally-engaged workforce** necessary to ensure the **Nation's leadership** in advancing science and engineering **research and innovation**.

Source: http://www.nsf.gov/pubs/2013/pub13064/pub13064.htm#WT.mc_id=USNSF_25&WT.mc_myclick

Eligibility



Note: Verify eligibility in the official NSF solicitation.

http://www.nsf.gov/pubs/2013/pub13064/pub13064.htm#WT.mc_id=USNSF_25&WT.mc_myclick


What you will need to do


1. Launch an "account" in FASTLANE - GRFP
2. Complete personal profile (education, work, etc.)
3. Enter email addresses of 3-5 references
4. Upload a copy of your transcript(s)
5. Write 2 statements (5 pages total)
6. Upload statements into Fastlane
7. Submit application by disciplinary deadline

Plan ahead: NSF makes no deadline exceptions!

Last fall: Mizrou applicant was disqualified for being 16 seconds late.


Here's what typically happens

 **AUG:** competition opens


 **NOV:** application deadlines

DEC-FEB: 800+ panelists begin review process

- reviewers are disciplinary experts
- required to attend orientation session
- each application gets 2-3 reviews
- new: review panels will convene online

 **APR:** notifications

- GRFP offers fellowship awards
- Fellows must accept or decline by May 1

 **SUMMER - FALL:** Commence grad studies

Pending federal funding, NSF GRFP cycle repeats annually



<https://www.fastlane.nsf.gov/grfp/Login.do>


2 GRFP Statements (new instructions this year)

Personal, Relevant Background & Future Goals

- Motivation for an advanced degree
- Professional development plans
- Research experiences
- Career goals
- and
- Intellectual Merit
- Broader Impacts

Graduate Research Topic

- Original research topic
- General approach (methods)
- Resources needed
- Literature citations
- and
- Intellectual Merit
- Broader Impacts

 **GRFP's 2 Review Criteria**

Intellectual Merit

The potential to advance knowledge

Broader Impacts

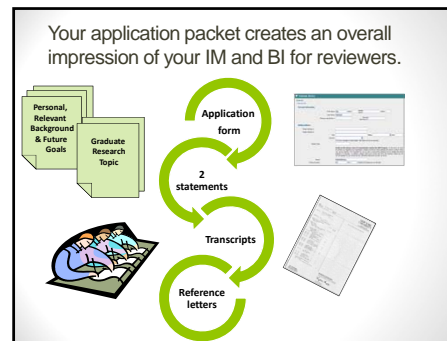
The potential to benefit society and contribute to the achievement of specific, desired societal outcomes


Source: http://www.nsf.gov/bfa/dsa/policy/merit_review/overview.pdf

 Examples of
“specific, desired societal outcomes”

- participation of underrepresented minorities
- improved STEM Education
- improved public scientific literacy
- public engagement with science & tech
- improved well-being of individuals
- more diverse, globally competitive workforce
- improved US national security
- increased US economic competitiveness
- infrastructure for research & education

Source: http://www.nsf.gov/bfa/dias/policy/merit_review/overview.pdf




 GRFP's 1st Review Criterion: IM

“Indicators” of Intellectual Merit

- courses, grades & academic awards
- research experience
- international & study abroad experience

Inferences about your potential are drawn from

- academic & career goals
- scholarly publications, presentations & posters
- graduate research topic (statement)
- exceptional reference letters

 GRFP's 2nd Review Criterion: BI


“Indicators” of Broader Impacts

- leadership roles on & off campus
- teaching, mentoring & outreach
- engagement with diverse audiences
- past research with societal benefits

Inferences about your potential are drawn from

- research topic with potential societal benefits
- proposed BI activity related to your research
- career goals that include a sincere interest in addressing the needs of society

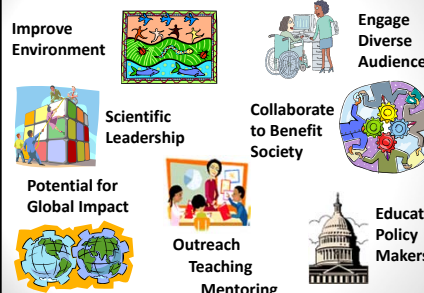
3 ways to demonstrate Broader Impacts




- through the research itself
- through activities that are directly related to specific research projects
- through activities that are supported by, yet are complementary to the project

Source: NSF

Possibilities: BI Activities Related to Research



 **Finding Reference Writers**

1. Faculty mentor/adviser
who knows your research knowledge & skills
2. Faculty who supervised summer research
who knows your research knowledge & skills
3. Other campus faculty
who can attest to leadership, mentoring, teaching or team skills
4. Campus program directors
Honors College, McNair, service learning, study abroad
5. Current or former internship or work supervisors
best if work was related to your research or future career plans

See handouts

GRFP Application Resources




<http://grfpessayinsights.missouri.edu>



<http://www.nsfgrfp.org/>

Apply here: <https://www.fastlane.nsf.gov/grfp/Login.do>

 **GRFP Writing Resources**

- Your faculty mentor(s)
- GRFP Resource Persons
- Graduate School
- Current GRFP fellows @ UCF
- University Writing Center (uwc.ucf.edu; 105 Coburn Hall)
- Nicole Gelfert (Office of Prestigious Awards)
- Michael Aldarondo-Jeffries (RAMP & McNair students)

Writer's block? Here are possible topics for your GRFP Personal, Relevant Background and Future Goals Statement

- How did a “pivotal moment” in your life motivate you to pursue a graduate degree?
- How did a key college experience ignite your passion for research and discovery?
- What “life lesson” has readied you for success in graduate school?
- How has volunteering or service learning or study abroad impacted your career goals?
- If you have triumphed over an adversity in college, how this readied you for future success?
- If a role model inspired you to attend college, how can you become a role model for others?
- What have you learned from your faculty mentors that will help you mentor others?
- What knowledge, skills and abilities will your reference writers discuss in their letters about you?
- What career options have you explored (e.g., academic, government, industry, nonprofit)?
- How have you engaged people from diverse backgrounds in your research/ teaching/outreach?
- What efforts have you made to improve the public's understanding of science?
- In what ways have you applied your previous research findings to benefit society?
- How have you demonstrated your commitment to responsible and ethical research practices?
- How might you extend your research skills through interdisciplinary or collaborative work?
- How do you analyze problems, frame relevant issues, devise solutions and marshal resources?
- What are your plans to develop scholarly writing (articles/grants) and project management skills?
- How will you stay abreast of technological advances that will impact the future of research?
- What experiences have shaped your cultural literacy and global awareness, and how does your insight prepare you to join the diverse/global workforce that the NSF envisions for the future?
- In the next 10 years, how do you intend to advance knowledge within and beyond your discipline?
- How does the NSF's value of “societally relevant outcomes” resonate with your research topic?
- How will your future research activities align with the NSF's priorities in the areas of national security; economic competitiveness; enhanced infrastructure for research and education; and academic-industry partnerships? Source: www.nsfgrfp.org

Worksheet for the Graduate Research Statement

Statement Instructions: "Present an original research topic that you would like to pursue in graduate school. Describe the research idea, your general approach, as well as any unique resources that may be needed for accomplishing the research goal (i.e., access to national facilities or collections, collaborations, overseas work, etc.) You may choose to include important literature citations. Address the potential of the research to advance knowledge and understanding within science as well as the potential for broader impacts on society. The research discussed must be in a field listed in the Solicitation." Source: [NSF GRFP User Guide](#)

Step I. Talk with your mentor(s). Even if you have decided on a research topic, it's a good idea to consult with the experts. Why? Faculty mentors stay informed about recent discoveries, research trends, and emerging issues. They can point you to gaps in the literature, the need for follow up study, and new topics to investigate. Mention that your research topic must have the potential to advance knowledge *and* benefit society.

Step II. Literature Review. Read broadly and synthesize what you learned. Identify 2-4 key findings from the literature that point to a problem you would like to address. Document how the topic can advance knowledge and benefit society. If the topic is interdisciplinary, include references from other disciplines. If possible, use nationally known researchers in the area(s) of study. Record the complete citation.

1 st finding: Citation:
2 nd finding: Citation:
3 rd finding: Citation:
4 th finding: Citation:

Step III. Summarize Preliminary Work. If your research interest stems from work that you and/or your mentor(s) have accomplished previously, summarize the findings - even if preliminary or inconclusive.

Note: If you have published/ presented on your research, list in your citation(s) in the GRFP application.

Note: Be sure to describe your research roles in the *other* GRFP statement. Emphasize what you learned and how your experience has readied you for graduate study. Include independent, collaborative, team, interdisciplinary or international work.

Step IV. Problem Statement. Clearly and succinctly, state a specific, researchable problem that you intend to address. This must be *logically* connected to the results of your literature review.

Step V. Research Question and/or Hypothesis. Although no longer a requirement, you may wish to consider adding a research question or hypothesis if appropriate to your field of study.

Step VI. General Approach (Research Methods). Your lit review should help you identify a general approach to your research topic. Consult with a mentor or a statistician on your methods and methodology. (Reviewers will look for methods that are rigorous *and* appropriate.) List steps below. Add rows as necessary.

1	
2	
3	
4	
5	

Step VII. Identify Unique Resources. Explain how your future program has the lab space, equipment, and supplies (e.g., chemicals, instruments, tools, etc.) that you will need to conduct this research. Will you need funds for field research or travel abroad? (Reference letters should confirm available resources.)

Other considerations for your general approach:

- **Ethics & Compliance.** Have you completed training on RCR (research ethics) or scholarly integrity? As appropriate, how will you protect human subjects and/or adhere to animal welfare regulations?
- **Timeline.** How long will it take you to conduct this study, analyze and report the findings?
- **Evaluation.** How will you monitor your progress toward the study's completion?
- **Limitations & Contingency.** What happens if you experience problems or unexpected results during your study?

Step VIII. Intellectual Merit (IM). You are *required* to address the potential of your research to advance knowledge and understanding within science. To do this, go back to your literature review (Step II). What knowledge gaps did you find? How might researchers in *other* disciplines apply this new knowledge? Include how you will *actively* communicate findings to the scientific community within and across disciplines and industries - - in the US and beyond.

Step IX. Broader Impacts (BI). You are *required* to address the potential of this research for broader impacts on society.

- Reflect on (a) which groups will benefit and (b) how they will benefit. Quantify whenever possible (e.g., magnitude of the problem; how many people; projected cost savings; % growth; % reduction, etc.) Will your research help lead to enhanced infrastructure for research and education?
- What activities can you conduct to involve people from underrepresented groups in your research? Teach diverse public audiences about your research? Will you inform policymakers about the importance of research and/or your area of inquiry? (List specific methods, audiences, venues or technologies you will employ for your proposed BI activities.)

Step X. Write a conclusion. Might you pursue this line of study as a dissertation topic? Might you pursue this research strand as part of your long range career goals? Could you move into interdisciplinary study? Why should the NSF make an investment in your future? How will you help the agency accomplish its goals?

10 Strategies for Planning Broader Impacts Activities

What are Broader Impacts? According to the National Science Foundation, "Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, yet are complementary to the project." Further, that "The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievements of specific, desired societal outcomes." NSF Sources : http://www.nsf.gov/bfa/dias/policy/merit_review/mrfaq.jsp#1 and http://www.nsf.gov/bfa/dias/policy/merit_review/overview.pdf

The Graduate Research Fellowship Program reflects the mission and goals of the National Science Foundation. To help the agency achieve its long range goals, this fellowship program invests in high-achieving students who show good potential for Broader Impacts thru: scientific discovery; leadership; integration of science concepts into educational efforts; working with people from diverse backgrounds; and serving or otherwise benefitting society.



The following 10 strategies can help jump start planning your future Broader Impacts (BI) activities:

Strategy 1: Learn more about the mission and goals of the National Science Foundation and the Revised Merit Review Criteria. Understand the purpose of the Graduate Research Fellowship Program.

Strategy 2: Talk with current NSF investigators on your campus. Ask: How have you addressed the BI criterion in NSF grant proposals? How do you engage people from diverse populations? How can I get involved in current BI activities in our community? The next time you plan a NSF grant proposal, may I observe the planning process?



Strategy 3: Talk with your mentor(s) about the societal benefit(s) of your research, including the potential for long range impact. Tell them about your plans to apply for the GRFP and ask for advice: How can I strengthen my broader impacts on society? Ask how to launch a BI activity on campus - or collaborate with an existing effort. Learn how to get better engaged with international researchers. Together, think creatively on how to engage people from diverse populations in your proposed research project. Inquire if you can contribute to a policy paper or presentation for government leaders.

Strategy 4: Consider technology and social media. How can you teach others about your research via a web site, blog, web cam, e-materials, wiki, webinars, videos, or chats? Examples. Can you use technology to get globally engaged (e.g., cloud computing)? How can you reach people from diverse populations with technology - through community groups, schools or organizations? Also consider how you will reach people who do not use technology.

Strategy 5: Identify specific target groups for outreach and education efforts. Politicians. Science writers. School teachers. Civic clubs. VISTA/ Peace Corps volunteers. Teach for America. Youth groups. New college students. Donors. Alumni. Faculty retirees. Participants in summer research. Bridge programs. Veterans. People with disabilities. Racial and ethnic minorities. Girls interested in STEM. People who live in low income areas or developing countries.



Strategy 6: Identify public venues & events for outreach and education initiatives. Libraries. State capitol. State fair. Community events. K-12 classrooms. Community colleges. Day camps. Senior citizen housing. Adult learning centers. Juvenile-at-risk programs. Book stores. Career fairs. Interdisciplinary conferences. Poster sessions.





Strategy 7: Improve your cultural competence. Collaborate with a student, postdoc or faculty member from another country. Network at professional conferences with international researchers. Attend lectures, seminars, and webinars by international speakers. Obtain a travel grant for study abroad or overseas research and make the most of your stay! Identify how your proposed research may make a difference beyond the US. Assist an international students' group. Become an English tutor or conversation partner with someone from another country.

Strategy 8: Become a scientific leader. Launch an innovative STEM initiative and track your results. Actively seek opportunities to become a scientific leader on campus and in your community. Lead peer lab teams. Become an officer in the student division of a national professional organization related to your discipline. Read the NSF news to learn how STEM leaders get engaged. Conduct a literature review on STEM leadership. Complete a self-assessment of your abilities at your career services office to identify your strengths as well as what skills you need to improve. "Job shadow" a campus leader, politician, or industry leader then identify the traits and skills you will need to become a scientific leader. Tip: Complete a leadership short course or study leadership theories (e.g., servant leadership) then practice leadership skills.

Strategy 9: Become a STEM mentor. Observe your faculty mentor(s) and identify how they effectively motivate and coach student researchers. Attend a mentoring workshop. Learn about STEM teaching and assessment methods. Tutor middle, high school, or college students in STEM courses. Strive to be inclusive (age, gender, income, race, ethnicity, disabilities, international, and/or veterans) in your educational efforts.



Strategy 10: Volunteer. Identify how you can use your scientific knowledge to benefit others - especially women, racial and ethnic minorities, persons with disabilities, or veterans. Collaborate with students from other disciplines (e.g., music, art, convergence journalism) to devise innovative strategies for sharing research findings with school teachers, nonprofit groups or service organizations. Credit-based service learning is another option. Get involved! Keep a journal of your learning experiences.

Handout copyright 2011, 2013 by Drs. Robin G. Walker & Linda Blockus, University of Missouri.
Updated 2013 with special thanks to Dr. Susan Renoe, University of Missouri.

Addressing BI in your GRFP Proposed Plan of Research

Panelists come from diverse disciplinary backgrounds and possess multiple perspectives on broader impacts (BI). For this reason, I strongly recommend that GRFP applicants explicitly address both (a) the broader impacts that are intrinsic to your research and/or how your research will benefit society, and (b) your intent to execute a BI activity related to your proposed plan of research.

To create a compelling outreach activity, identify a (a) learning objective, (b) target audience, (c) venue, and (d) intended outcome of your BI effort.

Learn more at <http://grfpessayinsights.missouri.edu/what-are-broader-impacts.php>

- Dr. Walker

Selecting GRFP Reference Writers

Choose mentors who know you best

Your GRFP application will not be complete without three strong letters of reference. Select reference writers who can attest to your scientific knowledge, team skills, and lab abilities and convince others of your potential as a researcher, educator, leader and scholar. The letters should also confirm that you will have adequate resources to conduct your graduate research project.

Your best options for selecting reference letter writers:

- Faculty mentors who have directly supervised your work in research settings.
- Faculty collaborators from a grant project, research team or other institutions.
- International collaborators who can address your potential for global engagement.
- Faculty from other departments who will be able to address your ability to effectively work and communicate across disciplines.
- A future mentor who has tentatively or officially accepted you into a graduate degree program. (This person will be able to address the quality of your current program and your readiness to commence graduate studies. Further, this person should confirm that your future institution has the facilities and resources to support your proposed research topic.)

Other options for identifying reference letter writers:

- Collegiate instructors who know your classroom performance. Select faculty members who praised your academic work or group leadership, analytical ability, peer mentoring or outstanding contributions to class discussion.
- Program directors who know your leadership abilities well and understand your research projects to date. Examples: director of an undergraduate research office, McNair Scholars' Program, service learning, study abroad or Honors College.
- Internship or workplace supervisors. Select individuals who can provide examples that demonstrate your professionalism, leadership, communication, dependability, resourcefulness, etc. Technical skills – particularly if they are transferable to research settings – should be noted.

Working with faculty members

Set an appointment with each potential reference writer to discuss the GRFP and your intent to apply. Take your resume, your Graduate Research Statement, and the reverse side of this handout. Explain how the GRFP will help you achieve your goals. Then ask, *"Do you feel that you know my strengths well enough to write a positive letter of reference for me?"* Allow plenty of time for your writers to submit letters. You can initially approach them early in the year, then confirm their willingness to write a letter once the NSF opens the competition cycle. By early September, submit the names and email addresses in Fastlane, so that your writers receive their official instructions as soon as possible.

☞ Follow up with your reference writers two weeks before your deadline. First, check Fastlane to make certain that at least three letters were received. If not, send a gentle reminder about the deadline. Once the letters are in the system, send your references a brief thank you note by email.

On the confidentiality of reference letters

As the applicant, you will not be able to view the reference letters in Fastlane GRFP. If a letter writer asks if the reference letters remain confidential, please tell him/her that the NSF protects writer's identity to the "maximum extent possible." However, there is also the chance that under the Privacy Act of 1974, the NSF may be required to release a copy of the letter. Details are provided to references writers in Fastlane GRFP.

GRFP Reference Writers: FYI

NSF's Aim with the GRFP

The Graduate Research Fellowship Program funds *students who are training to become well-rounded researchers*. As shown by the boldface below, the GRFP Solicitation contains several keywords that correspond with the mission, goals and future direction of the agency.

"The program goals are 1) to select, recognize, and financially support **individuals** early in their careers with the **demonstrated potential to be high achieving** scientists and engineers, and 2) to **broaden participation** in science and engineering of **underrepresented groups**, including women, minorities, persons with disabilities, and veterans. GRFP is a critical program in NSF's overall strategy in developing the **globally-engaged workforce** necessary to **ensure the Nation's leadership** in advancing science and engineering **research and innovation**. The ranks of NSF Fellows include numerous individuals who have made **transformative breakthroughs** in science and engineering research, become leaders in their chosen careers, and been honored as Nobel laureates."

Source: NSF13-584 GRFP Solicitation.

GRFP Review Criteria: Intellectual Merit and Broader Impacts

The Intellectual Merit criterion encompasses the potential to advance knowledge. The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

Importance of Your GRFP Reference Letter

You will be asked to specifically address the applicant's potential for becoming globally-engaged in the US science and engineering workforce, his/her academic potential, prior research experiences and the proposed graduate research topic. It will also be helpful to document the applicant's efforts to increase public scientific literacy; improve STEM education at any level; work with people from diverse backgrounds; and his/her potential for innovation, discovery, or advancing knowledge.

GRFP panelists are seeking evidence that each applicant holds the potential to (a) advance knowledge within and across disciplines and will (b) benefit society and contribute to the achievement of specific, desired societal outcomes.

Reference letters that offer specific examples of the applicant's intellectual merit and potential for discovery help to make the application packet more competitive in the eyes of the reviewers.

Steps for submitting a GRFP reference letter

1. The GRFP applicant will enter your name and email address into the NSF FastLane GRFP system.
2. You will receive an automatically-generated email that explains how to log in to the Fastlane GRFP system.

Note: Fastlane GRFP is separate from the regular Fastlane system for grant proposals. Your PI login will not work in the GRFP system.

3. Once in the system you will find (a) what you must address in your reference letter and (b) how to format the letter and (c) upload instructions.
4. Note the reference letter submission deadline. The NSF GRFP makes no deadline exceptions.
5. Ask the applicant for a copy of her/his essays. Also ask for a copy of the GRFP review criteria.
6. Reference letters should address the instructions precisely.
7. Once your letter is complete, login to Fastlane GRFP and click "Start" upload your letter.
8. Read the Confidentiality panel and select A or B.
9. Upload your letter as instructed.

Note: Applicants will be able to confirm that your letter is saved in the system but will not be able to view or print your letter from Fastlane GRFP. The "NSF will protect your comments and your identity as a reference from public disclosure to the maximum extent possible. However, if the applicant requests records on his or her application under the Privacy Act of 1974, we may be required to release to the applicant a copy of your comments." Source: NSF

You may learn more about the review process and review criteria at <http://grfpessayinsights.missouri.edu>

Suggested Outline for the Graduate Research Statement

GRFP Instructions: "Present an original research topic that you would like to pursue in graduate school. Describe the **research idea**, your **general approach**, as well as any **unique resources** that may be needed for accomplishing the research goal (i.e., access to national facilities or collections, collaborations, overseas work, etc.) You may choose to include important **literature citations**. Address the potential of the research to **advance knowledge and understanding within science** as well as the **potential for broader impacts on society**. The research discussed must be in a field listed in the Solicitation." Source: **NSF**

Basic Outline from Instructions

Research Idea
General Approach
Unique Resources
Intellectual Merit.
Broader Impacts
Literature Citations

Suggestion:

Modify the basic outline so that it is appropriate to your discipline and tailored to your study.

Best advice: Work closely with your mentor on this statement. You should (a) work from an outline, (b) write in a scholarly fashion and (b) approach this statement like a two-page research abstract.

One Example of a Modified Outline

Introduction

- Research aim (2-3 sentences that spark the reviewer's interest)
- Background (literature review)
- Research questions (or hypotheses, as appropriate to your discipline)

Methods (or general approach)

- Introductory statement (state that this will be a quantitative, qualitative or mixed methods study)
- Data collection or data sources
 - Sub-points as appropriate to discipline
- Data analysis or interpretation
 - Sub-points as appropriate to discipline
- Other factors you might consider:
 - Compliance, animal welfare or human subjects (as appropriate to the study)
 - Timeline
 - Evaluation (monitoring progress toward completion)
 - Limitations & Contingency (if research does not go as planned)

Unique Resources

- Specialized equipment, supercomputing, etc
- Big-ticket items (international travel, field work)
- Explain how costs will be covered (by the institution, a grant, etc.)

Intellectual Merit (*this is required*)

- How this study will advance knowledge with and across disciplines
- Specifically state how you will actively share the findings from this study

Broader Impacts (*this is required*)

- BI inherent to the research itself (how the research findings will benefit society)
- BI resulting from the research process (who benefitted from being engaged into)
- Proposed BI activity related to the project (List specific methods, audiences, venues or technologies you will employ to improve the public's scientific literacy.)

Conclusion

- How does this research fit with your academic and career goals?
- How will your research efforts help the NSF accomplish its goals?

Literature Citations

Notes:

- Your rationale for selecting a particular research topic should be informed by the literature.
- Consider a graduate research topic that relates to your stated career goals.
- The scope of the subject matter must be doable for a graduate student's research project.
- Be realistic about the resources you need and how your expenses will be covered.

Formatting Requirements. Strictly adhere to the essay formatting guidelines found in Fastlane GRFP. Do NOT alter the margins, line spacing, typeface or font sizes because you will be disqualified from the competition. Do not exceed 2 pages. Citations may be in 10 point font.

Citations. One way to maximize space in your essay is to number your citations. For example

1. Smith, AJ; Thomas, RM; & Bradley, CT. (2009)...
2. Hoover, FN; Smith, AJ; Bradley,CT and Fernandez, JA. (2008)...
3. Wyatt, GP and Fernandez, JA (2006)...

Then in your narrative, use the numbers to cite the references at the end of the sentence (instead of surnames in parenthesis). Example:

Anomalies in sea surface temperatures in the Equatorial Pacific are attributed to unusually cold or warm ocean temperatures [1, 3].

When the reader turns to the citation section, it shows that the authors of [1] and [3] are the sources of that information. While this citation style is common in many science journals, do not use it if your mentor advises against it.

For your Consideration

1. Reviewers understand that quite often, students work on lab teams funded by external grants. If your graduate research topic is part of a larger research project, make certain that you explain this. Be clear about your role and responsibilities. Specify how your topic relates to the overall research project.
2. DO NOT copy and paste sections from a grant proposal - that is plagiarism.
3. Rest assured that reviewers also understand that students need to build research skills. If your proposed research topic will be a challenge with your current skill level, insert a sentence about how you will acquire the necessary skills to conduct your research (e.g., graduate courses, summer research, and/or mentoring.)

Questions a Reviewer *Might* Pose Related to this Statement

Intellectual Merit

Has the student presented a well-organized statement?
Is the writing clear? Definitive?
Is the topic innovative or potentially transformative?
How did the student justify the need for this research topic?
Is the "general approach" appropriate for the topic? Are methods rigorous?
Has the student identified possible pitfalls or limitations with this topic?
Is this student ready conduct a graduate research project on this topic?
What is the mentor's expertise and how strong is the mentor's support of this research?
Do the references letters confirm that the student will have adequate research resources?
Will the student publish and present scholarly findings within and across disciplines?
If the student proposed international research or field study, is it relevant?
How will this research help the student acquire new knowledge and skills?
Potentially, how might this research advance knowledge within and across disciplines?

Broader Impacts

How will society directly benefit from this research?
How will society indirectly benefit from this research?
What groups will be reached and how will they benefit?
How will the researcher engage people from underrepresented groups in the research process?
How will the researcher engage people from underrepresented groups in research-related activities?
How will this applicant propose to teach lay audiences and improve the public's scientific literacy?
Are the proposed BI activities realistic? Sustainable?
Does the topic address a significant global problem, societal need or NSF priority?
Does this applicant express an interest in becoming a scientific leader, either within or across disciplines?
How does this applicant propose to collaborate with international researchers?
Might this study enhance research and education infrastructure (e.g., facilities, instrumentation, networks, and partnerships)?
If the GRFP makes an investment in this student, how will this student help the NSF achieve its goals?

Personal, Relevant Background & Future Goals Statement

This statement will introduce you to the reviewers. In a compelling fashion, you will share your motivation to pursue advanced studies; steps you have taken to gain professional knowledge and skills; your independent and team research experiences, and your career goals. Reviewers will be seeking strong evidence of your intellectual merit and broader impacts: *How have you (and will you) advance knowledge and benefit society?*

Basic Outline for this Statement:

- Part I. Introduction
- Part II. Body (bulk of your narrative)
- Part III. Intellectual Merit*
- Part IV. Broader Impacts*
- Part V. Conclusion

* You have the option to (a) explicitly address both review criteria in a separate paragraph or (b) in two separate paragraphs or (c) integrate examples of the criteria throughout the body of your essay. Consider the judicious use of boldface to draw reviewers' attention to the key words Intellectual Merit and Broader Impacts.

Suggested writing strategy: It will be easier to start with the body (Part II) because you will be writing straightforward answers to the writing prompts found in the GRFP instructions. First create an outline to organize your thoughts (example below). Select experiences that *best* illustrate your knowledge, skills and abilities. Begin by writing freely (you can edit later.) Now review your work. You may need to re-arrange the order of your paragraphs to create a “story.” Add transition language to help move your reader from one paragraph to the next. Reread the statement in its entirety. Edit for clarity and length (limit is three pages).

Detailed Outline (adapted from the instructions):

Part I. In 3-5 sentences, make an interesting point about your unique background, your goals, or your vision for benefitting society. These first few sentences must quickly convince the reviewers that you are intelligent, innovative and articulate. Your writing must be original, sincere and engaging. Avoid clichés and the mundane. Your aim is to so intrigue the reviewers that they will want to read the rest of your statement carefully.

Part II A:

- Describe your plans to attain a master’s degree. Doctoral degree? Postdoctoral training?
- Describe your professional development plan. How will you acquire *transferable* knowledge and skills to become a well-rounded professional? (leadership, team building, project management, scholarly writing, public presentations, etc.)
- List your short term (1-5 years) career goal:
- Describe your vision for a successful career. What do you want to accomplish?
- To conclude Part IIA, make this connection for reviewers: *How will graduate school prepare you for a career that allows you to expand scientific understanding as well as benefit our society?*

- **Part II B.** Write a brief vignette that tells *how* you became motivated to pursue advanced studies.

Hint: Your motivation can come from a positive or negative experience. Reflect on personal, professional and educational experiences: teaching; outreach; leadership; mentoring; research; internships; jobs; scholarship; campus & community engagement; family; societal issues; volunteer work; service with underrepresented groups; study or travel abroad; or inspiring role models. Identify what you learned from the experience or how the experience changed your perspective. Ideally, your story should logically connect to the degree program you have chosen to study.

Part II C.

- Describe previous research experiences (also see worksheets)
 - Specify your role in the activity. Did you work independently and/or as part of a team?
 - What research and scholarship skills did you acquire?
How will you be able to use your skills in graduate school?
 - If you worked with people from other countries, how can you apply your cultural literacy to successfully connect with international researchers in the future?
 - How did your research activity advance knowledge in a STEM field?
 - Who will benefit from your research activities, and *how* did they benefit?
- Describe professional and service activities.
 - Specify your role at a professional conference or with a student group on campus or in the community.
 - How did you enhance your leadership, team building or communication skills or acquire new skills?
 - Explain how these activities have prepared you to persist with a graduate degree program.
 - Did activity serve to advance knowledge in a STEM field?
 - Who benefitted from your professional and service activities, and *how* they will benefit?

Part III. If you have not already done so, address **Intellectual Merit**. Include specific examples of your previous research & outreach activities and goals, to help demonstrate the criterion.








Part IV. If you have not already done so, address **Broader Impacts**. Point to specific examples of your previous research, teaching and outreach activities and goals, to help demonstrate the criterion.

Part V. Conclusion: In 3-5 sentences, conclude your essay. Examples: Reiterate how a graduate degree will help you achieve your career goals; or explain how the GRFP will enable you pursue a particular line of research; or describe how you intend to contribute to your profession as a scientific leader or address social needs or global challenges.

☞ **Suggested editing strategy:** When you have completed a first draft, ask family members and friends for feedback. Revise. Ask your mentor(s) and a GRFP Resource Person to read your polished statement. Faculty members are extremely busy, so allow at least a week turn-around time. Based on the feedback, revise your essay again. Consult a campus writing tutor for help with grammar or mechanics. Set your statement aside for a few days. Now read your statement with “fresh eyes.” Is it compelling? Does it reflect your potential for intellectual merit & broader impacts?

GRFP Broader Impacts Activity Planning Sheet

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	Past Audiences & Activities	Number Reached & Results	<i>Proposed</i> Audiences & Venues	<i>Proposed</i> Aims & Intended Outcomes
 Leadership Teamwork				
 Benefitting society or environment				
 Engaging diverse audiences				
 Collaborate; Share findings				
 Global issues & Cultural Competence				
 Inform policy makers				
 Teaching Mentoring Outreach				