The NSF Graduate Research Fellowship Program
NSF Graduate Research Fellowship Program Goals

- To increase the Nation’s human capacity in science and engineering by providing fellowships for early-career graduate students who pursue research-based master’s and doctoral degrees in NSF-supported disciplines

- To support the development of a diverse and globally engaged US science and engineering workforce
GRFP Unique Features

- Flexible: choice of project, advisor & program
- Unrestrictive: No service requirement
- Portable: Any accredited U.S. institution
  MS → PhD

- 2,000 Fellowships offered annually, 2010 - 2013
  ~17% success rate
GRFP Successes

- 48,000 Fellowships since 1952
- 40 Nobel Laureates
- 450 members of the National Academy of Sciences
- Founders of corporations to authors of books
- Higher Ph.D. completion rates
- Enhanced diversity

National Science Foundation Graduate Research Fellowship Program
Apply at: www.fastlane.nsf.gov/grfp/
GRFP Key Elements

- Five Year Award – $132,000
- Three years of financial support
  - $32,000 Stipend per year
  - $12,000 Educational allowance to institution per year
- International research opportunity through GROW
- Access to XSEDE cyberinfrastructure resources
GRFP General Eligibility

- U.S. citizens, nationals, and permanent residents
- Early-career students
- Pursuing research-based MS or PhD in NSF fields
- Enrolled in accredited U.S. institution by fall 2014
- Applicants must self-certify in the application that they meet the GRFP Eligibility criteria

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GRFP Supported Disciplines

- Chemistry
- Computer and Information Science and Engineering
- Engineering
- Geosciences
- Life Sciences
- Materials Research
- Mathematical Sciences
- Physics and Astronomy
- Psychology
- Social Sciences
- Science, Technology, Engineering and Mathematics Education (research-focused)
Not Supported by NSF GRFP

- Business administration or management
- Social work
- Medical, dental, law, or public health programs
- Joint science-professional degree programs, e.g., MD/PhD, JD/PhD, etc.
- Education (except research-focused STEM Education programs)
- See Solicitation (www.nsfgrfp.org)
GRFP Cycle

- **Application**: Available online August
- **Deadlines**: November (varies by field)
- **Awards**: Announced late March to early April
- **Best Time to Start Preparing**: Now

National Science Foundation Graduate Research Fellowship Program
Information: [www.nsf.gov/grfp](http://www.nsf.gov/grfp) and [www.nsfgrfp.org](http://www.nsfgrfp.org)
Complete Application

NSF FastLane

- Personal, Relevant Background and Future Goals Statement (3 pages)
- Graduate Research Statement (2 pages)
- Transcripts, uploaded into FastLane
- **Three** letters of reference required

- Additional information required for some candidates

See Solicitation for eligibility requirements (available on www.nsfgrfp.org)
Resources

NSF GRFP Website (nsf.gov/grfp)
• Solicitation
• FAQ and Guide links

Fastlane.nsf.gov/grfp
• Online application, user guides, official announcements

Phone and email
• 866-NSF-GRFP (673-4737)
  info@nsfgradfellows.org
Resources at nsfgrfp.org

- Tips for applying
- Frequently asked questions (FAQ)
- Find GRFP contacts
- Important links for the GRFP
- Panelist registration
How I applied for the NSF-GRFP (the third time)

Presented by Stephen Lee
Resilience Pays off – Do not give up!
## Application Breakdown

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Now (after award)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intellectual Merit:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of publications</td>
<td>0 (1 in prep)</td>
<td>0 (2 in prep)</td>
<td>0 (2 submitted, 2 in prep)</td>
<td>+2 (3 new in prep)</td>
</tr>
<tr>
<td># of presentations</td>
<td>3 posters 1 oral</td>
<td>+1 poster</td>
<td>+2 abstracts</td>
<td>+2 abstracts +1 oral</td>
</tr>
<tr>
<td># research experiences</td>
<td>3 (1 NSF experience)</td>
<td>+1</td>
<td>+1</td>
<td>5</td>
</tr>
<tr>
<td><strong>Broader Impact:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership positions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Teaching experience</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Outreach</td>
<td>0 (in app)</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mentoring</td>
<td>1 UG</td>
<td>3 UG</td>
<td>3 UG, 1 HS</td>
<td>5 UG, 1 HS</td>
</tr>
</tbody>
</table>

**Awarded!!!**

**No Award**  
**Honorable Mention**  
**Awarded!!!**
Past Reviewer Comments

Year 1:
Summary – Not enough broader impacts. Applicant has mentioned his involvement, but how will he continue? Not as strong as other applicants.
Adjustment: Explain my broader impact activities clearly and sought more -> new leadership positions, outreach

Year 2:
“Letters of rec not as strong as other applicants”
“More examples of leadership could be included”
“Research proposal could be improved by articulating the potential impact to a broader audience”
Adjustment: Changed one of my recommenders for next application; included more material in my recommendation request email
Last Year Scores and Comments

Year 3:
Reviewer 1: Excellent, Excellent
Reviewer 2: Very good, very good
Reviewer 3: Very good, excellent

“Good student but not as good as other excellent applicants. Undergraduate GPA is a bit lower than the excellent ones”

“His grades are not quite the top of a very excellent applicant pool”
Constructing the Personal Statement

- List out everything you have ever done that fits IM and BI criteria
  - IM: publications, presentations, posters, abstracts, awards, research experiences, internships, volunteer experiences...
  - BI: any teaching, mentoring, leadership, outreach activities
    (ex. were you ever a TA, volunteer at science-related events, serve e-board positions, tutored, mentor, scouting, youth organization, etc.)

- Group experiences into paragraphs with topic sentences that make a cohesive story
  - Ex. “My goal to be an educator comes from an early love of teaching others and from rewarding experiences as a teaching assistant...”
  - 2-3 experiences is sufficient per section; highlight key points of each exp, and what you got out of them

- Previous research section
  - Would not recommend more than 3 experiences.
  - Transitions between them are important; try to connect them. Did you shift interests? Are you building upon previous experience? Same area, different application?
Personal Statement format (3 pages)

Personal/Relevant Background

1. Vivid story of recent outreach experience
2. Brief background on what sparked my interest in science
3. I sought research experiences because they allowed me to delve deeper into my interests

Intellectual Merit

Detail of nano-related research experiences

– 4 – Experience with nanoscience at UNL
– 5 – Experience with graphene nanoparticles at SBU
– 6 – Recent interests in graphene nanochemistry at SBU

Broader impact

7: Teaching experiences paragraph
8: Outreach and mentoring experiences paragraph
9 (1-2 sentences): What the fellowship would do for me
10: References (Cited my publications)
I joined the Multi-Functional Nano-Biosystems Lab under supervision of Dr. Balaji Sitharaman, where I worked on two graphene-based projects. One, my senior design project, focused on improving anode performance in microbial fuel cells (MFCs) using an inexpensive fabrication method we had developed and graphene nanoribbons (GNRs), sheets of graphene with large surface areas that can be synthesized from carbon nanotubes via an oxidation process that longitudinally unzips their sidewalls. The second, in collaboration with a researcher at Tufts University¹, evaluated GNRs as a possible delivery agent for lucanthone (Luc), a chemotherapy agent, in glioblastoma multiforme therapy using a previously reported non-covalent loading strategy. Both projects prepared me for graduate research by giving me the freedom to independently and creatively decide how to work toward the desired results. I led my design team in the fabrication and characterization of GNR anodes, including training in scanning electron microscopy (SEM) at Brookhaven National Laboratory (BNL) to acquire images of our films. For the drug delivery project, I designed and executed the initial experiments such as Luc loading onto GNRs and in vitro efficacy assays. Overall, I gained tremendous experience with graphene synthesis and characterization techniques (i.e. Raman, UV-Vis, HR-SEM) that will be particularly useful in my proposed research. Moreover, sharing my work with many scientists has advanced my own knowledge of the field and expanded my work in new directions. This experience has led to one publication (a co-author for drug delivery¹), one invited oral presentation³, and five accepted abstracts/poster presentations at conferences. In addition, the collaboration with Tufts showed me the benefits of working in groups, especially when no one person has all the expertise.
General PS Tips

• Boldface the important topic sentences or statements
  – Mentoring, teaching, passion for outreach, etc.
  – “Experiences such as this have fueled my desire to pursue a career full of scientific discovery…”

• Identify “Intellectual Merit” and “Broader Impacts” sections for them
Research Proposal (2 pages)

1. Title & Keywords

2. Introduction and Motivation
   – Bolded and italicized importance/significance lines

3. Research Plan
   – P1: What I plan to do with bolded/italicized objective
   – Aims 1,2,3

4. Expected Results, Alternative strategies
   – What is expected, what will it elucidate/lead to, why is it important?
5. Intellectual Merit
   – Novelty/innovation, gaps of understanding being addressed, how will it advance field

6. Broader Impacts
   – Plans to promote interest in field
   – free online learning tools, continued mentoring and outreach, collaboration with BNL

7. References
   – Self cited if possible. Use “In prep, expected journal” if you are currently writing one.
Letters of Recommendation

Pick professors, professionals that know you very well
  – They should be happy to write you one; a “sure”, “okay”, or any excuse ≠ happy

My recommenders:
  • My PI (4 years in his lab + undergraduate advisor)
  • Undergraduate Program Director
  • NSF-REU Advisor from University of Nebraska
  • Outreach Professor (I also TAed for her)

Ask via email or in person (followed by summary email) well in advance
  – 2 weeks minimum; I let them know in 4 weeks
  – Send them all materials that will help them construct your letter
  – Specifically point out what you feel they could comment positively on
  – Ask them about future reminders
Example:

Dear ______,

I am applying for the ______ and was wondering if you would be willing to write me a strong letter of recommendation. As a ______ (TA, researcher, mentor, employee)________________________ , I feel you would be able to comment positively on __________________________ (broader impacts, intellectual merit). The deadline is in ___ weeks on ________. Attached is my CV for your reference.

If you would be willing to write me a recommendation, please let me know and I can stop by your office to discuss any information you might need.

Thank you for your consideration,
Additional Advice

• Submit early
• Selection of panel
  – Match with the basic science, not necessarily the department you are in or application
  – Avoid sending to same panel as your peers
• Have many people from different fields read your research proposal
• If you’re staying at the same undergraduate university, explain why
• Refer to LORs, Personal Statement, Research Proposal ("See ....")
A reviewer’s perspective

Susan Brennan
Two National Science Board-approved Review Criteria:

• **Intellectual Merit**: this criterion encompasses the potential to advance knowledge

• **Broader Impacts**: this criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes
The Review Process

- Now on-line (virtual panels)
- *Very* fair (levels, Z scores, diverse panelists)
- Sample reviews
- What I wish were different
- Strategic things
  - Choosing a panel
  - Taking the reviewer’s perspective
  - Writing defensively

Remember:

Much is outside of your control.
But do control the things that you can.
September 4, 2014  
Re: Writing a letter of reference for the NSF Graduate Research Fellowship Program  

Dear Faculty,

As you may know, strong letters of reference are essential for a successful NSF GRFP application. The most effective letters are targeted to the GRF competition, which attracts talented STEM students early in their graduate training (last year there were ~15,000 applicants for ~2000 fellowships across all the STEM fields). NSF highly values scientific achievement, innovation, and leadership; GRF winners are young scientists with the potential and ambition to change the world. This means that a strong GRF letter is somewhat different than a strong letter for graduate school admission. A GRF letter should address both of NSF's review criteria: Intellectual Merit and Broader Impacts. These criteria are equally important.

Intellectual merit includes "the potential of the applicant to advance knowledge," based on "the strength of the academic record, the proposed plan of research, the description of previous research experience or publication/presentations, and references." If you have mentored or collaborated with the applicant on a past research project, it's helpful to address the specific contributions of the applicant, as well as the status of the project (especially if it's destined for the publication pipeline). Vivid details about the applicant's approach, achievements, background, and special strengths are most helpful to reviewers, as an NSF GRF funds the person, not the project. If you are the applicant's Principal Investigator or Research Advisor, it is essential for you to provide feedback on a draft of their Research Statement, but not to overshadow their voice; they should "own" the project. Finally: GREs are no longer considered as part of the application.

Broader Impacts include "the personal, professional, and educational experiences, the future plans and prior accomplishments in the integration of research and education, and the potential for future broader impacts." NSF values outreach at all levels of STEM education and practice, inclusion of younger or diverse (especially under-represented) students in science, and communicating science to industry, policy leaders, and the general public. If you are aware of the applicant's relevant past, present, or planned outreach, mentoring, community service, leadership, teamwork, resilience, or ability to rise over adversity, it is helpful to comment on those. Gifted applicants may fail to sufficiently convey the broader impacts of their candidacy, sometimes through modesty (!); you may be in a position to assess the "big picture" (and potential for impact) most directly and effectively. Do read the applicant's statements if at all possible.

If you are at the applicant's graduate institution, it is also helpful to comment on the research infrastructure, facilities, mentoring activities, and other training resources available to the applicant.

This year's deadline for letters of recommendation is much earlier than usual: Thurs., Nov. 6, 2014 (5:00 p.m. PST). This is an absolutely firm deadline! You will receive an email with a new ID to register on FastLane before uploading your letter. The letter can be no longer than 2 pages and should be on letterhead with your name, department, and digitized signature. Additional info and tips can be found at http://www.nsfgrfp.org/reference_writers. Please feel free to contact me if you have any questions.

Sincerely,

Susan E. Brennan, Ph.D.  
(susan.brennan@stonybrook.edu)  
Professor of Psychology, Linguistics, and Computer Science; Graduate Director, Psychology
This year’s GRF competition

Deadlines:

• Wed Oct 29      Engr, Comp Sci, Materials Research
• Th Oct 30       Math, Physics, Astronomy, Chem
• Mon Nov 3       Social Sci, Psych, STEM education
• Tues Nov 4      Life Sciences, Geosciences
• Nov 6          Deadline for letter writers

(much earlier than usual!)

Note: each is at 5:00 pm PST/ 8:00 pm EST.
All deadlines are absolutely firm.
Monitor completeness of your application on FastLane.
If you’re fortunate enough to have > 3 letter writers, list 4 or 5 (in preferred order) on FastLane in case any fall through.
(I don’t expect we’ll get to the following slides; in any event, Stephen or I will cover this material in our sections.)
The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
   A. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   B. Benefit society or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or organization to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?
• Personal, Relevant Background and Future Goals Statement
• Graduate Research Statement
• Reference Letters
• Transcripts
Panelists may consider the following with respect to the **Intellectual Merit** Criterion:

- the potential of the applicant to advance knowledge based on the totality of the content in the application, including the strength of the academic record, the proposed plan of research, the description of previous research experience or publication/presentations, and references
Panelists may consider the following with respect to the **Broader Impacts** Criterion:

- the potential for future broader impacts as indicated by personal, professional, and educational experiences
How do you envision graduate school preparing you for a career that allows you to contribute to expanding scientific understanding as well as broadly benefit society? Describe your personal, educational and/or professional experiences that motivate your decision to pursue advanced study in science, technology, engineering or mathematics (STEM). Include specific examples of any research and/or professional activities in which you have participated. Present a concise description of the activities, highlight the results and discuss how these activities have prepared you to seek a graduate degree. Specify your role in the activity including the extent to which you worked independently and/or as part of a team. Describe the contributions of your activity to advancing knowledge in STEM fields as well as the potential for broader societal impacts (See Solicitation, Section VI, for more information about Broader Impacts)
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 (Section X, Fields of Study).
Preparing a competitive application

Reference Letters

• Choose at least **three** reference writers

• Give them ample time to prepare their letters

• They should know you as a scientist and personally

• Share your application materials and the merit review criteria (good letters address Intellectual Merit and Broader Impacts)

• Track letter submission using FastLane; **you must have 3 letters for a complete application**
Preparing a competitive application

1. Read the Solicitation carefully
2. Address the two NSF Merit Review Criteria (Intellectual Merit and Broader Impacts) in each Statement
3. Check for spelling and grammatical errors
4. Verify statements and transcripts uploads
5. You must certify that this is your own original work
6. You must self-certify your eligibility according to the criteria in the Solicitation
7. Make sure you Press “Submit” button
8. Regularly check application status for # of reference letters
9. Make sure you are enrolled in graduate school by Fall 2014
Evaluation of applications

• Panelists are academic and research experts in general discipline, not necessarily in your research topic

• Panelists rate your application using the two Merit Review Criteria, Intellectual Merit and Broader Impacts

• NSF requests panelists to provide constructive comments (applicants receive anonymous copies of the reviews)

• Panels make recommendations to NSF

• NSF awards fellowships and honorable mentions
Besides constructive feedback, the application is great preparation for:

- Graduate school applications
- Other award applications
- Job applications
- Writing publications
- Professional connections

2013

2,000 Awards
12,000 Applications reviewed
~ 17% Success

You are encouraged to apply