The NSF Graduate Research Fellowship Program

September 28, 2018

College of Engineering
Office of Graduate & Professional Education
Research Office

UNIVERSITY OF DELAWARE
What is the NSF GRFP?
Federal agency created in 1950 to “to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense”

>$7 billion annual budget for research and education in Science, Technology, Engineering and Math (STEM) disciplines- all fields but clinical biomedical (NIH)
NSF Graduate Research Fellowship Program

• Initiated in 1952 - oldest NSF program

• Goals are to:
  – select, recognize, and financially support individuals early in their careers with the **demonstrated potential** to be high achieving scientists and engineers.
  – **Broaden participation** in science and engineering of underrepresented groups, including women, minorities, persons with disabilities and veterans.

• NSF expects to award 1,000 compared to 2,000 (if implemented)
  – success rate increased from 13% to 16% from 2016 to 2017
  – 50% reduction in the number of new fellowship awards
Program Benefits

• **Three years of support** over five year graduate enrollment period

• **$34,000** annual cost of living stipend
  – Often supplemented by PI, ask your department about this

• **$12,000 cost-of-education allowance** paid to institution (tuition typically waived)

• **International opportunities**—fellows will receive announcements about opportunities to apply for GRFP support for their participation in international opportunities

• **TeraGrid supercomputer access** for both fellows and honorable mentions
• Clarify your educational goals
• Provide research independence
• Enhance your career (very prestigious)

• Portable to graduate institutions in US or abroad
• Flexible- your choice of project, advisor, department
• No service requirement
GRFP Eligibility

- U.S. citizens and permanent residents
- Senior undergrad or 1st or 2nd year graduate students
  - Can only apply once as a grad student
- Pursuing research-based MS and PhD
- NSF supported fields
- Plan to enroll in accredited US institution

Academic Levels
- 1: Seniors/baccalaureates; no graduate study
- 2: First-year graduate students
- 3: Second-year graduate students
  - ≤ 12 months of graduate study by August 1, 2018
- 4: >12 months graduate study (Extenuating circumstance)
  - Interruption in graduate study of 2+ years
What is NSF looking for in successful applicants?

Individuals who **demonstrate potential** to complete graduate degree programs and **become future leaders** in disciplines relevant to NSF’s mission.

**GRFP Supported Disciplines**

- Chemistry
- Computer and Information Science and Engineering
- Engineering
- Geosciences
- Life Sciences
- Mathematical Sciences
- Physics and Astronomy
- Psychology
- Social Sciences
- Science Education
Reviewer Criteria & Finding Success
GRFP Application

- Personal profile, education, and work experience
  - Load this up, this is the first part reviewers see
  - This heavily influences how reviewers examine the rest of your packet
- Personal, Relevant Background and Future Goals statement (3 pages)
- Graduate research statement (2 pages)
- Three letters of reference
  - Pick people that will write you an excellent letter
  - Help them prepare the letters
- Transcripts
- Extenuating circumstance essay
Who will read your application?

• Applications are assigned to panels based on the primary field of study designated by applicant

• Applications reviewed in disciplinary virtual panels

• Online review of applications by panelists

• Virtual panel review
• Two National Science Board-approved criteria
  – Intellectual Merit
  – Broader Impacts
NSF Intellectual Merit

• **Potential to advance knowledge** within field and across fields based on a holistic analysis of the complete application

• Considerations include:
  – Ability to plan and conduct research (include in letter and personal statement)
  – Ability to work independently and as a member of a team (include in letter and personal statement)
  – Proposed activities are well-reasoned and based on sound rationale
  – Interpret and communicate research
Intellectual Merit Assessment

- Academic performance
  - Grades, curricula, etc.
- Awards/honors
- Research experience/other professional experience
- Communication skills
- Independence/creativity
- Publications/presentations
- Research plan
- Reference letters
NSF Broader Impacts

Contributions and achievements that have broader impacts on society, including:

– Enhance STEM education at all levels (K-16)
– Integrate research and education
– Enhance public scientific literacy of society - blogs, newspapers, radio, TV, etc.
– Enhance participation of all citizens, esp. women, underrepresented minorities, persons with disabilities and veterans
– Share your science with the broader public – community outreach
– Participation in museums, national parks,
– Participation in the global STEM enterprise
Broader Impacts Assessment

- Prior accomplishments
- Future plans
- Individual experiences
- Integration of research and education
- Potential to reach diverse audiences
- Impact on society and connectivity
- Community outreach
- Leadership potential
<table>
<thead>
<tr>
<th>Intellectual Merit Rating *</th>
<th>○ Excellent ○ Very Good ○ Good ○ Fair ○ Poor</th>
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</thead>
<tbody>
<tr>
<td>In the context of the five review elements, please evaluate the strengths and weaknesses of the application with respect to intellectual merit.</td>
<td></td>
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<td>Broader Impacts Comments *</td>
<td></td>
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<tr>
<td>Summary Statement *</td>
<td></td>
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<tr>
<td>Overall Score *</td>
<td>Score must be a whole integer between 1 – 50</td>
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</tbody>
</table>
### Rating Applications

<table>
<thead>
<tr>
<th>Quality Groups (QG)</th>
<th>Ratings (E – P)</th>
<th>Score (1-50)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QG 1: Highly Meritorious</strong>&lt;br&gt;Recommended for Fellowship</td>
<td>Excellent</td>
<td>50 - 40</td>
</tr>
<tr>
<td><strong>QG 2: Meritorious</strong>&lt;br&gt;Recommended for Fellowship&lt;br&gt;/Honorable Mention</td>
<td>Very Good</td>
<td>39 - 30</td>
</tr>
<tr>
<td><strong>QG 3: Not Recommended</strong>&lt;br&gt;Not eligible to receive Fellowships/Honorable Mention</td>
<td>Good</td>
<td>29 - 20</td>
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<tr>
<td></td>
<td>Fair</td>
<td>19 – 10</td>
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<tr>
<td></td>
<td>Poor</td>
<td>9 – 1</td>
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</tbody>
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Charge to Panels

• Maintain integrity of the panel review process
  – Merit review criteria
  – Conflict-of-interests rules
  – Confidentiality

• Reconcile differences early

• Thorough and efficient review

• Provide feedback to enhance program effectiveness
Application Review Process
Virtual Panel Activities

• Day 1 Panel Deliberations
  – Day 1 Ranking Report
  – Discrepancies resolution
  – Quality Group placement
  ▸ Panelists review and revise evaluations, if necessary

• Day 2 Panel Deliberations
  – Day 2 Ranking Report

• Final Ranking Report produced
Reviewers are very tired at this time of year. Classes just ended. We take a week or two to “catch up”. It's now the week of Christmas and I have to read ~30 of these applications. How much time do you think I will devote to each application? Make it easy for me to read your application.
How to Apply
GRFP Application

• Personal profile, education, and work experience
• Personal, Relevant Background and Future Goals statement (3 pages)
• Graduate research statement (2 pages)
• Three letters of reference
• Transcripts

• Extenuating circumstance essay
Formatting Instructions

- Required font and size: Times New Roman 12

- References, footnotes and figure captions may be Times New Roman 10

- Required margins: 1” margins all sides

- Page formatting: Standard 8.5” x 11” paper; single spaced
Planning Timeline - September through First Week of October

- Discuss the grant with your Graduate Advisor and/or Mentor and start clarifying your ideas (If not applying this year, go ahead and start preparing your personal statement and research statement now)

- Personal Profile - Table within Fastlane

- Education and Work Experience - Tables within Fastlane

- Planned Graduate Program - Table within Fastlane

- Request all transcripts - Load to Fastlane upon receipt

- Obtain agreement from three reference writers
  - Give them a draft of your goals & research statement, CV, and instructions for reference writers
  - Draft a version of the letter for them, this helps you receive an amazing letter
  - Once agreement is confirmed, input contact information into Fastlane
  - Deadline for reference writers is **November 2, 5 pm**

- Personal, Relevant Background and Future Goals statement - (3 pages)
Planning Timeline -
Second Week of October - Deadline

- Finalize graduate research statement - 2 pages
- Print a draft version of all forms, narrative (with references) and have your Graduate Advisor/Mentor review
- Print out a hard copy and begin to proof
- Enlist proofreading help from peers, advisors, family
- Proofread it again and find someone who hasn’t seen it before to proof
- Submit!!
- Remind reference writers to submit by deadline
Writing the essays

Organize your narrative
• Make a list of all the information that makes you a good candidate
• List all of your research and project experiences
• List all your extra-curricular activities, particularly those involving STEM
• Make a rough draft of the argument of your application
• Allocate each idea on your list to an element of your application; that is one of the essays or to one of the letters of recommendation
Writing Style Counts

• Write in the active voice
  (Whether you use 1st or 3rd person depends on your field)

• Avoid technical jargon when possible

• Use proper grammar

• Avoid phrases like….It is obvious. It is apparent. As previously stated.

• Take out every “very,” “pretty,” actually in your narrative.
Personal, Relevant Background and Future Goals statement (3 pages)

- **Introduction & Future Goals**
  - Tell them about yourself
    - Why did you study what you did as an undergrad
    - Why are you getting a PhD
    - What are your long term goals
      - Not only career but scientific
      - What problems will you be addressing in your career

- **Intellectual Merit**
  - Tell them your research experiences, what you discovered, and put your results in context (who cares?)
  - Describe what intellectual merit you will provide in the future

- **Broader Impacts**
  - Tell them activities you have already participated in
  - Tell them what activities you plan to do during your PhD to meet this criteria
  - Tell them what activities you will do throughout your career
    - Integrate research and education
    - Increase diversity in STEM
    - Inform community about research (everyone pays for this)
Research Statement (2 Pages)
Complete in 3 years or so (Example)

• Background & Hypothesis (1/2 page)
  • Use a long-standing, important problem with no solution as your motivation
  • Present a hypothesis/technology of how to solve this problem
  • Use results from existing literature or your research to support your hypothesis
  • Give a brief overview of how you will test it, what the anticipated results are, and how it will impact society (intellectual merit and broader impacts)
  • Include a figure/schematic/cartoon that shows what you will be testing

• Objectives (1 paragraph)
  • Provide a list of objectives (THIS IS NOT A LIST OF EXPERIMENTS)
  • This is 2 or 3 objectives to test your hypothesis

• Experimental Design (1 page)
  • Describe in detail what experiments you will be perform to achieve your objectives and test your hypothesis
  • Provide another small figure if possible.
  • This is not a materials and methods section of a paper

• Summary (1 short paragraph)
  • Summarize what your anticipated results will be, the intellectual merit developed and the broader impacts of your research.

• References (you are out of room now, bunch together in paragraph format)
How to prepare a proposal

~ Educate yourself on a topic or choose a topic you are very familiar with
   ~ Read lots of literature
~ Develop a hypothesis based on holes or data in literature or your own results
~ While doing above, think about the potential impact if your hypothesis/hypotheses is/are correct
~ Research the literature and make sure your hypotheses have not been tested
~ Brainstorm on exactly what experiments would need to be performed, with proper controls, to test your hypothesis
   ~ Outline on paper what figures would be produced, be very detailed
   ~ Determine what techniques will let you measure what you want to measure and what the flaws are
~ You now have the basic parts needed to write your proposal
Resources

University of Delaware – GRFP Resource Hub
LINK

University of Missouri- GRFP Essay Insights
http://grfpessayinsights.missouri.edu/resources.php

Leigh Botner – lbotner@udel.edu

UD Recipients

Hannah Clipp – hclipp@udel.edu
Talisa Carter – tjcarter@udel.edu
Rebekah Houser - rlhouser@udel.edu
Advice from a Previous Recipient

Margot Farnham (Biomedical Engineering)