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?

The National Science Foundation

- 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

Benefits Continued

- 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

National Science Board

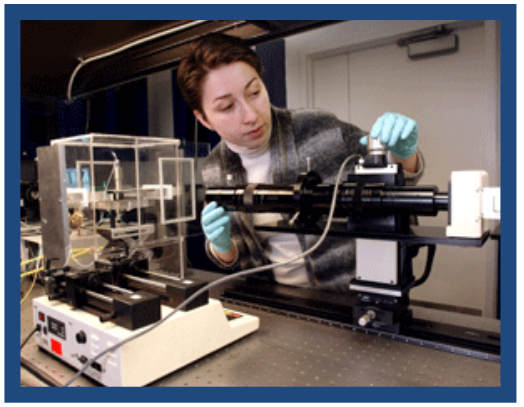
GOVERNING BOARD OF THE NATIONAL SCIENCE FOUNDATION & POLICY ADVISORS TO THE PRESIDENT AND CONGRESS

- 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

Application Review Form

Intellectual Merit Rating *	○ Excellent ○ Very Good ○ Good ○ Fair ○ Poor In the context of the five review elements, please evaluate the strengths and weaknesses of the application with respect to intellectual merit.
Intellectual Merit Comments *	
Broader Impacts Rating *	○ Excellent ○ Very Good ○ Good ○ Fair ○ Poor In the context of the five review elements, please evaluate the strengths and weaknesses of the application with respect to broader impacts.
Broader Impacts Comments *	
Summary Statement *	
Overall Score *	Score must be a whole integer between 1 – 50

Rating Applications

Quality Groups (QG)	Ratings (E – P)	Score (1-50)
QG 1: Highly Meritorious Recommended for Fellowship	Excellent	50 - 40
QG 2: Meritorious Recommended for Fellowship /Honorable Mention	Very Good	39 - 30
QG 3: Not Recommended	Good	29 - 20
Not eligible to receive Fellowships/Honorable Mention	Fair Poor	19 – 10 9 – 1

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

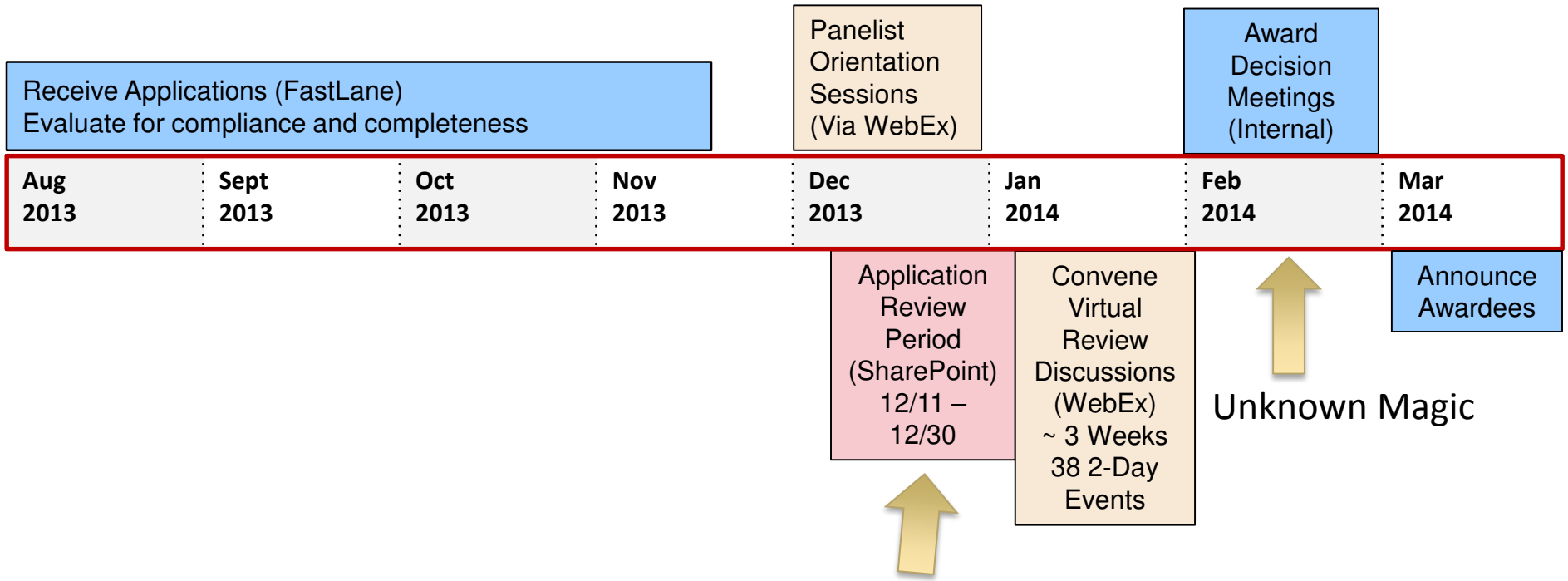
Application Review Process
Virtual Panel Activities

- 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

GRFP Review Timeline



Reviewers are very tired at this time of year.
Classes just ended. We take a week or two to "catch up". Its 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 st 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 chose 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 you 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)