National Science Foundation’s

Graduate Research Fellowship Program

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University of Missouri
Today’s Topics

1. GRFP overview
2. Review criteria & processes
3. Boosting students’ competitiveness
4. Collaboration strategies
5. Motivating students to apply
6. Q & A
One more thing…

Although today’s focus is on the GRFP, other nationally-competitive fellowships look for VERY similar levels of achievement, leadership and service.
Part 1: GRFP Overview

National Science Foundation’s GRFP Competition
GRFP Provisions

Provides 3 years of support payable over 5 years

Award value: $132,000

- $32,000 stipend per year paid to student
  Fellowship travels with student to the US university of choice.

- $12,000 “educational allowance” paid to institution
  The graduate institution must waive tuition during the 3-year GRFP tenure.

Other opportunities for active Fellows:

- International research & internships – GROW, GRIP
  Graduate Research Opportunities Worldwide; Graduate Research Internship Program

- Access to XSEDE resources
  Extreme Science & Engineering Discovery Environment: www.xsede.org; Supercomputing; visualization; data sets, etc

- Supplemental funding for researchers with disabilities
  Facilitation Awards for Scientists & Engineers with Disabilities

See handout

The GRFP is the oldest graduate fellowship of its kind (1952). To date, more than 46,500 Fellowships have been awarded.
Official Solicitation

Note: Verify eligibility in the official NSF solicitation.


See handout
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.

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“Typical” Eligibility

1. Citizenship
   - US citizen, US national, or permanent resident of the US

2. Degree requirements*
   - will pursue a research-based graduate degree
   - college senior planning to graduate by August 1, 2015
   - began graduate studies fall 2013 or fall 2014 (no more than 12 months of credits)
   - more than 12 months of grad credits but returning after a break of 2+ years
     can have MS degree
   - nearing completion of a 4 or 5 year joint BS/MS

3. Field of study*
   - Must be an NSF-supported field

*Note: Extenuating circumstances? May still be able to apply. Verify eligibility in the upcoming official NSF solicitation.
NSF GRFP Eligible Fields*

Engineering (18)
Computer & Information Science & Engineering (18)
Chemistry (10)
Geosciences (26)
Life Sciences (19)
Mathematical Sciences (14)
Materials Research (10)
Physics & Astronomy(10)
Psychology (14)
Social Sciences (20)
STEM Ed & Learning (5)

* Interdisciplinary applications are possible.
(n) = number of sub-discipline fields

See handout
NOT Eligible – *in brief*

1. **practice-oriented professions**
   - Law, medicine, dental, public health, business
   - Clinical psychology or counseling, social work
   - Education (except for STEM education); history (except for history of science)

2. **research with disease-related goals***
   - Diagnosis/treatment of physical or mental disease; behavioral studies
   - Animal models for disease or drug development or testing
   - EXCEPTION is bioengineering (application of engineering principles to problems in biology and medicine while advancing engineering knowledge)

*Notes: Always verify eligibility in official NSF solicitation.*
Here’s what typically happens

**AUG:** competition opens

**SEP-NOV:** applications received *by disciplinary* deadlines

**NOV-JAN:** 800+ panelists begin review process
  - reviewers are disciplinary experts & educators
  - required to attend orientation session
  - *every* application gets 3 independent reviews
  - review panels convene online

**MAR:** notifications
  - GRFP *offers* fellowship awards
  - Fellows must formally accept or decline by May 1

**SUMMER - FALL:** commence grad studies

*Pending federal funding,* the NSF GRFP cycle repeats annually
GRFP solicitation, deadlines, log in to apply, awards, FAQ’s, etc.
What students will need to do

✓ Launch an “account” in FASTLANE - GRFP
✓ Complete personal profile (education, work, etc.)
✓ Enter email addresses of 3-5 references
✓ Upload transcript(s)
✓ Write 2 statements (5 pages total)
✓ Upload statements into Fastlane GRFP
✓ Submit application by disciplinary deadline

The NSF makes no deadline exceptions!

Fall 2012 example: Mizzou applicant was disqualified for being 16 seconds late.
INSTRUCTIONS

Privacy Act

* Required Field

Instructions for Preparing GRFP Application

- The GRFP application is divided into sections with separate headings. Instructions are provided for completing each section. The required fields are indicated by an asterisk (*). Before you start this application, please read the Application Preparation Instructions in the Program Solicitation.

- You may complete the sections in any order that you choose. Navigate through the application using the links in the title for each section.

- You may save your application information as you go and complete it at a later time. Click "Save and Continue" to save your data and advance to the next step. Caution: Using the buttons on your Internet browser toolbar can result in the loss of data.

- You can submit your application by clicking "Submit" in the SUBMIT APPLICATION section. The system will verify that you have provided the required information to submit your application. Please review these certifications before you submit. You will not be able to submit an application without making these certifications. Five certifications must be made before the National Science Foundation can authorize funds for a fellowship award. These concern 1) controlled substances; 2) delinquency on Federal debt; 3) determinate and suspension; 4) eligibility criteria; and 5) originality of the application.

- You can check for application completeness at any time while preparing your application by clicking the "Check Application Completeness" link on the right of this page. We recommend you save an electronic copy of your completed application for your records, as the application will not be available to you after decisions are made. Applications are not carried forward for resubmission in later years.

Continue
2 GRFP Statements

**Personal, Relevant Background & Future Goals**
- Motivation for an advanced degree
- Professional development plans
- Research experiences
- Career goals
- Intellectual Merit
- Broader Impacts

**Graduate Research Topic**
- Original research topic
- General approach (methods)
- Resources needed
- Literature citations
- Intellectual Merit
- Broader Impacts
Any Questions?

National Science Foundation’s GRFP Competition
Part 2: Review Criteria & Process

National Science Foundation’s GRFP Competition
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.

“Desired societal outcomes”

A few examples:

• full participation of women, persons with disabilities, and underrepresented minorities in STEM
• improved STEM education and educator development
• increased public scientific literacy
• a diverse, globally competitive STEM workforce;
• improved national security and economic competitiveness
• enhanced infrastructure for research and education.

Source: NSF
Reviewers are instructed to...

- give **full** consideration to both criteria - in review *and* decision making processes
- assess each applicant individually, holistically
- comment on the strengths & weaknesses of the application with respect to IM and BI
Reviewers seek evidence of past IM & BI...  

...and make inference about an applicant’s potential for IM & BI.

Complete GRFP Application Packet:

- Online application
- transcript(s)
- 2 statements (5 pages total)
- 3 reference letters
1st Review Criterion: IM

“Indicators” of Intellectual Merit

- academic preparation, performance & honors
- previous research experiences
- engagement with international researchers
- mentoring younger researchers
- quality/rigor of proposed graduate research project

Generally, highly competitive applicants also have:

* scholarly publications, presentations &/or posters
* exceptional reference letters
2nd Review Criterion: BI

“Indicators” of Broader Impacts

- previous & proposed research with BI outcomes
- educational outreach with lay audiences
- engagement with diverse audiences
  - age, race, ethnicity, gender, disabilities, income, veterans, or underserved individuals living in isolated areas

Some reviewers also make note of:

* service learning & study abroad (global engagement)
* leadership & teamwork; communication skills
* teaching any age, any level
Bottom line:
Statements MUST be equally strong

- Personal, Relevant Background & Future Goals
- Graduate Research Topic

Intellectual Merit

Broader Impacts
GRFP’s 2 Review Criteria

**Intellectual Merit**

The potential to...

**Broader Impacts**

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

## T/F Quiz: GRFP’s 2 Review Criteria

<table>
<thead>
<tr>
<th>Artifact or Description in Statement</th>
<th>IM</th>
<th>BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Transcript shows applicant’s GPA of 3.9 dropped to 3.6</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2. Presentation about scientific findings with civic leaders</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>3. Research experience and outreach in a developing country</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4. Well written research plan with rigorous methods section</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>5. Exceptional reference letters on applicant’s potential</td>
<td></td>
<td>should be both</td>
</tr>
<tr>
<td>6. Previous research with a group underrepresented in STEM</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>7. Publication in university’s McNair Journal</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Any Questions?

National Science Foundation’s GRFP Competition
Making Progress

✓ GRFP Overview
✓ Review Criteria & Processes

3. Boosting students’ competitiveness
4. Collaboration strategies
5. Motivating students to apply
Part 3: How to Help Students Become More Competitive

National Science Foundation’s GRFP Competition
First, find out “what it takes”

**READ**

- NSF's official GRFP solicitation
- NSF GRFP page & NSFGRFP.org
- Unofficial GRFP resource sites: examples and reviewer comments

**NETWORK**

- GRFP Program Officers
- Current & former GRFP fellows
- GRFP panelists
- Social Media Groups

[Links]
- http://www.nsfgrfp.org
- http://grfpessayinsights.missouri.edu
- http://www.nsfgrfp.org/applicants/tips_for_applying/experienced_resource_list
Second:
Understand how the GRFP statements are intertwined

How prepared is this applicant (e.g., knowledge, skills & abilities) to undertake a graduate research project and persist toward a graduate degree?
Second:
Understand how the GRFP statements are intertwined

How will this research project build the student researcher’s IM & BI and help her/him achieve academic and career goals?
Third: Hone your skills as a reviewer

READ

Personal, Relevant Background & Future Goals

Graduate Research Topic

HINT: Read awarded essays from SEVERAL fellowship competitions and serve as a reviewer.

Tip: Find examples on Alex Lang’s site
Activity: Practice reviewer skills

Step 1: Read example
- Half read page 1
- Half read page 2
- Find IM & BI examples

Step 2: Use rubric to help you critique the statement

Step 3: Discuss why the GRFP Office should invest in this applicant, based on examples of IM & BI you found in the statement.
Building Students’ IM Capacity

Teach them to articulate how their research will **advance knowledge** within and across disciplines.

See handout for more ideas!
Another key to IM:

Reference Writers & Their Letters

They should enter 5 references in ranked order. (Suggested order of inferred importance to reviewers.)

1. Faculty mentors/advisers
   who knows applicant’s research knowledge & skills

2. Faculty who supervised summer research
   who knows applicant’s research knowledge & skills

3. Other campus faculty
   who can attest to applicant’s 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 research-related work or related to future career plans
Building Students’ BI Capacity

Teach them to articulate how their research will benefit society.

See handout for more ideas!
Create new BI opportunities for students to improve public scientific literacy...

...or mentor them as they launch and evaluate an innovative STEM BI effort.

Science & Me

Student + Teacher Collaborations

Welcome to the Graduate Student Science Outreach website!

Graduate Student Science Outreach (GSSO) is a program that connects graduate students from a variety of science disciplines from the University of Missouri with classrooms in local public schools to show how science is fun; and how interesting questions are asked and answered. Teachers can select from a list of graduate students who are available to speak to classrooms about their research and about the excitement of scientific discovery. The diverse backgrounds and research interests of graduate students participating in the program allow teachers to select from a variety of topics and presentation styles (e.g., interactive presentation, nature walk, etc.).

Participating graduate students attended a workshop led by the late Dr. Sandra Abell and Dr. Marcelle Siegel of the University of Missouri - Columbia Science Education Center. The workshop provided an introduction to effective lesson planning for K-12 students and provided strategies for constructing an engaging and valuable lesson.

W. Andrew Cox
2006 GRFP Fellow
According to reviewers…

…a track record of BI efforts is a good indicator that the applicant will follow through on the proposed BI activities.

Take home message:

**Engage students in BI activities as early as possible!**

Undergrads: create a program they can continue into grad school & early career
Grads: plan for sustainability or replication of project following graduation
Help Students Plan BI Activities

Community leadership & teamwork

Leadership with environmental initiatives

Efforts to improve public scientific literacy

Engagement with diverse audiences

Cross cultural experiences in US or abroad

Educating policy makers

Teach Mentor Outreach

Copyright Robin G Walker PhD and Linda Blockus, PhD
Brainstorming Activity:
Helping Students Plan a BI Activity

**Directions:**
As a group, use BI worksheet to devise at least one activity that is STEM related. Must be doable for a graduate student and feasibly connected to “desired societal outcomes.”
Let’s share BI Ideas!

Success Story
Any Questions?

National Science Foundation’s GRFP Competition
Part 4: Collaboration Strategies

National Science Foundation’s GRFP Competition
Realities Facing Students, Faculty & Staff

Somewhat Limited Resources

Virtually Unlimited Resources
Mizzou Model: Where we started in 2006

- Undergrad Research
  - 1 person

- Fellowships Office
  - 1 Person

- Grad School
  - 1 person

Enrollment: 21,551

# of GRFP Applicants: 14
Mizzou Model: Joined Forces

- Undergrad Research
- Fellowships
- Grad School
Mizzou Model: Growing Collaborations

- Undergrad Research
- Grad School
- Faculty Mentors & Former GRFP Panelists
- Requested Site Visit
  - NSF Program Officer
  - NSFGRFP.org (ASEE) staff
- Promoting GRFP Applications
- Grant Writers
- Office

Requested Site Visit

- NSF Program Officer
- NSFGRFP.org (ASEE) staff
Collaborative GRFP Approaches Across the US

- Undergrad Research, McNair Scholars & Honors College
- Faculty Mentor(s)
- Fellowships, Prestigious Awards Office
- Collaboration across institutions
- GRFP Fellows
- GRFP Panelists
- GRFP Resource Persons
- NSF Program Officers
- GRFP.org (ASEE) staff
- Former GRFP Fellows (now Postdocs)
- Graduate School/Division Office of Research
- Research Deans
- Writing Centers, Grant Writers
- Directors of Grad & Undergrad Studies
- National webinars
- Disciplinary conferences
- Targeted conferences
- Supporting GRFP Applicants
- Career Services Office
- Peer Mentors
- Family Members
Realities Facing Students, Faculty & Staff

Somewhat Limited Resources

Potential Collaborators on campus & other campuses
Please remember:

We share a goal of supporting students
Collaboration Activity: Identifying Collaborators

Directions:
As a group, talk about your resource needs related to the GRFP. Brainstorm ideas. Use the Collaboration worksheet to make a few notes on who you might contact when you return home.

See handout
Any Questions?

National Science Foundation’s GRFP Competition
Home Stretch

- GRFP Overview
- Review Criteria & Processes
- Boosting students’ competitiveness
- Collaboration strategies

5. Motivating students to apply
Part 5: Motivating Students to Apply

National Science Foundation's GRFP Competition
Q: Why don’t your students apply?

• Not aware of GRFP or aware they are eligible
• Was told social scientist not competitive
• Feel unqualified or not ready to apply
• Too busy to write statements
• Tension with mentor over possibility of “leaving”
• Believe mentor will not write a strong letter
A few strategies to help motivate students to apply:

Engage current & former GRFP Fellows
We asked Fellows…

**What has been the greatest advantage of winning the GFRP?**

… being able to focus on my classes and research…without having to worry about finding funding

… the freedom to choose where you want to attend graduate school

… increased probability of joining lab of choice

… once you finish the NSF GRFP application…graduate apps will be a snap

… time to focus heavily on research and create a good roadmap for my dissertation topic and methods
A few strategies to help motivate students to apply:

Appeal to their aspirations.
Why take the time to apply for a Fellowship?
Why apply?

“The NSF GRFP is one of the most prestigious fellowships that can be awarded to a graduate student. Having this award on your record

...opens many doors down the road.”

MELONIE WILLIAMS
‘09 FELLOW
VANDERBILT UNIVERSITY
GRFP Fellows “Down the Road”

1993 GRFP Fellow
Attended Stanford

6 years later, founded Google
Sergey Brin

- 30+ Nobel Laureates
- 440+ in National Academy of Sciences
- Other notable fellows
  - *Freakonomics* coauthor, Steven Levitt
  - US Energy Secretary, Steven Chu

Between 2001-2012, *active* Fellows reported 1,232 patents and inventions
A few strategies to help motivate students to apply:

GRFP award information ("Show me the money")
2 GRFP Statements

3 + 2 = 5 pages

for $132,000
### NSF GRFP Awards

<table>
<thead>
<tr>
<th>Year</th>
<th># Applications</th>
<th># Awards</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>10,000</td>
<td>1,000</td>
<td>10%</td>
</tr>
<tr>
<td>2010</td>
<td>12,000</td>
<td>2,000</td>
<td>17%</td>
</tr>
<tr>
<td>2013</td>
<td>13,000</td>
<td>2,064</td>
<td>17%</td>
</tr>
<tr>
<td>2014*</td>
<td>14,000</td>
<td>2,053</td>
<td>14%</td>
</tr>
<tr>
<td>2015</td>
<td>16,000</td>
<td>2,000</td>
<td>8%</td>
</tr>
</tbody>
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Note: Looks daunting, but these are actually VERY good funding rates!

* 1,069 women; 382 from underrepresented minority groups; 55 persons with disabilities; 37 veterans. About 20% (442) were from baccalaureate institutions.

If you can dream it, you can achieve it.

– Zig Ziglar
A few strategies to help motivate students to apply:

Repurpose those statements!
“Repurposing” Success Stories

Kiran repurposed his personal statement for graduate school applications and was admitted to Northwestern.

Quentin repurposed his statements and received a $36,000 award from NOAA which paid for his MS at the University of Texas-CC.
Encourage your students apply to several
Nationally Prestigious Programs

Fulbright
http://www.us.fulbrightonline.org

Churchill Scholarship
http://www.winstonchurchillfoundation.org

Goldwater Scholarship
http://www.act.org/goldwater

Ford Foundation Fellowship
http://sites.nationalacademies.org

National Defense Science & Engineering
Graduate Fellowship
https://ndseg.asee.org/
A few strategies to help motivate students to apply:

Provide checklists, writing tools & resource/support persons
Detailed GRFP Writing Resources:
http://grfpessayinsights.missouri.edu

Review criteria: IM & BI
*Outlines & worksheets
Checklist: stay organized
*Self-scoring rubric
Selecting references
Reference writer tips
Future applicant info
Advice from reviewers
GRFP Fellows’ advice
*Links to statement examples
Any Last Questions?

National Science Foundation’s GRFP Competition
Thank you for joining us!

Dr. Robin G. Walker
Office of Graduate Studies
University of Missouri

Special thanks to
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Mr. Tim Parshall
MU Fellowships Office
Dr. Susan Renoe
National Association for Broader Impacts

National Science Foundation’s GRFP Competition