National Science Foundation Graduate Research Fellowship

Workshop
September 11, 2015

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THE GRADUATE COLLEGE

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

THE GRADUATE COLLEGE

at the UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Fellowship Opportunities

Welcome to the Fellowship Opportunities database, maintained by the Office of External Fellowships in the Graduate College. This database contains over 800 graduate student funding opportunities. To search, select the relevant category below and browse the listings. Though it requires an investment of time, this is the best way to locate all the fellowships appropriate for you.

If you want information only on one particular award, enter the name in the box below and click "Search Fellowships."

For tips on searching the database as well as information on our grantwriting workshops and proposal advising services, watch the short video at the lower right.

Browse fellowships by category:

- Campus
- Dissertation Support
- Humanities/Social Science
- International Students
- Postdoctoral
- Professional Programs
- Research/Study Abroad
- Science/Engineering
- Underrepresented Groups
- Women
- All Fellowships

[Search Fellowships] | Advanced Search

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Upcoming Deadlines
Search Tips
FAQ
External Fellowships Office
Grantwriting Workshops
Proposal Advising
Helpful Resources
Staff & Contact

How to Search for Fellowships

00:00 04:53

Hello, this is Ken Vickery, Director of External Fellowships in the Graduate College.

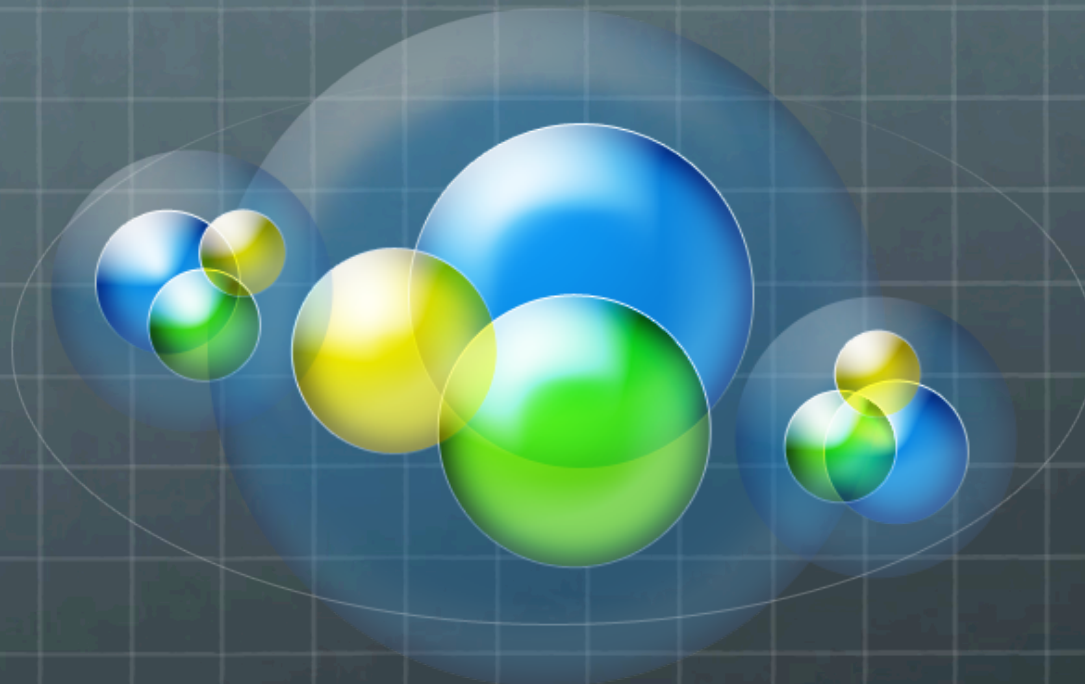# In Your Packets:

Program

PowerPoint Slides

List of Helpful Resources

Program Solicitation

William J. Hahn
Georgetown University

NSF Graduate Research Fellowship Program

University of Illinois, 2015

William Hahn
Georgetown University

Overview of Presentation

➢ The National Science Foundation

➢ Purpose of the Graduate Research Fellowship

➢ Benefits and Eligibility

➢ Review Criteria

➢ Application Format

➢ Application Review Process

➢ Award Determination and Announcement

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 national defense"

Supports research and education in Science, Technology, Engineering and Math (STEM) disciplines - all fields but clinical biomedical areas (covered by NIH)

NSF annually awards about 10,000 research grants, a proposed 2,000 new graduate fellowships (student as awardee), graduate trainees, and +/- 30,000 research assistantships (via grants to Principal Investigators)

NSF Graduate Research Fellowship

to help ensure the vitality and diversity of the scientific and engineering workforce of the United States.

recognizes and supports outstanding graduate students pursuing research-based master's and doctoral degrees in STEM fields and in STEM education.

three years of support for graduate education of individuals who have demonstrated potential for significant research achievements in STEM and STEM education

NSF especially encourages women, members of underrepresented minority groups, persons with disabilities, and veterans to apply.

NSF also encourages undergraduate seniors to apply.

NSF GRF Benefits (FY16 Solicitation)

READ PROGRAM SOLICITATION CAREFULLY!

- Three years of support over a five year period

- Annual stipend of $34,000 - cost of living to student

- Tuition support of $12,000 - cost of education allowance paid to institution – remainder covered by university

- Cyber infrastructure access via XSEDE

- International opportunities through GROW initiative

GRF Eligibility Criteria

- Academic level
  - Level 1 - Seniors, baccalaureates with no graduate study
  - Level 2 - First-year graduate students
  - Level 3 - Second-year grad students (12 months of graduate study or less by Aug 1 prior to submission)
  - Level 4 - >12 months graduate study – extenuating circumstances
  - Historic success: Level 1>Level 2>Level 3>Level 4

- Citizenship
  - U.S. Citizen, National or Permanent Resident

- Discipline
  - Research-based Masters or PhD in NSF-Supported Field of study (note changes in various fields, esp. BIO)

NSF-Supported Disciplines

- Engineering
- Computer and Information Science and Engineering
- Materials Research
- Mathematical Sciences
- Chemistry
- Physics and Astronomy
- Social Sciences (non-clinical)
- Psychology (non-clinical)
- STEM Education and Learning
- Life Sciences
- Geosciences

Some Areas <u>Not</u> Supported

- Clinical work
- Counseling
- Business
- Management
- Social work
- Practice-oriented professional degree programs
- Joint science-professional degree programs (MD/PhD and JD/PhD)
- Medical, dental, law, or public health programs
- Education (except research-focused STEM education)

Review Criteria

- Potential to <u>advance knowledge</u> and understanding within field or across different fields (Intellectual Merit) and <u>benefit society</u> or advance desired societal outcomes (Broader Impacts)

- Creative, original, or potentially transformative concepts

- Plan is well-reasoned, well-organized, and based on a sound rationale

- Plan incorporates a mechanism to assess success

- Applicant is qualified to conduct the proposed activities

- Adequate resources available for the proposed activities

Intellectual Merit Criterion

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

- Academic performance & background (grades, curricula)
- Awards/honors
- Communication skills
- Research experience
- International experience
- Independence/creativity
- Publications/presentations
- Research plan
- Choice of institution
- References

Broader Impacts Criterion

- "Achievement of societally relevant outcomes"

- Accomplished through the research itself, activities directly related to specific research projects or that are complementary to the project.

- Full participation of women, persons with disabilities, and minorities underrepresented in STEM fields

- STEM education and educator development at any level – increased public scientific literacy & development of STEM workforce

- Partnerships between academia, industry, and others

- Improved national security

- Increased economic competitiveness of the US

- Enhanced infrastructure for research and education

Broader Impacts Criterion

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

- Prior accomplishments
- Community outreach
- Impact on society and connectivity
- Future plans
- Leadership potential
- Individual experiences
- Integration of research and education
- Potential to communicate to diverse audiences

Application Materials
GRFP FastLane

Researcher Database: Orcid.org

Personal Statement, Relevant Background, and
  Future Goals Statement (3 pages incl. figs)

Graduate Research Statement (2 pages incl. figs)

Three Letters of Reference

Transcripts (uploaded into FastLane)

(GRE Scores NOT ACCEPTED!)

Personal Statement, Relevant Background, and Future Goals

- Three pages—provide the narrative of your story

  o Your <u>motivation</u>, <u>preparation</u>, & <u>potential</u> to contribute to scientific research, education, and innovation

  o Examples of <u>leadership</u> skills, <u>creativity</u>, <u>perspective</u> & <u>unique characteristics</u> (avoid arrogance)

  o How the GRFP will assist you with <u>career goals</u>

- Opportunity for evaluators to see you as a person and understand what "makes you tick"

- Chance to respond to broader impact merit criterion – How will you contribute to science and society?

Relevant Background

- Emphasize experience relevant to your application but include all examples of "research", even if not in field

- List experience with hypothesis formulation and testing, experimental design, data management and analysis, interpretation of results, dissemination of findings

- Highlight what you did (independence) but discuss collaborators (teamwork) and leadership

- A global worldview is important – mention international experience, collaborators, research opportunities, etc.

- List any publications, posters, presentations, prizes, awards, grants, special recognition, etc.

Graduate Research Statement

- Introduce general theory/area of study and importance - a few references will demonstrate understanding of field

- Panelists are experts in general field; *may not* be experts in your specific research specialty - <u>avoid</u> <u>jargon</u>

- Describe your motivation to go into that area and discuss plans to prepare for that field of study - mention school(s), degree programs, potential advisor, etc.

- Spell out specific details of your research and study plan but avoid jargon, specific experimental details, etc.

- Comment on the broader impacts of your activities

- Let the reader know of your career plans, even if tentative

- Demonstrate flexibility ("plan B")

Letters of Reference

- Three required - should know you as scientist and person

- Will compare you with NSF Graduate Research Fellows & other successful students they have known based on: potential to make unique contributions to discipline, ability to conduct original research, leadership potential, productive member of scientific community, and originality of plan of study

- Will state their role in assisting with the application

- Provide referees sufficient time; share application materials with them; ask for advice

- Track letters on FastLane - remind referees about deadline

Panelist Review of Applications

- Applications are sent to panelists in December allowing <u>several weeks for review</u>

- Applications are scored numerically for overall merit by three panelists. Applications are also ranked by each panelist using standard NSF categorical ranks (poor/fair/good/very good/excellent)

- Panelists comment on intellectual merit and broader impacts criteria highlighting strengths and areas for improvement – comments are provided to applicants

Panel Review of Applications

- Program office normalizes the numerical scores using a z-score approach and ranks applications by an average of these scores

- Virtual panel sessions held in Jan & Feb to permit discussion and recommendations to NSF

- Applications with inconsistent scoring (Z-score) are discussed and/or re-evaluated

- Final ranking is primary determinant of award choice but NSF uses ranking and other factors to determine awardees and honorable mention

Award Announcement

Usually in late March or early April

Awardees and recipients of Honorable Mention listed on the program FastLane website

Final numbers dependent upon funding made available to the program office

Success rates across disciplines not always equal

Contact Information

NSF GRF description, solicitation, and links:
http://www.nsf.gov/grfp/

Online application, user guides, & official announcements:
http://www.fastlane.nsf.gov/grfp/

Operations Center, Outreach, Helpdesk:
http://www.nsfgrfp.org

866-NSF-GRFP (673-4737)
help@nsfgrfp.org

Program Evaluation
http://www.nsf.gov/ehr/Pubs/
GRFP_Final_Eval_Report_2014.pdf

The NSF-GRF Application

-Tips on Writing the Statements-

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September 11, 2015

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University of Illinois at Urbana-Champaign
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217-333-3464

Personal, Relevant Background, & Future Goals Statement

"Describe your personal, educational, and/or professional experiences that motivate your decision to pursue advanced study in science, technology, engineering, or mathematics. Include specific examples of any research 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."

Personal, Relevant Background, & Future Goals Statement

"Describe your personal, educational, and/or professional experiences that [motivate](#) your decision to pursue advanced study in science, technology, engineering, or mathematics. Include specific examples of any research 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](#)."

1. Motivation
2. Preparation
3. Intellectual Merit
4. Broader Impacts

1. Motivation

What really drives you as a scientist?

What is *your* story?

2. Preparation

Clarify, elaborate upon, & establish relevance of *each* research, educational, or professional experience.

Frame experiences: stepping stones, convergence, etc.

Show how each experience moved you forward.

Show *your* role… use 1st person and active voice.

3. Intellectual Merit

Significant findings

Presentations

Publications

Awards/honors

Organizations

4. Broader Impacts

Clarify & elaborate upon individual BI-related activities.

Use concrete examples. Show, don't tell.

Emphasize service.

Emphasize leadership.

Emphasize results, impact on recipients.

On road to becoming publicly-engaged scientist.

Tell: I am passionate about sharing my knowledge with young students. I believe that scientists have an obligation to train the next generation, and I look forward to making teaching and mentoring a central part of my graduate studies and my career.

Show: For two semesters I volunteered at Leal Elementary School in Urbana as part of Engineering Outreach Society every Monday morning. I led a class of 3rd grade students to conduct scientific projects that I designed to demonstrate some known physical phenomenon. Each session began with a brief discussion on the subject of the day, followed by some hands-on activities together with the students. Some past projects included making Silly Putty (polymers), wiring a visible LED (circuits), and making thermometers using a sealed cup and a straw (thermal expansion). My students' many questions have been inspiring; they've also taught me how to gauge my explanations to match their level of understanding.

4. Broader Impacts

Clarify & elaborate upon individual BI-related activities.

Use concrete examples. Show, don't tell.

Emphasize service.

Emphasize leadership.

Emphasize results, impact on recipients.

On road to becoming publicly-engaged scientist.

Graduate Research Plan Statement

"Present an original 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."

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1. Research Idea
2. Approach
3. Intellectual Merit
4. Broader Impacts

Research Idea & Approach

What?

Why?

How?

Research Idea & Approach

What? – question/hypothesis

Research Idea & Approach

What? – question/hypothesis

Why? – background/significance

"Research progress is very much like an ongoing story, with plot twists and surprises. A well-written application creates a tale that appeals to the reader. The plot is revealed in the "Background and Significance" section, laying out a self-contained story. Unlike a novel, however, the story is unfinished. After the plot is presented, the reviewers should be curious about what happens next, and the questions you propose (the specific aims) should reveal how you will unfold the next chapter."

- Otto Yang, MD
Guide to Effective Grant Writing, 2005, p. 2-3

Research Idea & Approach

What? – question/hypothesis

Why? – background/significance

How? - methods

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Citations

Use sparingly

Highly abbreviated format is OK:

[1] Best et al. 2005 *Topics in Lang Disdrs,* **[2]** Grambell & Bales 1986 *Rding Rsch Quart*, **[3]** Leutner et al. 2009 *Computs in Hum Bx*, **[4]** Nicol & Swinney 1999 in *Anaphora: A Ref Guide,* **[5]** West & Holcomb 2000 *J Cog Neurosci*, **[6]** Kutas et al. 2006 in *Handbk of Psycholing, 2nd Ed.*

Structure is Good

I.   Introduction & Problem Statement
II. Hypothesis
III. Methods
IV. Anticipated Results or Findings
V.   Significance & Broader Impacts
VI. Citations

...

I. Introduction & Problem Statement
II. Hypothesis
III. Methods
IV. Anticipated Results or Findings
V. Significance & Broader Impacts
VI. Citations

I. Introduction
II. Literature Review
III. Objectives
IV. Research Plan
V. Intellectual Merit
VI. Broader Impacts
VI. Citations

I. Introduction
II. Background & Significance
III. Preliminary Data
IV. Specific Aims
V. Conclusion
VI. Citations

...

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

Completion Tracking   ☐
You may use this checkbox as a reference tool to track completion of your reviews.

Letters of Recommendation

Extremely important

Help your recommenders
Time
Materials
Discussion

Get Feedback

Advisor

Departmental review panels

Talk with your Director of Graduate Studies

Office of External Fellowships: one-on-one review

Protocol:

Complete drafts (both essays)
Already reviewed by advisor
At least 3 weeks before NSF deadline

Staff:

Dr. Ken Vickery, Director
Dr. Colleen Vojak, Assistant Director
Dr. Karen Ruhleder, Assistant Director

NSF Graduate Research Fellows

Cecilia Klauber
Electrical & Computer Engineering

Daniel Mosiman
Civil & Environmental Engineering