NSF GRADUATE RESEARCH FELLOWSHIP PROGRAM

WHAT IS IT? HOW DO I APPLY?

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WHAT IS NSF GRFP

- Around 2000 students a year across all STEM disciplines are awarded NSF graduate research fellowships
  - Approximately 15% of applicants
- It is one of the most prestigious fellowships one can receive in their early graduate career
  - They are given to students they believe will be future leaders in their fields
- This is a fellowship: it is funding a person, not a project
  - You need to show you can develop a strong research plan, but ultimately they are deciding on the person
- Historically they have gone to students from top schools, but that is finally changing (somewhat):
  - https://www.sciencemag.org/careers/2019/08/nsf-graduate-fellowships-disproportionately-go-students-few-top-schools

Graduate Research Fellowship Program

WHAT NSF SAYS

"The NSF GRFP recognizes and supports outstanding graduate students in NSF-supported STEM disciplines who are pursuing research-based master's and doctoral degrees at accredited US institutions. The five-year fellowship includes three years of financial support including an annual stipend of $34,000 and a cost of education allowance of $12,000 to the institution."

- That $12,000 is a reward to your institution—you have no access to that money
  - You should have a full tuition remittance with your acceptance to a PhD program, unless it is a state school with out-of-state tuition issues for out of state students
- You can pick and choose which 3 years you take it over a 5 year period
  - A previous student, Rubi, got a McNair first year fellowship from the University of Texas, so she delayed the NSF GRFP for years 2-4
- I have never heard of an undergraduate applying only to master's programs getting one
  - Say you are applying to PhD programs even if you don't get admitted to any
  - You don't want your smaller masters sized project being compared to bigger PhD projects unless you have a very clear justifiable reason

BASICS OF NSF GRFP FUNDING

- Most graduate programs in the social sciences and natural sciences will fund their PhD students
  - There are limits on how long and whether you must have a master's degree first
  - The funding is not always a livable wage
    - Especially at public institutions and in high cost locations
- NSF GRFP pays you $34,000 a year to get your masters/PhD (for 3 years)
  - Better than almost any university fellowship and is a livable wage in most places
  - Some universities will pay you a bonus to reward you (e.g., $1000 bonus or extra 10%)
  - Increases the likelihood you will be accepted because you bring your own funding
    - Unfortunately they usually tell you to late to use it as a bargaining chip unless you wait a year

BASICS OF NSF GRFP FUNDING

- You can only apply once as a graduate student for the NSF GRFP
  - During your first or second year
- BUT undergraduate seniors can apply and then they would have the option to apply a second time during graduate school
  - Undergraduate applicants are reviewed separately to give them a fair chance
  - If you apply now, you will get a second chance
    - You can submit a revised application or a totally new application

ELIGIBILITY

- Must be a US citizen or resident
- Must intend to enroll (or be enrolled at) a graduate program in one of the fields on the next slide (it is long, basically an Natural or Social Science or STEM education) that is in the US
  - No MDs, MPHs, etc
- Must be early in graduate career (pre- or first two years)
  - You cannot have a completed master's degree unless you waited at least two years between your master's degree and applying to NSF GRFP (but not currently in a PhD program yet)
- You need at least 3 letters of recommendation

CHEMISTRY

Artificial Intelligence
Chemical Catalysis
Chemical Measurement and Imaging
Chemical Structure, Dynamics, and Mechanism
Chemical Synthesis
Chemical Theory, Models and Computational Methods
Chemistry of Life Processes
Computationally Intensive Research
Environmental Chemical Systems
Macromolecular, Supramolecular, and Nanochemistry
Other (specify)
Quantum Information Science
Sustainable Chemistry

COMPUTER AND INFORMATION SCIENCES & ENGINEERING

Algorithms and Theoretical Foundations
Artificial Intelligence
Bioinformatics and other Informatics
Communication and Information Theory
Computational Science and Engineering
Computationally Intensive Research
Computer Architecture
Computer Networks
Computer Security and Privacy
Computer Systems and Embedded Systems
Data Mining and Information Retrieval
Data Science
Databases
Formal Methods, Verification, and Programming Languages
Graphics and Visualization
Human Computer Interaction
Machine Learning
Natural Language Processing
Other (specify)
Quantum Computing and Communication
Quantum Information Science
Robotics and Computer Vision
Software Engineering

ENGINEERING

Aeronautical and Aerospace Engineering
Artificial Intelligence
Bioengineering
Biomedical Engineering
Chemical Engineering
Civil Engineering
Computationally Intensive Research
Computer Engineering
Electrical and Electronic Engineering
Energy Engineering
Environmental Engineering
Industrial Engineering & Operations Research
Manufacturing Engineering
Materials Engineering
Mechanical Engineering
Nuclear Engineering
Ocean Engineering
Optical Engineering
Other (specify)
Quantum Engineering
Quantum Information Science
Systems Engineering
Wireless Engineering

GEOSCIENCES

Aeronomy
Artificial Intelligence
Atmospheric Chemistry
Biogeochemistry
Biological Oceanography
Chemical Oceanography
Climate and Large-Scale Atmospheric Dynamics
Computationally Intensive Research
Geobiology
Geochemistry
Geodynamics
Geomorphology
Geophysics
Glaciology
Hydrology
Magnetospheric Physics
Marine Biology
Marine Geology and Geophysics
Other (specify)
Paleoclimate
Paleontology and Paleobiology
Petrology
Physical and Dynamic Meteorology
Physical Oceanography
Quantum Information Science
Sedimentary Geology
Solar Physics
Tectonics

LIFE SCIENCES

Artificial Intelligence
Biochemistry
Bioinformatics and Computational Biology
Biophysics
Cell Biology
Computationally Intensive Research
Developmental Biology
Ecology
Environmental Biology
Evolutionary Biology
Genetics
Genomics
Microbial Biology
Neurosciences
Organismal Biology
Other (specify)
Physiology
Proteomics
Quantum Information Science
Structural Biology
Systematics and Biodiversity
Systems and Molecular Biology

MATERIALS RESEARCH

Artificial Intelligence
Biomaterials
Ceramics
Chemistry of Materials
Computationally Intensive Research
Electronic Materials
Materials Theory
Metallic Materials
Other (specify)
Photonic Materials
Physics of Materials
Polymers
Quantum Information Science

MATHEMATICAL SCIENCES

Algebra, Number Theory, and Combinatorics
Analysis
Applied Mathematics
Artificial Intelligence
Biostatistics
Computational and Data-enabled Science
Computational Mathematics
Computational Statistics
Computationally Intensive Research
Geometric Analysis
Logic or Foundations of Mathematics
Mathematical Biology
Other (specify)
Probability
Quantum Information Science
Statistics
Topology

PHYSICS & ASTRONOMY

Artificial Intelligence
Astronomy and Astrophysics
Atomic, Molecular and Optical Physics
Computationally Intensive Research
Condensed Matter Physics
Nuclear Physics
Other (specify)
Particle Physics
Physics of Living Systems
Plasma Physics
Quantum Information Science
Solid State Physics
Theoretical Physics

PSYCHOLOGY

Artificial Intelligence
Cognitive Neuroscience
Cognitive Psychology
Comparative Psychology
Computational Psychology
Computationally Intensive Research
Developmental Psychology
Industrial/Organizational Psychology
Neuropsychology
Other (specify)
Perception and Psychophysics
Personality and Individual Differences
Physiological Psychology
Psycholinguistics
Quantitative Psychology
Quantum Information Science
Social/Affective Neuroscience
Social Psychology

SOCIAL SCIENCES

Anthropology, other (specify)
Archaeology
Artificial Intelligence
Biological Anthropology
Communications
Computationally Intensive Research
Cultural Anthropology
Decision Making and Risk Analysis
Economics
Geography
History and Philosophy of Science
International Relations
Law and Social Science
Linguistic Anthropology
Linguistics
Medical Anthropology
Other (specify)
Political Science
Public Policy
Quantum Information Science
Science Policy
Sociology
Urban and Regional Planning

STEM EDUCATION AND LEARNING RESEARCH

Artificial Intelligence
Computationally Intensive Research
Engineering Education
Mathematics Education
Other (specify)
Quantum Information Science
Science Education
Technology Education

PREPARING TO APPLY

- What do you want to study?
- Do you have graduate programs and advisors picked out?
- Do you have someone to help you with the process (a current advisor)?
- Do you have a proposed project that is discrete, fundable and compelling?
  - You are not held to it though– it is ok if you change it later in your career
- Remember deadlines range from October 18-22
  - You need to start writing well before the deadline (NOW!)
  - Reference letters are due Oct 29, so you have an extra week to bug your letter writers

CHOOSING LETTER WRITERS

- You need at least 3 people, but you don't want 3 professors from your department that knew you in the same context
- You want your letters to provide different perspectives on your work
  - Maybe a professor you took many classes with, a professor whose lab you worked in, and a boss who has seen you flourish
  - Tell them why you chose them, so that they can make sure they tailor their letter to that
  - Give them rough drafts of your proposal as quickly as you can, so they accurately describe your project
- If you have diverse experiences, you can include up to 5 letter writers
  - Would give you a safety net if one letter writer falls through

TWO DOCUMENTS: ONE NARRATIVE

- Personal, Relevant Background and Future Goals Statement
  - Who are you and why are you in your field?
  - Why should NSF sponsor you? Are you a leader? What have you done that showcases your ability to do self-directed work? What experiences do you have that prepare you to be a successful graduate student and researcher? What is your potential?
- Graduate Research Plan Statement
  - What is your proposed project: what is its intellectual merit and how will it benefit society in large?

DOES YOUR PROJECT HAVE INTELLECTUAL MERIT?

- "*[R]eviewers will be asked to consider [in the graduate research plan statement] what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful.*"
- Look at the" call for proposals" as a grading checklist
  - Someone is scoring each thing that is being asked for
  - If you don't provide it, you get a zero for that box (this applies to job applications too)
- Does this project have the potential to advance knowledge?
  - You need to have a clear, formal research question with testable hypotheses
  - Answer basic questions in the field in a new (different methodology), i.e., classic question with a novel approach
  - If you question is too convoluted or our of left field, you will be scored poorly

DOES YOUR PROJECT HAVE INTELLECTUAL MERIT?

- Are you applying to the right graduate program to support this project?
  - Be clear that this is best lab and mentor to work under and that they want you to come (because you already talked to them)
  - If you proposed mentor doesn't have the equipment you need, how will you get access? Collaborations elsewhere?
  - Trust me, someone on the panel knows this potential PhD advisor and whether your project is a good fit for their lab

DOES YOUR PROJECT HAVE BROADER IMPACTS?

- Does this project have the potential to benefit society and contribute to the achievement of specific, desired societal outcomes?
  - Training an under-represented minority/marginalized scholar counts under this section—don't be afraid to highlight your identity if it is marginalized in your field (in addition to the personal background section)
- This is half of your proposal, so if this is weak, you are screwed
  - This is often the weakest part of people's application
- Describe your project to a non specialist and ask them if they think this is important work? If they can't see why it is, your broader impacts failed
  - Should be understandable to a non-specialist
  - Should be important to other disciplines

DOES YOUR PROJECT HAVE BROADER IMPACTS?

- Specifically detail outreach efforts you will have
  - Making a youtube channel or tiktok science videos counts!
  - The more creative you are, the more you will stand out
  - If you work at a field site, why will local people benefit? How will they learn about the results of your work?
- If your topic is very jargon-y or difficult for non-specialists to understand, how will you translate it for the public?
- WHY SHOULD THE US GOVERNMENT BE PAYING FOR YOU TO GET A PHD?!

DOES YOUR PROJECT HAVE BROADER IMPACTS?

- Be upfront about your identity in the *Personal, Relevant Background and Future Goals Statement*
  - And be specific: women may not be underrepresented in education, but they are in particle physics—conversely Indian Americans may not be underrepresented in physics, but they are in anthropology. Say so..
  - Black and Latinx scholars are underrepresented EVERYWHERE
  - LGBTQ scholars are less likely to persist into STEM PhD programs
- Give a unique story about what brought you to your research field
  - Every anthropologist says Indiana Jones ::yawn:: tell me something new
  - Provide a clear narrative of what brought you to your topic and why you are the person to study it
- There are so many applicants that being underrepresented is not enough, but it can help decide between two borderline applicants

NEWS | 14 March 2018

Sexual-minority students more likely to abandon science majors

Undergraduates who identify as gay, lesbian, bisexual or queer switch to non-science degrees at higher rates than their heterosexual peers.

Giorgia Guglielmi

Cite it!

News & Views | Published: 28 September 2020

SCIENCE AND SOCIETY

The road to equity for women in academic rheumatology

Cite it!

Shereen N. Mahmood & Irene Blanco

Nature Reviews Rheumatology **16**, 669–670 (2020) | Cite this article

Gender disparities persist in many aspects of working life for women in academic rheumatology. To move forward, we must find ways to address the gender gap in rheumatology with the goal of creating a workforce as diverse as the patient population it serves.

DOUBLE CHECKING BEFORE YOU SUBMIT

- Use headings that match the call for proposals
- Bold each important item in the text
  - Don't make the reviewer hunt for information
- Get your advisor to read it many times, but also ask friends and non-specialist academics for feedback
  - I asked my student Sahara to revise her proposal numerous times, but she was funded in the end
  - It will go through many drafts—it is not something you pull together last minute
- Try to submit it before the last day—the portal can get glitchy and it closes at 5pm local time

HOW IS MY PROPOSAL EVALUATED?

- Undergraduates are scored first, so that the reviewers are not biased by "better" written graduate student proposals
- There are 80 panels total (per topic) and about 25-30 panels meet at a time
  - Panels are composed of a diverse group of top scholars, around 25 of them
    - Is that really diverse though? They privilege people at doctoral granting institutions
    - They are instructed to consider non-Ivy League students heavily
  - 3 specialists read each proposal then one presents it to the rest for 5 minutes
    - They cannot review students who they have a conflict of interest with and will be sent out of the zoom room
  - After an open discussion, the 3 who initially scored the proposal have the option to adjust their score (in case of bias, error, or an unconsidered issue)
    - If the proposal is stellar, it may not even be discussed. It is the middle ranking ones that are discussed

HOW IS MY PROPOSAL EVALUATED?

- The final decision is made by the NSF program officer though
  - They consider the rankings and they sat in on parts of the panel discussion
  - They may give extra weight to student identity, university type (HSI, HBCU, MSI), uniqueness of question, whatever they want
  - They may even have withheld the best proposals which were never seen by the panel because they knew 100% they were going to fund those ones
  - It is not exclusively rankings

IT IS AN APRIL MORNING AND YOUR INBOX IS FLOODED WITH CONGRATULATION EMAILS

- If you are awarded an NSF GRFP, congratulations!
- If you have already accepted at a PhD program, let them know immediately
  - If you are negotiating at a program or between multiple programs, DEFINITELY let them know ;)
- If you did not get into a PhD program, consider if there are masters programs you are still interested in
  - Or you can let the NSF program officer know that you want to defer your GRFP a year and apply to PhD programs again next year with the NSF GRFP in hand
  - If there was a PhD program that told you that you were not admitted for purely financial/funding reasons, you could reach out and ask them if having the NSF changes their mind

IF YOU GET BAD NEWS…

- Chin up! This was a learning experience and you will have a leg up when you apply again in grad school
  - You have a better chance next year than those who never tried in undergrad
- There is an "honorable mention" list—definitely tell your advisor/new PhD program about that if you are granted that honor
  - It means you were heavily considered and it is an special
- It is important to collect "No"s; it is the only way to eventually get "Yes"s

BOBBIE BENAVIDEZ

- Internship at the Smithsonian Institute in the summer of 2017
- Graduated CSUDH in 2018
- In her third year of a PhD program at Northwestern
- Awarded an NSF GRFP in Spring 2021
  - Did apply as an undergrad senior
- Currently in Oxford for a research trip