Applying for Grants

GmMaW

University of Wisconsin-Madison

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Why apply for a fellowship?

- More money, less work!
- With a fellowship, your PhD is supported by an external source so you don’t have to TA.
- Looks great on your CV.
- Practice writing grant applications and learning how to communicate about your mathematical interests.
What can you apply for?

- NSF-GRFP

Government fellowships:

- DOE Computational Sciences Graduate Fellowship
- NDSEG (through US Department of Defense)

Diversity related fellowships:

- Ford Foundation Predoctoral Fellowships
- Graduate Fellowships for STEM Diversity (formerly NPSC)
- GEM Fellowship

Other:

- Hertz foundation
- Jane Street Graduate Research Fellowship
NSF-GRFP (Graduate Research Fellowship Program)

- **$37,000** stipend for 3 years (over a 5 year period) and tuition paid
- Can only apply in undergrad or one of your first two years of grad school
- Must be a US citizen, or permanent resident
- Need a research statement
  - Ask a professor to help you
  - NSF wants to fund people who have a clear goal and a plan for reaching that goal
  - Don’t have to end up actually working on that problem or even working with that professor
- 3 references, transcript, personal statement
- 2022: 12,600 applicants → 18 % acceptance rate
- Due **Oct 20th** (this Friday!)
Research statement excerpt:

Wall Crossings of Stability Functions of Root Systems
S. Moore

Background
Let $L$ be a finite dimensional semisimple Lie algebra. A subset $H \subset L$ is said to be a Cartan subalgebra if $H$ is a maximal toral subalgebra (a subalgebra in which all elements are ad-diagonalizable). In particular, $H$ will be abelian, implying that every $h \in H$ is simultaneously ad-diagonalizable. We call $\alpha \in H^*$ a root of $L$ if $\alpha \neq 0$ and there exists nonzero $v \in L$ such that $[h, v] = \alpha(h)v \forall h \in H$. The set of roots, $R_\phi$, is finite. Let $S_\phi = \{\alpha_1, \alpha_2, ..., \alpha_n\} \subset R_\phi$ be a basis of $H^*$ such that any $\alpha \in R_\phi$ can be written as $\alpha = \sum_{i=1}^{n} c_i \alpha_i$ with all $c_i$ either nonpositive or nonnegative integers. We call elements of $S_\phi$ simple roots. If $\alpha \in R_\phi$ has all $c_i$ nonnegative, then $\alpha$ is said to be a positive root. We denote the set of positive roots by $P_\phi$. These sets $S_\phi \subset P_\phi \subset R_\phi$ (together with some more data) are called the root system $\phi$ of $L$. For example, the root system of $sl_3(\mathbb{C})$ (denoted $A_2$) has simple roots $\{\alpha_1, \alpha_2\}$ and positive roots $\{\alpha_1, \alpha_2, \alpha_1 + \alpha_2\}$.

A (Bridgeland) stability function on a root system is a map

$$Z : P_\phi \to \mathbb{H} = \{z = x + iy \in \mathbb{C} | y > 0\}$$

satisfying $Z(\alpha + \beta) = Z(\alpha) + Z(\beta)$ for all $\alpha, \beta \in P_\phi$. As such, $Z$ is uniquely determined by $Z |_{S_\phi}$. We also typically require that $Z$ be generic, meaning that $Z(\alpha) \neq cZ(\beta)$ for any $c \in \mathbb{R}$ whenever $\alpha \neq \beta \in P_\phi$. See Fig. 1 for examples of stability functions on $A_2$. 

NSF-GRFP(2)
Personal statement excerpt:

Broader Impacts

After graduating, I plan to become a professor. As described in my personal statement, a large focus of my career will be in mentoring undergraduates in research projects. I have previously mentored a high school student in a research project where she explored various non-Euclidean geometries. If awarded the NSF GRFP, I will continue building my mentoring capabilities by creating a project for UNC’s Directed Reading Program. This program allows graduate students to mentor undergraduates through a semester-long reading project. My project would be based in Lie algebra, culminating in an understanding of the root systems associated to each $sl_n(\mathbb{C})$. I will also become involved in the McNair Scholars Program at UNC by helping with their research program over a summer. This will allow me the opportunity to help minority undergraduate researchers in a variety of fields (not just mathematics) by providing them with critical feedback at various stages in the research process.
DOE Computational Sciences Graduate Fellowship

- **$45,000** stipend and tuition paid
- Must be in first year of grad school to apply
- Research topic must be "broadly applied" - make your work sound more applied if you can (they specifically mention applied math and machine learning but other areas could work).
  - e.g. Harmonic analysis can be applied to PDEs which can be applied to physics.
- For now it says "the application will open in late October"
National Defense Science and Engineering Graduate Fellowship (NDSEG)

- $43,000 stipend
- Also get some travel money
- Must be a US citizen
- Must have at least 3 years in program remaining by Sept 2024 (i.e. must be a second year (now) or before if you’re planning on taking 5 years, or a third year or before if you’re planning on taking 6 years)
- Minorities especially encouraged to apply! (mentions women, people with disabilities, and ethnic minorities)
- Due Nov 3
Graduate Fellowships for STEM Diversity (formerly NPSC)

- Duration: 2-3 years, can be extended up to 6 years
- $20,000 annually
- Must be a US citizen
- Can be Masters or PhD student
- Due Dec 29
GEM Fellowship

• For PhD and Masters
• MS: $8,000 living stipend and tuition paid, PhD: $16,000 plus tuition paid
• Maybe only senior undergrads and masters students can apply? update when they respond to email
• Due Nov 10
Hertz Foundation

- Must be a senior undergrad or first year PhD student
- US citizen
- $38,000/nine-month personal stipend and tuition paid
- Renewable annually for up to five years, $5,000/year stipend for fellows with dependent children
- ”intend to direct their studies toward understanding and solving major, near-term problems facing society;”
- Due Oct 27th
Jane Street Graduate Research Fellowship

- $45,000 and tuition paid
- International students eligible
- Due mid December
- CV and research statement
- Two letter writers
General Advice on writing statements/proposals

• Start working on statements as early as possible
• Have multiple people look over them and give you feedback
• Write to the panel you’ll have (i.e., appropriate breadth)
• Submit early, before the deadline
• Read the instructions early, well before the deadline, and follow them.
NSF-GRFP specific advice

Have separate sections for:

Intellectual Merit:
- Convince readers you are academically prepared
- classes, seminars, workshops you’ve done
- Things you plan to do: academic, research, conferences

Broader Impacts:
- ways in which you contribute to the broader math/scientific community, or even to the general public
  - Mentoring: DRP, MxM, math circle
  - organizing a group or event
  - organizing a seminar or reading group
  - outreach
- Remember that the NSF GRFP is looking to fund the PERSON as a whole and not just the research they are proposing. This is to a large extent true of other fellowships as well.
TAing with a Fellowship

- You can always choose to TA a class while you have a fellowship!
- This would be a 33% appointment, which pays $19,883.
- e.g. Graduate Fellowship for STEM Diversity pays 20,000, plus a 33% appointment that pays $19,883 = $39,883
Links

- NSF-GRFP
- DOE
- NDSEG
- Ford Foundation
- Graduate Fellowships for STEM Diversity
- GEM Fellowship
- Hertz Foundation Jane Street
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