

# First You Get the Money, Then You Get the Power, Then You Get the Telescope Time: Writing Grant and Telescope Proposals

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# The Cycle

- Obtain Money to Fund Research
- Obtain Telescope Time (OK . . . supercomputer time I guess for you theorists)
- Obtain, Reduce, and Analyze Data
- Write Papers

# The Cycle and You

<b>Step in the Cycle</b>	<b>Your Involvement as Grad Student</b>
Obtain Money to Fund Research	Find faculty member who has money
Obtain Telescope /Supercomputer Time	Might lead telescope proposal
Obtain, Reduce, and Analyze Data	Your main purpose!
Write Papers	Required to graduate

# A Key Realization

You can be great at analyzing data and writing papers, but if you don't get funding or telescope time, it doesn't matter that much.

# My Two Cents

- Start with telescope time, focus on big Telescopes (with a capital T), like Spitzer and Keck
- Getting funding as a graduate student, my experience with NASA's GSRP program (which no longer exists)
- NASA ROSES: As an applicant
- NASA ROSES: As a reviewer

# Telescope Time

- Small telescopes relatively easy to get time on
- Big telescopes and space-based facilities heavily oversubscribed, have to have an edge!



Keck Telescopes

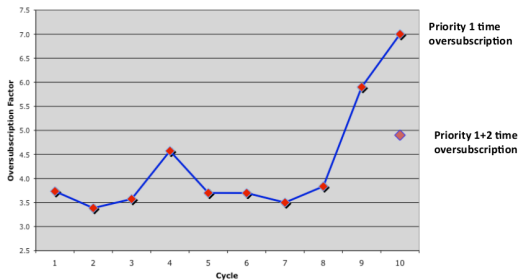
# Big Telescopes are Oversubscribed



## Hours Oversubscription



- Priority 1 time oversubscribed by a factor of 7!
- Including priority 2 time oversubscription is nearly 5.



Spitzer Cycle 10

7 August 2013 - 5

# My Experience With the “Big Glass”

- PI on two successful Spitzer proposals, co-I on current large program
- PI on two successful IRTF proposals (OK, not really big glass, and not that oversubscribed, but its on Mauna Kea)
- co-I on several successful proposals for Keck and VLT time



# Some Tips

- On the first page, there should be a thesis statement (preferably in bold) saying exactly what you want to do
- Tends to not be too much space, so be succinct and to the point
- Have co-I's with lots of experience!
- For NASA facilities, include relevance to NASA goals (space missions are a big plus here)
- Include signal-to-noise estimates for targets

# NASA GSRP

- NASA Graduate Student Research Program
- Opportunity for grad students to get thesis research funded by NASA and spend summers at a NASA center
- Not only do you not have to TA and get to work at NASA, but you learn how to write a funding proposal!
- Doesn't exist anymore, but programs like NESSF are still running
- I had one from 2011-2013 (snuck in before they canceled it!)

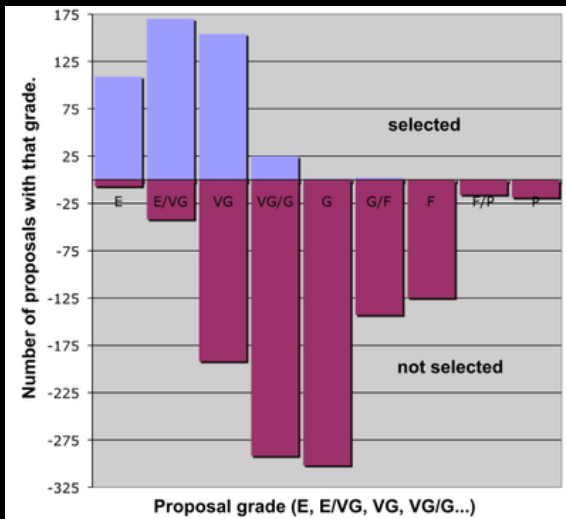
# NASA ROSES

- NASA Research Opportunities in Space and Earth Sciences (ROSES)
- Overreaching announcement for funding opportunities through NASA
- Cannot be led by graduate students (or, at UT and lots of other institutions, even post-docs)

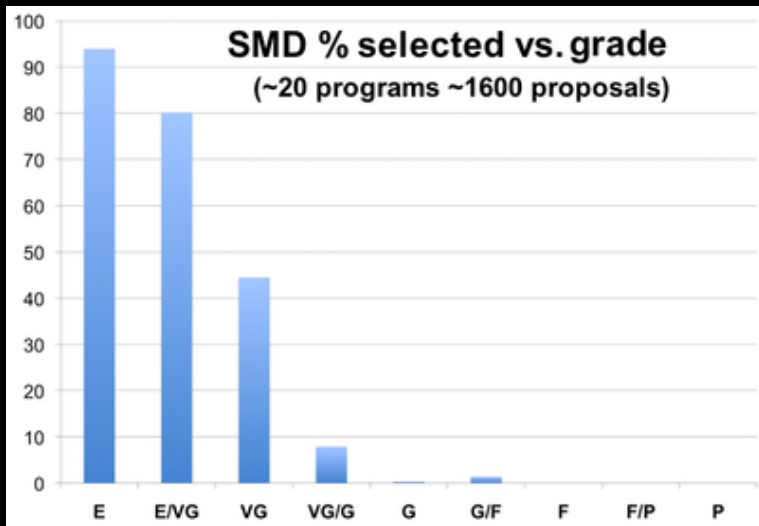
# NASA ROSES

- 15-page proposal (sounds long until you actually write one)
- Must include science justification, budget, and relevance to NASA sections
- I have been co-I (can't lead because I am a post-doc) on five proposals to date, 0 for 4 with one (still) pending

# “Good” is Very Bad!



# “Good” is Very Bad!



# Lessons learned from ROSES and GSRP proposals

- Like telescope proposals, first page should contain thesis statement describing exactly what you want to do
- “Tell’em, tell”em again, and then tell’em what you told them”-Repetition is not bad
- Avoid jargon
- Have compelling science, explain methodology thoroughly
- Usually required, but even if it is isn’t include section on relevance to NASA (or NSF, or whoever you are applying to). Quoting directly from documents such as Decadal Survey useful.
- You will be frustrated by some of the reviewer comments, but don’t get mad, become a reviewer!

# Being a Reviewer

- Interesting and valuable (even if mind-numbing at times) experience ... and you get paid!
- I served on a “recent” review panel, sorry no more details
- Typically assigned 2-3 proposals to serve as lead reviewer, 6 or so as secondary reviewer
- First few days spent discussing proposals and giving grades
- Rest of week spent writing official reviews, dealing with NASA bureaucracy



# Lessons Learned Being a Reviewer

- The frustratingly vague language in reviews is not their fault, imposed by NASA
- Assume reviewers are NOT an expert in your field, avoid jargon (my subpanel only had two comet people)
- To reiterate, repetition isn't so bad, when they are reading their 15th proposal on the plane to the review panel they will thank you!
- Compelling science goes a long way! Connect to the Big Picture!
- The panel is looking for any flaws to differentiate proposals, don't give them any (or at least address them)!

# A Few Last Remarks

- Very different from paper writing, which is iterative, proposals are much more final
- Practice, Practice, Practice!
- Unfortunately, feedback on proposals not always helpful for improving, serve on a review panel!