

Writing Proposals and Getting Funded at a Primarily Undergraduate Institution

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with contributions from

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Who are we? What is our experience?

- Martin Wong – at Colgate, a small liberal arts undergraduate university since 2005
 - Involved in NSF proposals as a graduate student
 - Three NSF grants funded at Colgate (Two to EAR-Tectonics and one MRI grant to upgrade our SEM lab)
 - Frequent NSF reviewer
- Jennifer Anderson – at Winona State, public four-year university, since 2005
 - Never even saw a proposal until after PhD!
 - Participated on two NASA review panels, NAGT/SERC and NASA proposal workshops, external reviewer for NASA programs
 - Collaborator, then Co-I on proposal with senior colleague
 - Submitted my NASA proposal four times before it was funded!

Proposal Experience?

- What has been your experience with proposals up to this point in your career?
 - Funded? Written? Reviewer? Read some? Nothing?
- What agencies are you most likely to apply to for research funding?

PUIs compared to Research Institutions...

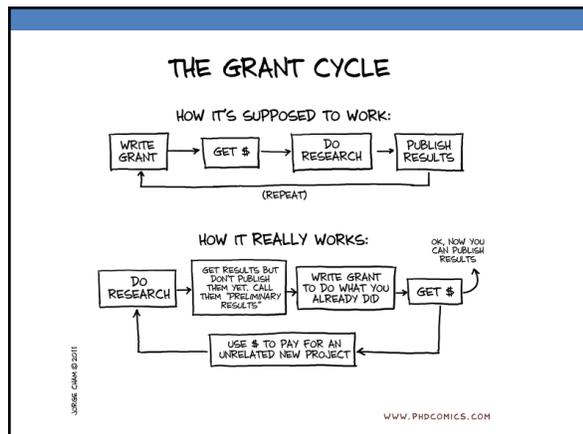
- What are strengths or advantages to PUIs?
- What are challenges (perceived or real)?

Let's Review Some Successful Proposals at PUIs...

- Read or scan your assigned proposal...
- Take notes on the handout.
- Then form a group to compare proposals...
 - What commonalities do you observe about great proposals?
 - Why might these proposals be well-suited for a PUI?

Critical Pieces of a Proposal

- **A clearly articulated, doable project**
 - State hypothesis or research questions clearly
- **A well-formulated argument for why this is important, how this fits into previous work, and why you are the one to do it**
- **A definite plan for implementation**
 - What will success look like?
- **A track record**
 - Preliminary data/previous publications/pilot projects
 - Partnerships with recognized experts



Proposal Review

• What are the criteria?

- NSF
 - Criterion 1: Intellectual Merit
 - Criterion 2: Broader Impacts
 - Program Guidelines
- Your institution
- American Chemical Society, NASA, NOAA, Dept of Education, Dept of Energy, Dept of Transportation, ONR, EPA, US Geological Survey EDMAP, ...

• Who are the reviewers?

Writing a Strong Proposal

- **Grant writing as a persuasive essay**
 - What do you want to do?
 - Why is it important?
 - How will you do it?
 - Why are you the best person to do this?
 - What do you need to succeed?
- **Clear, concise, compelling**
- **Follow the rules!!**

Strengths/Advantages of a PUI

- PUI is hard-money – not dependent on funding for a paycheck.
- Institutional expectations are variable, but generally less pressure to get funded compared to R1.
- External grants are wonderful for University and students.
- Undergraduates are very inexpensive!

Real Challenges at many PUIs

- Time to do research with full teaching load?
- Small department size, limited research group
- Limited (or no) start-up or travel funds.
- Limited access to instrumentation
- Minimal (or no) support staff.
- Undergrads can be a challenge to mentor through research and often get less done than grad students. (There is another session on this!!)

Selling yourself at a PUI...

- Find established collaborators
- Demonstrate a track-record
- In general, PUIs are less expensive
- In particular, undergraduate students are much less expensive than graduate students
- Convince reviewers you have the time to achieve your goals
Leverage your PUI status to add something unique to the proposal (e.g. Broader Impacts at NSF). What can you build on to your research that a large R1 institution can't/won't?
- NSF has a special RUI (Research at Undergraduate Institution) statement that is an add on to a proposal

Spell out an achievable and detailed work plan!

National Funding Opportunities*...

- National Science Foundation
 - RUI: Research in Undergraduate Institutions
 - ROA: Research Opportunity Award
 - NSF-REU: Research Experience for Undergraduates
 - Sites vs. Supplements
- American Chemical Society Petroleum Research Fund
 - UNI: Undergraduate New Investigator Grants
 - UR: Undergraduate Research
- EDMAP: Education component of National Cooperative Geological Mapping Program
- NASA: Early Career Fellowship Program

* Many more details and links on slides at end of presentation!

Regional Funding Opportunities...

- State or county agency funds or projects
- Alumni businesses or donations?
- Check with your institution!

** You can actually get quite a lot done with not very much money!! **

Student Funding Opportunities...

- Geological Society of America
 - Northeastern, South-Central, and Southeastern Sections
- Sigma Xi
 - Grants in aid of research program
- AEG
 - Multiple award types
- Check with your own institution as well!!!
 - Student research funding and/or student travel funding

Words of Wisdom

- Know what you want and why you want it
- Avoid upsetting reviewers - take care to cite relevant sources, give credit where due, follow the rules!!
- Approach it as a 'hypothesis testing' proposal rather than 'voyage of discovery' proposal.
- Contact relevant program officer – questions about ideas, mechanics – before submission
- Sell your research at a PUI and think about what you can contribute that a large R1 can't (Broader Impacts)

Read successful proposals

- On-site proposal collection
- Proposal collection on the Cutting Edge website

<http://serc.carleton.edu/NAGTWorkshops/earlycareer/research/funding.html>

- Get yourself on a proposal review panel!!!

Additional Information and Resources

Funding Opportunities

• NSF-RUI: Research in Undergraduate Institutions

- support PUI faculty in research
- builds capacity for research at their home institution
- supports the integration of research and undergraduate education

• NSF-ROA: Research Opportunity Award

- support PUI faculty research
- allow faculty to work as visiting scientists at research-intensive organizations where they collaborate with other NSF-supported investigators.
- May be a new collaboration between PUI and another institution, a supplement to an existing award at research institution, or a re-budget of an existing award to support PUI faculty

http://www.nsf.gov/crssprgm/rui_roa/contacts.jsp

Funding Opportunities

NSF-REU: Research Experience for Undergraduates

- **REU Sites** projects that engage a number of students in research. They may be based in a single discipline or offer multi-department research opportunities.
- **REU Supplements** may be a component of new proposals or requested for ongoing NSF-funded projects. Investigators should contact that program officer before submitting the request.

<http://www.nsf.gov/crssprgm/reu/faculty.jsp>

Funding Opportunities

American Chemical Society Petroleum Research Fund

UNI: Undergraduate New Investigator Grants

- \$55,000 over 2 years
- PI in department without doctoral program
- Seed money to demonstrate proof of principle
- Related to research in the petroleum field

UR: Undergraduate Research

- \$70,000 over 3 years
- PI in department without doctoral program
- Related to research in the petroleum field

<https://www.acs.org/content/acs/en/funding-and-awards/grants/prtfprograms.html>

Funding Opportunities

EDMAP

- Education component of National Cooperative Geological Mapping Program.
- Faculty request funds to support students in one year mentored mapping project on specific geographic area.
- Every Federal dollar that is awarded is matched with university funds.
 - Urgrad projects limited to \$7500 (plus match)

<http://ncgmp.usgs.gov/about/edmap.html>

Funding Opportunities

National Aeronautics and Space Administration

- Loads of programs for science funding
- NSPIRES →
 - NASA Solicitation and Proposal Integrated Review and Evaluation System
 - <https://nspires.nasaprs.com/external/>
- Planetary Geology → ROSES
 - Research Opportunities in Space and Earth Science
 - 95 different programs in ROSES 2018

Funding Opportunities

• Student-driven proposals

- Geological Society of America
 - Northeastern, South-Central, and Southeastern Sections
 - <http://www.geosociety.org/grants/ugrad.htm>
- Sigma Xi
 - Grants in aid of research program
 - <https://www.sigmaksi.org/programs/grants-in-aid>
- AEG
 - Multiple award types
 - <https://www.aegfoundation.org/16450/funds/>