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# Preparing Competitive Research Proposals

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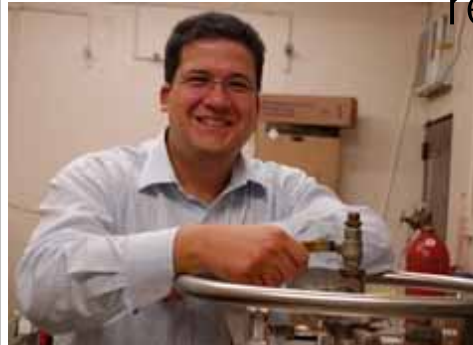
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# Who/What is a "Successful" Researcher?

From my point of view (that of an academic):  
 A successful researcher is one who advances the current state of knowledge/art in his/her field of research by:



- Performing research at the forefront of the chosen field
- Disseminating the results of his/her research in the primary literature (i.e., peer-reviewed journal publications)
- Training/educating new generations in how research is carried out and in the knowledge not available in the secondary literature (i.e., textbooks)

## What does it take to be a successful researcher?

- Passion
- Discipline
- Creativity
- The "right" education
- "Good" students
- Access to adequate resources
- **Research funding!**

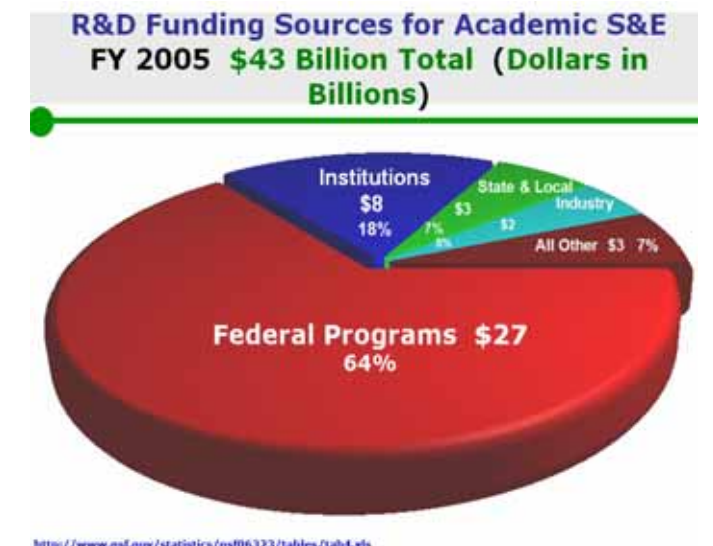
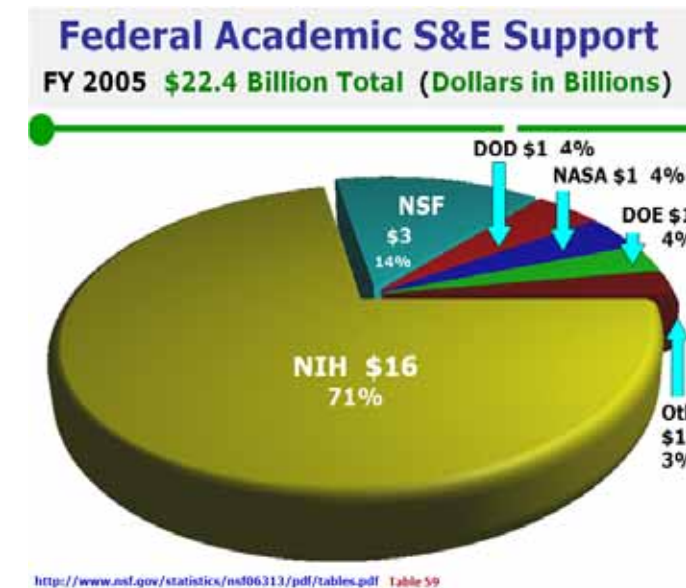


## Why and how is Research Funded?

- The primary source of academic research funding in the US is the Federal Government
- The objectives of Federal Research Funding include:
  - The advancement of science and education in order to sustain national competitiveness (NSF)
  - The advancements of science and techniques to deal with human disease (NIH)
  - The achievement of strategic goals in space exploration, energy policy, national defense, etc. (NASA, DoE, DoD, etc.)
- Other sources of funding include:
  - Local government

## Who Benefits from Research Funding

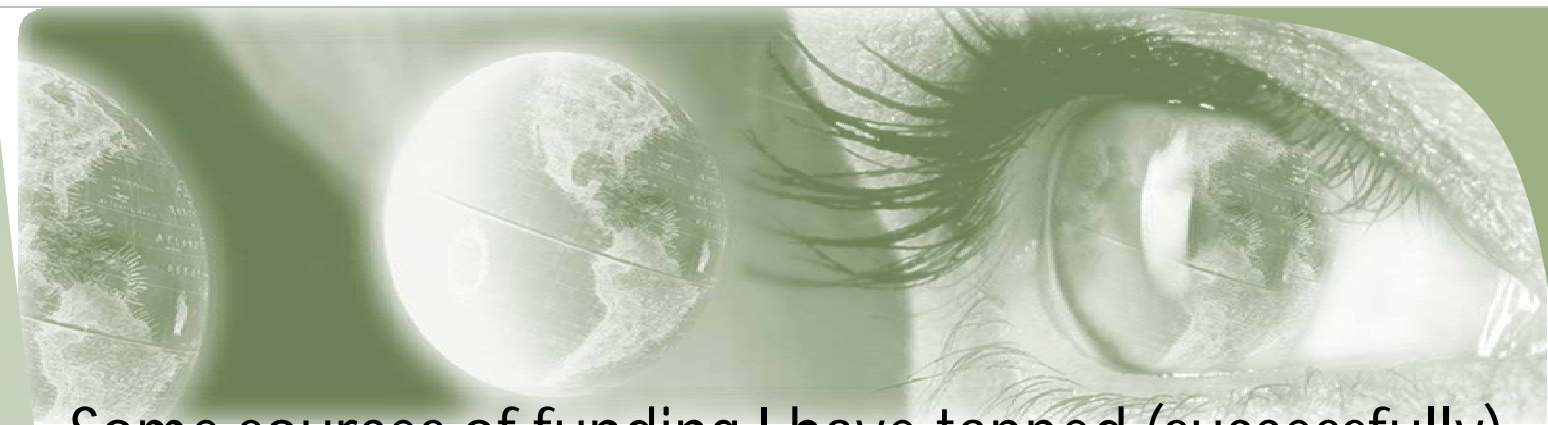
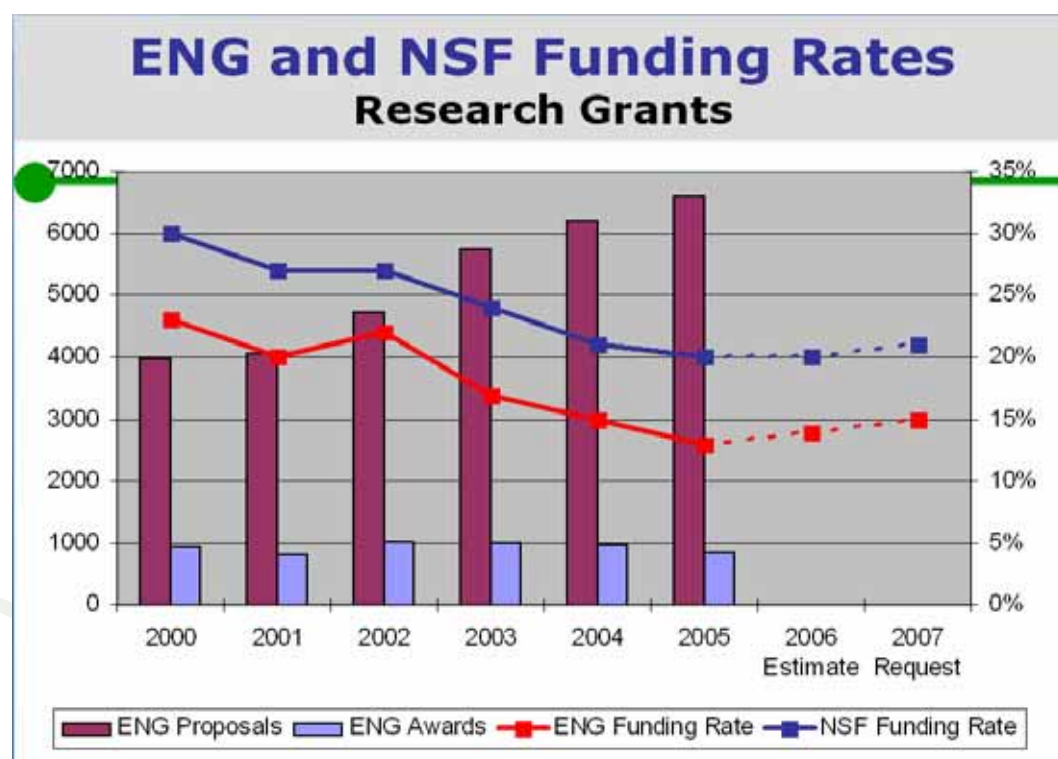
- The following are the obvious stakeholders in Research Funding:
  - Students – typically receive some form of support in carrying out their studies
  - Faculty – receive extra pay and recognition
  - Universities – prestige and indirect costs (revenue)
- However, the most important stakeholder is the average citizen on the street – if research funding ultimately does not impact society as a whole then eventually the government will stop sponsoring research!



## How to obtain research funding?

- Do your homework!
  - Get to know the major research funding agencies (NSF, NIH, DoD, DoE, NASA, DHS, etc.) as well as the smaller sources (ACS PRF, etc.)
  - Study the funding patterns of the agencies – what do they fund? How much?
  - Volunteer to serve as mail-in reviewer and in review panels (this is the future of proposal review)
  - Get to know your program manager(s) – discuss the research you plan to do with them, ask them for feedback, prepare whitepapers and pitch presentations

- Seek help!
  - R&D Center sponsored activities
  - Proposal Development Unit
  - Talk to successful colleagues (informal meetings, mentors, etc.)
  - Attend workshops sponsored by funding agencies
  - Buy books (e.g., Grant Writers Seminars and Workshops)
  - Submit as many proposals as you can, within intellectual and ethical constraints
  - **Do not** focus solely on sheltered funds – EPSCoR is meant to stimulate competitive research, not replace it
  - Take advantage of special programs for junior faculty (NSF BRIGE, NSF CAREER, NIH ESI, NIH Innovator, etc.)
  - Similarly, do not focus (long term) on a single funding agency
  - No proposal is too small – a little research funding is better than none!
  - Plan your research for the next five years and divide projects into categories
  - Long term vs short
  - Applied vs fundamental
  - Based on your research ideas choose an overarching theme – this will be your niche
  - Distance yourself from your advisors, but do not stray outside of your area of expertise



## Some sources of funding I have tapped (successfully)

- UPRM R&D Center Seed Funds (\$10k)
- EPSCoR New Faculty Start-Up Funds (\$250k)
- NSF Small Grant for Exploratory Research (\$25k)
- NSF Major Research Instrumentation (\$320k)
- NSF Unsolicited Proposal (\$50k)
- ACS Petroleum Research Fund (\$35k)
- NSF CAREER (\$421k)
- NSF Nanoscale Interdisciplinary Research Teams (\$1.15M)
- NSF REU (\$249k)
- NSF CREST (\$5M)

## Other sources of funding I tried (and failed)

- NSF NANOSCALE INTERDISCIPLINARY RESEARCH TEAMS (FAILED THE FIRST, GOT THE SECOND!)
- NSF CAREER (FAILED THE FIRST, GOT THE SECOND!)
- DOD RESEARCH IN HSIS
- NSF CREST (3 TIMES! GOT THE 4<sup>TH</sup>!)

Ejemplo:

Por: Arturo J. Hernández-Maldonado, PhD



## My Road to a CAREER Award

by: Arturo J. Hernández-Maldonado, PhD

### A timeline:

- **May 2004:** Prepared & submitted an EPSCoR Start-Up proposal (seed funds!)
- **Summer 2004:**
  - ✓ Finished my PhD work,
  - ✓ Hired @ UPRM,
  - ✓ Received EPSCoR Start-Up Grant
- **August 2004:** Hired two PhD students; 4 undergrad assistants.
- **September 2004:** Started looking for lab space. Started process of buying materials and critical equipment.
- **October 2004:** First visit to NSF. Attended a Workshop for Minority Faculty.
- **November 2004:** Finally, got my lab space assigned. Lab was set up in a month or so (ancillary equipment, etc.).
- **December 2004:** Critical lab equipment arrives. Received UPRM R&D Center Seed Money Award.
- **January 2005:** Submitted my first NSF proposal to the Major Research Instrumentation Program.
- **February 2005:** Submitted collaborative proposal to USGS-NIWR
- **April 2005:** My first NSF panel: unsolicited proposals.
- **January - May 2005:** Preliminary results on topics to be presented in my CAREER proposal. Brainstorming.
- **May 2005:** CAREER proposal writing starts. Submitted white paper to NSF program manager. Grad course elective: concept development starts.
- **June 2005:** Invitation to join two ERC pre-proposals. Grad course creation request submitted to UPRM administrators.
- **July 2005:** CAREER proposal submission.
- **Late August - September 2005:** preparation and submission of an NSF REU proposal (Co-PI)
- **November 2005:** Meeting with NSF CTS/MRI program director.
- **December 2005:** Submission of a proposal to ACS PRF.
- **January 2006:** Submitted my second NSF proposal to the Major Research Instrumentation Program (PI)
- **January 23, 2006:** Received NSF CAREER Award.
- ... and the never ending road continues.



University of Puerto Rico – Mayagüez  
Department of Chemical Engineering

2004

2005

2006