Competitive Grantsmanship in a Tight Federal Budget: Strategies for Success

Anna C. Palmisano, Ph.D.

My Background with Federal Agencies

- Leadership roles in management of science and technology programs at DOD, USDA, and DOE:
  - Director of Biomolecular and Biosystems Science and Technology, Office of Naval Research
  - Deputy Administrator for Competitive Programs, Cooperative State Research, Education and Extension Service (now the National Institute for Food and Agriculture)
  - Associate Director of Science for Biological and Environmental Research, Office of Science, Dept. of Energy
- Over 20 years of experience building working relationships across federal agencies in biology, environment, and agriculture.

Outline of Talk

- Budget outlook
- The appropriation process
- Targeting agencies for funding
- Interacting with program managers
- Reading the RFA and preparing proposals
- Appealing to reviewers
- Capitalizing on trends and staying “nimble”
- Q & A

Budget Outlook

President Obama on Science, Technology and Innovation

"Whether it's improving our health or harnessing clean energy, protecting our security or succeeding in the global economy, our future depends on reaffirming America's role as the world's engine of scientific discovery and technological innovation."

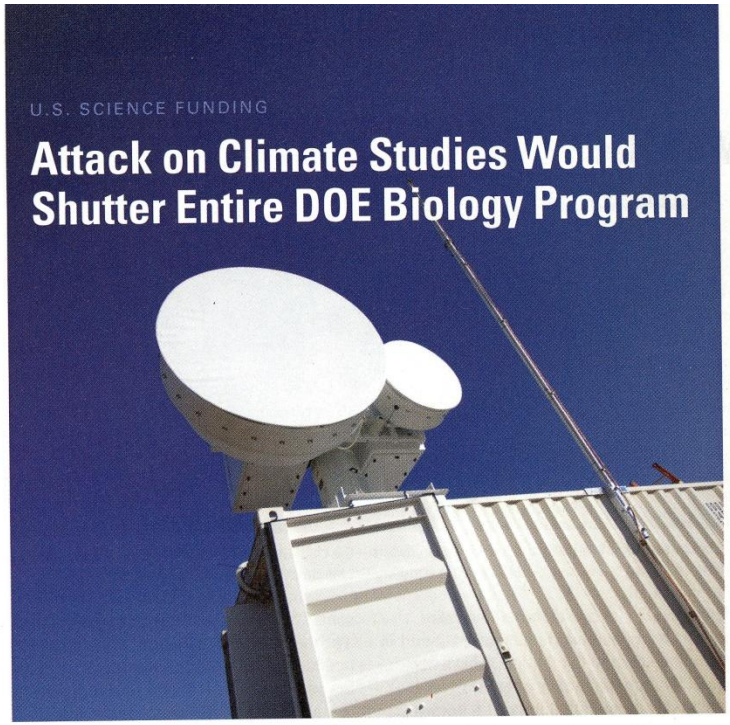
President Obama and Dr. John Holdren, Director of the Office of Science and Technology Policy

Budget Outlook for Federal Science Funding ($M)

Agency	FY2010	FY2011	*FY2012 PR*
NIH	31,008	30,686	*31,829*
NSF	6,872	6,807	*7767*
DOE science,ARPA-E	4,904	5,054	*5,966*
NASA space science	4,493	4,935	*5017*
EPA science & tech.	847	813	*826*
NOAA	4,853	4,511	*5498*
CDC	6,467	5,649	*5,893*
USDA competitive	262	264	*325*
DOD basic research	1,815	1,947	*2,078*

Source: AAAS

The federal science budget is volatile



U.S. SCIENCE FUNDING

Attack on Climate Studies Would Shutter Entire DOE Biology Program

Scientists were caught by surprise when they found out that the Department of Energy's (DOE's) office of Biological and Environmental Research (BER) would be shut down if a 2011 spending bill passed last month by the House of Representatives

Columbia. "BER doesn't make [climate] policy. It funds scientists to provide the basic research that will improve the models, which the policymakers can then use or disregard."

"I'm baffled by this proposal," says Anna Palmisano, who headed BER until

Looking skyward. Dual-ban
ARM site in north-central Ok
tional this month.

a wait-and-see attitude
decimation of BER. "V
challenges in 2011" i
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would go during a talk
meeting last week in W

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Ridge National Labo

Science, March 18, 2011

Earmarks are being reduced

- DOD and USDA have had greatest number of earmarks
- NSF and NIH have had the fewest
- Direct impact on recipients
- Indirect impact on others:
  - Increases pool of applicants for competitive funding
  - Reduces funding for infrastructure

Stimulus funding will be completed

- Agencies such as NIH and NSF used stimulus funds to support research projects that increased the number of PIs and their students
- Those funded will be looking for means to continue the research they began under the stimulus.
- A positive feedback loop…

More people looking for funding

Pool of funding is flat or shrinking

Competitive Grantsmanship is of vital importance!

Appropriation Process

“The President proposes…

- The typical timeline for budget planning is a minimum of two years.
- Planning for FY2012 budgets began at the agency levels in January 2010 at the very latest.
- Target numbers are provided to the agency by the Office of Management and Budget (OMB).
- Within the agency, guided by senior officials, with input from stakeholders, ideas are competed and reviewed.
- Agency proposals for FY2012 are vetted by OMB and by the Office of Science and Technology Policy, and coordinated across agencies

- Note: This is a highly iterative process!
- February, 2011, the FY12 President’s budget was released and delivered to Congress.

…and Congress disposes”

- The goal is for Congress to pass a budget by Oct. 1, but that rarely happens.
- While Congress debates, the government is run on a continuing resolution.
- House and Senate Appropriations Committees meet and draft budget language.
- Each house passes their version of the appropriations bill
- The two houses will “conference” to work out the differences between the two versions.
- The final version is passed by Congress.
- The bill goes to the President for signing.
- Agencies are provided funding for the fiscal year.

Targeting Federal Agencies for Funding

General Mission and Functions of Some Federal Funding Agencies

Dept. of Defense (DOD):

Basic, Applied and Advanced Technology Demonstration in support of military operations and requirements:

- Office of Naval Research (ONR)
- Air Force Office of Scientific Research (AFOSR)
- Army Research Office (ARO)
- Defense Advanced Research Projects Agency (DARPA)
- Strategic Environmental R&D Program (SERDP)

Supports fields ranging from biology and neuroscience to chemistry, materials, IT, sensors, space science and more

National Science Foundation:

Fundamental science and engineering, and science education; primary funder of basic research at US colleges and universities.

Directorates include:

Geosciences

Biological Sciences

Math and Physical Sciences

Engineering

Social and Behavioral Sciences

Computer and Information Science & Engineering

Education and Human Resources

Supports all fields of basic science and engineering.

National Institutes of Health:

The Nation's medical research agency—supporting scientific studies that turn discovery into health. There are 27 Institutes and Centers including:

- National Cancer Institute (NCI)
- National Institute of Allergies and Infectious Diseases (NIAID)
- National Institute of General Medical Sciences (NIGMS)
- National Human Genome Research Institute (NHGRI)
- Fogarty International Center

Department of Energy:

To ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.

Office of Science: Basic research and scientific facilities in support of the energy mission; largest funder of physics in the US. Funds 10 National Labs as well as Universities:

- Basic Energy Sciences
- Biological and Environmental Research
- Advanced Scientific Computing Research
- Nuclear Physics
- Fusion Energy Sciences
- High Energy Physics

Department of Energy:

Other Program Offices

Advanced Research Projects Agency- *Energy* (ARPA-E):high risk/ high payoff projects; develop and deploy advanced energy technologies

Energy Efficiency and Renewable Energy (EERE)
Environmental Management
Fossil Energy
Nuclear Energy
Legacy Management
Electricity Delivery and Energy Reliability

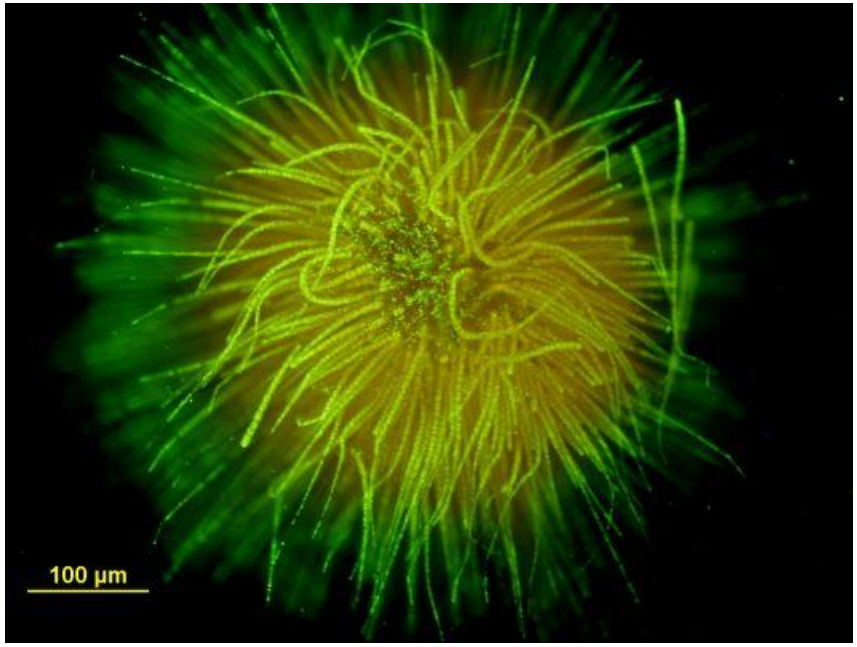
Strategies for Success

- Cast a wide net—include smaller agencies, private foundations
- Look for best fit of science and mission
- Seek out “meet the funder” sessions at professional meetings
- Find out success rates of individual programs
- Don’t use the “splatter” approach—be strategic

<u>In a tight federal budget, you must expand your funding portfolio</u>

Casting a wide net
Example: Microalgae Research

- DOE Office of Science (BES and BER)
- DOE Office of Biomass Programs
- Air Force Office of Scientific Research
- NSF- BIO, GEO, ENG
- Industry: Exxon

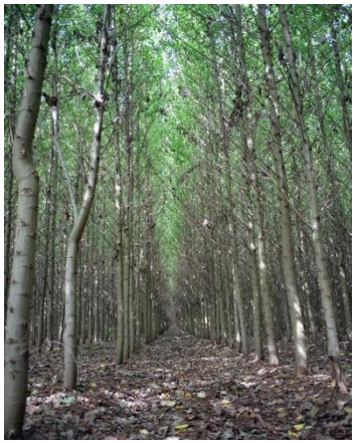


Barry H. Rosen, USGS

Casting a wide net
Example: Carbon Cycle

- DOE programs (Office of Science)
  - BES: Carbon capture, deep geological sequestration
  - BER: Systems biology of carbon cycle, terrestrial ecology
- NSF programs (BIO, GEO)
- NASA and USDA

Duke FACE site



ORNL CSite

Casting a wide net: Bio-based or Bio-mimetic Materials

- NSF Math and Physical Sciences
- DOE Basic Energy Sciences
- Office of Naval Research

Success Rates are of Vital Importance!

- Find out success rates for ongoing programs
- Success rate is the percentage of proposals funded as a proportion of the total submitted
- If the success rate is single digit (<10%) it probably is not worth your time to write a proposal
- Pre-proposals are a tool to increase success rates—take advantage of this tool when available!

Why you should volunteer to serve on a peer review panel

- Inside look at program
- Understanding peer review process
- Face time with program manager
- “I had no idea…”
- High success rate for peer reviewers that proposed next year

Interacting with Program Managers

Three Models of Program Managers

Model #1

- Program Managers have total discretion on project selection.
- Peer review is often optional or used as a background information for the Program Manager.
- Examples: Office of Naval Research, Defense Advanced Projects Agency- DARPA, Air Force Office of Scientific Research.
- Program Managers have to “stand and defend” decisions to management.

Three Models of Program Managers

Model #2

- Program managers go strictly by reviewers with little deviation from a ranked list (1-X) provided by panel.
- Examples: National Science Foundation, NIH, USDA-National Institute of Food and Agriculture.
- Note: NIH has separate Extramural group that manages panels to avoid any appearance of conflict of interest.

Three Models of Program Managers

Model #3

- Hybrid of #1 and #2
- Program managers depend on reviews, but have some discretion
  - Proof of concept
  - Mission critical
  - “On-the-line.”
- Example: DOE Office of Science
- Deviation from reviews must be justified to agency managers.

Getting to know the Program Manager

- Critical for Models #1 and #3
- Getting face time:
  - Serving on peer review panels
  - Professional society meetings
  - Grantsmanship workshops or “meet-the-funder” sessions
  - Attend agency program development workshops
  - Call or visit the agency
- Do not rely on e-mail alone! Instead, e-mail to arrange phone call or meeting

Calling the Program Manager

DO:

- Have a goal to gain insights and build rapport; encourage a dialogue!
- Spend time reading the website in advance
- Do your homework on the programs and RFA
- Prepare your comments and questions in advance
- Take no more than 15-20 min. of time; be respectful
- If your project is not a good fit, ask about other agencies and contacts

DON’T:

- Give a lengthy “info-mercial” on your research
- Attempt to bully the program manager into funding you
- Debate your negative reviews

Visiting the Program Manager

- Ask for no more than 30 min. of time
- Plan transportation carefully in advance—know your geography and travel time
- Arrive early: Allow time to get through security BEFORE your meeting
- Bring no more than 5 – 10 slides for tabletop brief
- Dress professionally
- If invited to give a seminar at the agency: Prepare well, understand agency culture, and have polished slides—no mistakes!

Five Things Program Managers Hate

1. Caller or visitor has not done any homework on agency programs.

   Solution: read the web site and the RFA prior to calling

2. Caller or visitor provides a pushy, hard sell on his/her research

   Solution: promote a dialogue with the program manager

3. Angry calls and e-mails about reviews

   Solution: sleep on it, develop a list of questions, then call when you are not mad

4. Trying to end run the process (e.g. politicizing)

   Solution: stick with the process—the end run rarely works and generates a lot of ill will

5. “I want my own center.”

   Solution: don’t go there

Communicate Successes to your Program Manager

- Share high profile papers (*Science*, *Nature*, *Proceedings of the National Academy of Sciences*) in advance of publication.
- Notify of media interest in paper or talk
- Work with your institution's public affairs experts
- Make your Program Manager look good!
- Help your Program Manager maintain the program that is funding you!!

Reading the RFA and Preparing Proposals

Reading the RFA

- What does the agency really want?
- How is the call being constrained?
- What are the requirements?
- Is your idea a good fit? If not, are you willing to adapt your idea to the call?
- If the program is not new, check the web for what they funded last round:
  - Avoids duplication
  - Provides insights into what success looks like

Preparing the Proposal

- Make it clear up front how your proposal addresses the RFA
- Work from an outline to ensure good flow
- Provide preliminary data when possible
- Include back up plans for your approaches, show that you have thought through challenges
- If you have multiple contributors – have one PI serve as master editor
- If the limit is 15 pages, don’t go below 13.
- Get objective internal review prior to submission

Internal Review

- Why?
  - Provides an objective view on clarity of communication of ideas
  - Improves competitiveness
- How?
  - Plan timing of proposal preparation to accommodate an internal review
  - Enlist department chair or colleague to help

Appealing to Reviewers

Peer Review—Like it…or not

"In my considered opinion the peer review system, in which proposals rather than proposers are reviewed, is the greatest disaster visited upon the scientific community in this century.

I believe that U.S. science could recover from the stultifying effects of decades of misguided peer reviewing if we returned to the tried-and-true method of evaluating experimenters rather than experimental proposals.

Many people will say that my ideas are elitist, and I certainly agree."

Luis Alvarez (Nobel Laureate in Physics)

Peer Review: Another view

To Paraphrase Sir Winston Churchill:

“Peer review is like democracy, it’s better than the alternatives.”

What I have observed about Peer Review:

- Peer reviewers bring knowledge and (for the most part) objectivity and fairness.
- They put an extraordinary amount of effort to do a good job.
- Reviewers are asked to focus on constructive criticism and usually do.
- Reviewers tend to give young investigators the benefit of the doubt.
- Each reviewer knows that their work, too, will be reviewed.
- Program Managers do not invite back those that are ill-prepared or biased.

Reviewer Pet Peeves

- Typos, poor grammar, sloppy writing
- Difficult to follow, e.g. “I had to read it three times to understand it”
- Excessive budget requests, especially travel, “top heavy” personnel (few students or post-docs), highly paid consultants
- Collaborators haven’t contributed to proposal

Capitalizing on Trends and Staying “Nimble”

Trends

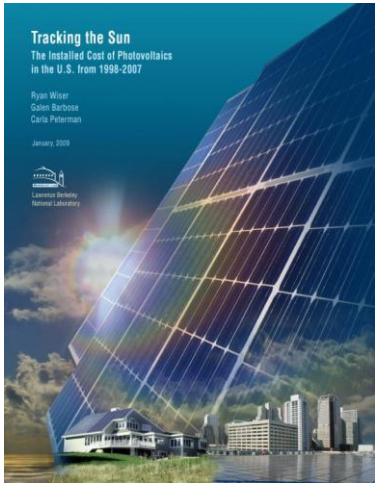
- Larger, interdisciplinary projects
  - NSF cross-directorate programs (Ocean Acidification; Dynamics of Coupled Natural and Human Systems)
  - DOE's Bioenergy Research Centers and Hubs
  - DOD's Multidisciplinary University Research Initiatives
- Influence of NAS reports such as "New Biology for the 20th Century," "Rising above the Gathering Storm"
- Collaborations between natural, physical and social sciences

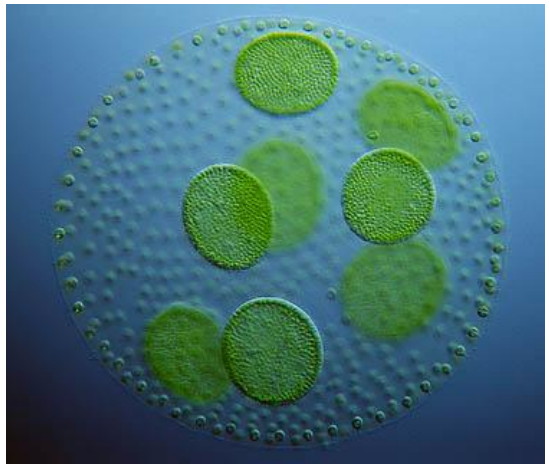
Trends, continued

- Transition to application (basic>>applied)
  - Drug discovery to development (NIH)
  - Partnership for Innovation Program (NSF-ENG)
  - Strategic Environmental Research and Development Program (SERDP-DOD)
- Deliverables are increasing in importance
- Public-private partnerships
- Agencies will continue to innovate within flat (or declining) budgets

Hot Topics: Alternative Energy

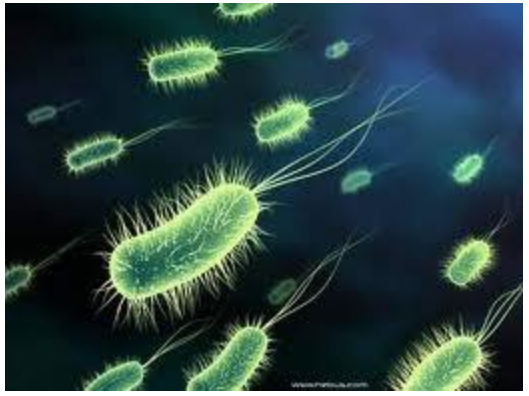
- Biofuels
  - Microalgae
  - Cellulosics
- Photovoltaic materials
- Batteries and improved energy storage
- Smart electric grid technologies
- Carbon capture





Hot Topics: “New Biology”

- Systems biology – holistic, data intensive and high throughput
  - Genomes vs. genes; proteomes vs. proteins
- Computational biology -- Strong partnerships between biologists and computer scientists/mathematicians
- Synthetic biology – design and construction of biological components or systems



DOE Office of Science FY12 Budget Request

Science for Clean Energy

- Materials by design using nanoscale structures and syntheses (carbon capture, PV)
- Biosystems by design using molecular tools kits in testbeds for design and construction (biofuels, bioproducts)
- Modeling and simulation to facility materials and chemistry by design (optimization of internal combustion engines for biofuels)
- Batteries and Energy Storage Energy Innovation Hub – transform the grid and electrify transportation

NSF FY12 Budget Request

Research at the Interface of the Biological, Mathematical, and Physical Sciences (BioMaPS*)*

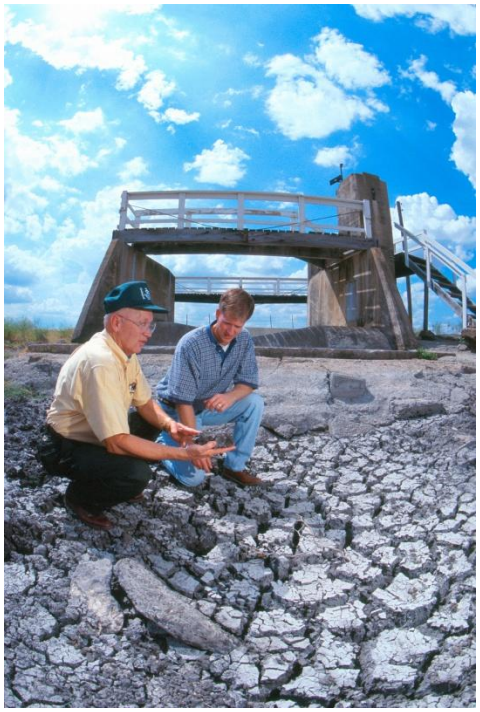
A collaboration among the Directorates for Biological Sciences, Engineering, and Mathematical and Physical Sciences that aims to result in accelerated understanding of **biological systems**, and then apply that knowledge into fundamental understanding and new technologies, **particularly clean energy.**

Hot Topics: Other Key Areas for the Future

Ecosystem services

Food security

Water availability



Stay “nimble”

- Be willing to work on topics somewhat outside of your expertise
- Don’t become known as a one trick pony
- Be willing to collaborate and create interdisciplinary teams
- Learn to think more broadly about your expertise:
  - Example: Bioremediation → Biocorrosion, biofuel cells, hydrogen production and bioenergy

Final thoughts….

- Cast a wide net for funding sources
- Be strategic rather than comprehensive
- Polish your proposal (internal peer review)
- Build rapport with Program Managers and with potential reviewers
- Communicate success to your Program Manager and your Institution

Thank you!

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