Center for Excellence in Research
Oct 7, 2015

Developing and Submitting
a Successful Science/Engineering Grant Application
to Federal Mission Agencies
(with some insights for NSF and NIH)

Dr. James S. Murday
Tel: 202 824 5863  E-mail: murday@usc.edu
9 years at USC
40 years in Dept of Defense S&T at NRL/ONR/OSD
The mazes were too easy, so now they have me running through bureaucracies and looking for grants.
USC DC Research Advancement Office

Services

Research Funding
Research initiative alerts
Collaborations across schools, other institutions
Federal funding agency advocacy / connections / intel
Strategically targeted activities
Proposal preparation - biosketch, letters of support, editorial, budget, and scientific
Repository with Mission Agency Program Summary (MAPS) resources
Searchable MAPS Program/Program Officer database
http://web-app.usc.edu/web/ra_maps/search/
Database with listings of prior early career/young faculty and Center awardees

Visibility/Prestige
(International) national conferences / workshops
Strategic partnerships
Advisory/planning committees

Faculty Development
Grant-preparation workshops
Arrange seminar/colloquia – staff from DC Office, federal funding agencies
Faculty recruitment
Presentation Outline

Introduction to (selected) federal agency science and engineering funding
Perspectives on various agency programs

National Science Foundation (NSF)
1. Department of Defense (DOD)
2. Intel Community (IC)
3. Department of Homeland Security (DHS)
4. Department of Energy (DOE)
5. National Aeronautics and Space Agency (NASA)
6. National Institute of Standards and Technology (NIST)
7. US Department of Agriculture (USDA)
8. US Department of Education (ED)
9. Environmental Protection Agency (EPA)
10. National Oceanic and Atmospheric Agency (NOAA)
11. Department of Transportation (DOT)
12. Department of Justice (DOJ)
13. Department of Health and Human Services (HHS)
14. Other - Dept of State (DOS), National Endowments for Arts and Humanities (NEA and NEH), Administration for International Development (USAID),...

National Institutes of Health (NIH)

Suggestions for selling your ideas to program officers

Resources

Other Pertinent Center of Excellence in Research (CER) Workshops
Dr. Randy Hall  Developing Funded Research Programs
Dr. Paul Ronney  Writing Compelling NSF Proposals
Dr. Carl Castro  Obtaining DOD Medical Research Funding
Dr. Steven Moldin  Developing NIH Grant Applications
Ms. Bonnie Lund  Writing Persuasive Proposals
Agency Science and Technology (S&T) Extramural Program Focus

National Science Foundation (NSF)
The National Science Foundation (NSF) is the primary Federal agency supporting research at the frontiers of knowledge, across all fields of science and engineering (S&E) and all levels of S&E education.

National Institutes of Health (NIH, HHS)
Fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability.

Department of Defense (DOD)
All scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields related to long-term national security needs.

Department of Homeland Security (DHS)
Produce revolutionary changes in technologies and capabilities for homeland security.

Intel Communities (IC)
Technologies/methodologies to acquire and process data

Department of Energy (DOE)
Change the landscape of energy demand and supply
Climate Change: Position U.S. to lead on climate change policy, technology, and science

National Aeronautics and Space Administration (NASA)
Expand scientific understanding of the Earth and the universe in which we live.
Advance aeronautics research for societal benefit.

National Institute of Food and Agriculture (NIFA, USDA)
Solve problems critical to making a plant, animal, ecosystem, food system, community, or marketplace work

National Institute of Standards and Technology (NIST, DOC)
Promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology.
Also to play a major role in the Advanced Manufacturing Initiative

Department of Transportation (DOT)
Highway, intelligent transportation and aviation

National Oceanic and Atmospheric Administration (NOAA, DOC)
Conducts research in three major areas: weather and air quality, climate, and ocean and coastal resources.

Department of Education (DoEd or ED)
Research that contributes to school readiness and improved academic achievement.

Environmental Protection Agency (EPA)
Provide the solutions to meet today’s complex environmental and human health challenges.

Department of Justice
Knowledge and understanding of crime and justice issues

Department of Health and Human Services
Protecting the health of all Americans and providing essential human services
Federal “Basic Research” Funding

in billions of constant FY 2015 dollars

Source: AAAS Report: Research & Development series. FY 2015 figures are latest estimates, FY 2016 is the President’s request. © 2015 AAAS

2016 does not show changes Congress may make in the appropriations bills
National Research Priorities
(e.g., where will “new” Federal money preferentially go - at least under Obama)

National Information Technology, Research, Development
Big (and open) Data
Trustworthy Cyberspace
Global Climate Change
Renewable/Sustainable/Clean Energy

STEM Education
National Nanotechnology Initiative
Advanced Manufacturing / Innovation
Materials Genome
Plasmonics and Photonics
BioEconomy - Synthetic Biology
Neuroscience (including the BRAIN Initiative)
Precision Medicine

Also see Office of Managment and Budget (OMB) /Office of Science and Technology Policy (OSTP)
annual S&T Investment Priorities Memo FY2017 at:
https://www.google.com/search?q=OSTP+OMB+s%26T+guidance+memo&ie=utf-8&oe=utf-8#
NSF
Principal S&E Funding Divisions
http://www.nsf.gov/staff/orglist.jsp

Directorate for Mathematical & Physical Sciences
Astronomical Sciences (AST)
Chemistry (CHE)
Materials Research (DMR)
Mathematical Sciences (DMS)
Physics (PHY)

Directorate for Engineering
Chemical, Bioengineering Environmental & Transport (CBET)
Civil, Mechanical & Manufacturing Innovation (CMMI)
Electrical Communications & Cyber Systems (ECCS)
Engineering Education & Centers (EEC)
Industrial Innovation and Partnerships (IIP)
Emerging Frontiers and Multidisciplinary Activities (EFMA)

Directorate for Biological Sciences
Biological Infrastructure (DBI)
Environmental Biology (DEB)
Integrative Organismal Systems (IOS)
Molecular & Cellular Biosciences (MCB)
Office of Emerging Frontiers (EF)

Directorate for Computer & Information Science & Engn
Advanced Cyberinfrastructure (ACI)
Computer & Network Systems (CNS)
Computing & Communication Foundations (CCF)
Information & Intelligent Systems (IIS)

Directorate for Geosciences
Atmospheric & Geospace Sciences (AGS)
Earth Sciences (EAR)
Ocean Sciences (OCE)
Polar Programs (PLR)

Directorate for Education & Human Resources (EHR)
Graduate Education (DGE)
Human Resource Development (HRD)
Research on Learning in Formal & Informal Settings (DRL)
Undergraduate Education (DUE)

Directorate for Social, Behavioral, & Economic Sciences
Behavioral & Cognitive Sciences (BCS)
Social & Economic Sciences (SES)
National Center for Science and Engineering Statistics (NCSES)
Multidisciplinary Activities (SMA)

Office of the Director
Integrative Activities (OIA)
International Science and Engineering (OISE)
NSF Research Opportunities

Proposal Guidance

What: Announcements for the many topics

Proposals may be submitted in response to the various funding opportunities that are announced by NSF. These funding opportunities generally fall into three categories:

• program descriptions (PD-XX-YYYY, continuing core programs)
• program announcements (NSF XX-YYY, generally special topic and constrained lifetime)
• center solicitations (also NSF XX-YYY, but are interdisciplinary/cross cutting)

Subscribe to e-alerts for NSF opportunities/events at
https://public.govdelivery.com/accounts/USNSF/subscriber/new?pop=t&qsp=823

When: See NSF announcements - almost all opportunities have specific deadlines

Where: NSF Fastlane (https://www.fastlane.nsf.gov/)

The NSF Days workshop is primarily designed for researchers and educators less experienced in proposing to the NSF. It covers the NSF proposal and merit review process, and those programs that cut across NSF disciplines.

Resources:
USC Center of Excellence in Research (CER) Workshops by Phil Taylor, Paul Ronney and John Gould

NSF Prospective New Awardee Guide, February 2014
www.nsf.gov/publications/pub_summ.jsp?ods_key=pnag

NSF Publication: A Guide for Proposal Writing

NSF Proposal and Award Policies and Procedures Guide (GPG), NSF 15-001


NSF Days (the USC MAPS website has some past NSF Days presentations)
www.nsf.gov/events/event_group.jsp?group_id=20013&org=NSF
<table>
<thead>
<tr>
<th># pages</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>- what your topic is and why it is important</td>
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<tr>
<td>3</td>
<td>Previous work</td>
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<td></td>
<td>- what has been done in this area</td>
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<tr>
<td></td>
<td>- note <strong>what key knowledge is lacking</strong> (not incremental)</td>
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<tr>
<td>1</td>
<td>Objectives</td>
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<tr>
<td></td>
<td>- very specifically what you will do (<strong>your new insights</strong>)</td>
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<tr>
<td></td>
<td>- how it extends the prior work</td>
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<tr>
<td></td>
<td>- the <strong>impact (scientific/technological) of your results</strong></td>
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<tr>
<td>1</td>
<td>Hypotheses</td>
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<tr>
<td></td>
<td>- what you think will happen</td>
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<tr>
<td>5</td>
<td>Approach</td>
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<td></td>
<td>- how you will test the hypotheses</td>
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<td>- experimental or computational apparatus, etc.</td>
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<tr>
<td>2</td>
<td>Closure</td>
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<td>- what you will do with the data once you have it</td>
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<tr>
<td>2</td>
<td>Broader Impact</td>
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<td>- applications of the research results and educational merit</td>
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NSF Proposal Review Panel Dynamics
adapted from Paul Ronney, USC AME

- Typically ~8 panel members, 25 proposals
- Each proposal read **fully** by at least 3 reviewers - 1 lead, 2 others
- Each of those reviewers discusses his/her opinion, starting with the lead
- Entire panel gives comments / feedback
- Champions are highly valuable - someone who will argue for your proposal
- Reviewers may revise comments based on panel discussion
- Proposals are ranked after all are discussed
- Every panel has different personnel and different dynamics (i.e., be sure to suggest appropriate panelists to your NSF program officer)

- Various programs at NSF are experimenting with other forms of review (to reduce financial and personal time costs), so there may be a somewhat different process - check with the NSF program manager.
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<td>Army Research Institute for Behavioral and Social Science (ARI)</td>
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<td>Telemedicine and Advanced Technology Research Center (TATRC)</td>
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DOD RDT&E Taxonomy - Primer

Science and Technology ($11.5B in FY15)

BA1  6.1  Basic Research (TRL 0-1)  knowledge of fundamental aspects of phenomena – largely use inspired
BA2  6.2  Appl Research (TRL 2-3)  determine means by which a specific need may be met
BA3  6.3  Adv Technol Development  development / integration of hardware for field experiment

Development ($52B in FY15)

BA4  6.4  Adv Component Devel and Prototype  evaluate integrated technology in realistic environment
BA5  6.5  System Devel and Demonstration  for projects without approval for full rate production
BA6  6.6  RDT&E Management Support  program managers, ranges, test facilities,…
BA7  6.7  Operational Systems Development  support of development acquisition programs or upgrades

Congressionally Directed Medical Research (CDMRP)

SBIR  2.9%  (will be 3.2% by FY2017) tax on R&D funding by Agencies with over $100M/yr extramural research
STTR  0.35%  (will be 0.4% by FY2017) tax on R&D funding by Agencies with over $1B/yr extramural research

BA  Budget Activity
RDT&E Research, Development, Test & Evaluation
SBIR Small Business Innovation Research
STTR Small Business Technology Transfer
TRL Technology Readiness Level
Service Research Offices (OXR’s)

Army Research Office (ARO)  
Air Force Office of Scientific Research (AFOSR)  
Office of Naval Research (ONR)  

Defense Advanced Research Projects Agency (DARPA)

Defense Science Office (DSO)  
Biological Technologies Office (BTO)  
Microsystems Technology Office (MTO)  
Information Innovation Office (I2O)  
Strategic Technology Office (STO)  
Tactical Technology Office (TTO)  

Defense Threat Reduction Agency (DTRA)

Basic and Applied Research Directorate (BA)  
Chemical and Biological Technologies Directorate (CB)  

Army Medical Research and Materiel Command

DMRDP (Defense Medical Research and Development Program)  
CDMRP (Congressional adds / DMRDP, fully open competition)  

Army Research Inst for Behavioral & Social Sci

CDMRP Congressionally Directed Medical Research Program
Service - Air Force (AFOSR), Army (ARO), Naval (ONR)
Basic Research Funding Opportunities (DRS)

What:  Largest source of DOD funding for University basic research
Each Service has specifically identified program interests (see solicitations, websites)
Majority invested in single investigator efforts (in contrast to MURI program)
OXR Broad Area Announcements (BAA) are relatively generic
Each Program Officer (PO) has focused interests, linking science with some military need
**OXR PO key to success**

How Much:  typically $100 – 200K/yr for three years (with continuation possible)
OXR programs typically have ~20% turnover each year

When:  Initial white paper useful (usually required)
Generic BAAs allow submission nominally anytime, but spring/early summer to be timely
Special program announcements have specific due dates
Most funding decisions processed in late fall, early winter – after appropriation bill is passed

Where:  See Agency websites / BAAs  Mix of paper and electronic (grants.gov)

DRS - the Defense Research Sciences is a budget line for DOD
MURI - Multidisciplinary University Research Initiative
OXR - umbrella acronym for ONR, AFOSR, ARO
## Example of Program Listing in an Academic Taxonomy

**Available in USC MAPS Defense Charts**

### Physics

<table>
<thead>
<tr>
<th>Field</th>
<th>Researcher</th>
<th>Number</th>
<th>Email</th>
</tr>
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<tbody>
<tr>
<td><strong>Physics - ARO</strong></td>
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<td></td>
</tr>
<tr>
<td>Atomic and Molecular Physics</td>
<td>Paul Baker</td>
<td>919 549 4202</td>
<td><a href="mailto:paul.m.baker4.civ@mail.mil">paul.m.baker4.civ@mail.mil</a></td>
</tr>
<tr>
<td>Condensed Matter Physics</td>
<td>Marc Ulrich</td>
<td>919 549 4319</td>
<td><a href="mailto:marc.d.ulrich.civ@mail.mil">marc.d.ulrich.civ@mail.mil</a></td>
</tr>
<tr>
<td>Optics &amp; Fields</td>
<td>Richard Hammond</td>
<td>919 549 4313</td>
<td><a href="mailto:richard.t.hammond10.civ@mail.mil">richard.t.hammond10.civ@mail.mil</a></td>
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<tr>
<td>Quantum Information Science</td>
<td>TR Govindan</td>
<td>919 549 4236</td>
<td><a href="mailto:t.r.govindan.civ@mail.mil">t.r.govindan.civ@mail.mil</a></td>
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<tr>
<td><strong>Physics - AFOSR</strong></td>
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<tr>
<td>Atomic and Molecular Physics</td>
<td>Tatjana Curcic</td>
<td>703 696 6204</td>
<td><a href="mailto:tatjana.curcic@afosr.af.mil">tatjana.curcic@afosr.af.mil</a></td>
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<tr>
<td>Biophysics</td>
<td>William (Pat) Roach</td>
<td>703 696 8450</td>
<td><a href="mailto:william.roach.4@us.af.mil">william.roach.4@us.af.mil</a></td>
</tr>
<tr>
<td>Electromagnetics</td>
<td>Arje Nachman</td>
<td>703 696 8427</td>
<td><a href="mailto:arje.nachman@afosr.af.mil">arje.nachman@afosr.af.mil</a></td>
</tr>
<tr>
<td>Laser and Optical Physics</td>
<td>John Luginsland</td>
<td>703 588 1775</td>
<td><a href="mailto:john.lugisland@afosr.af.mil">john.lugisland@afosr.af.mil</a></td>
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<tr>
<td>Plasma &amp; Electro-Energetic Physics</td>
<td>Jason Marschall</td>
<td>703 696 7721</td>
<td><a href="mailto:Jason.marshall.3@us.af.mil">Jason.marshall.3@us.af.mil</a></td>
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<tr>
<td>Quantum Electronic Solids</td>
<td>Harold Weinstock</td>
<td>703 696 8572</td>
<td><a href="mailto:harold.weinstock@afosr.af.mil">harold.weinstock@afosr.af.mil</a></td>
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<tr>
<td>Remote Sensing &amp; Imaging Physics</td>
<td>Kent Miller</td>
<td>703 696 8573</td>
<td><a href="mailto:kent.miller@afosr.af.mil">kent.miller@afosr.af.mil</a></td>
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<tr>
<td>Ultra-short Pulse Laser-Matter</td>
<td>Riq Parra</td>
<td>703 696 8571</td>
<td><a href="mailto:enrique.parra@afosr.af.mil">enrique.parra@afosr.af.mil</a></td>
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<tr>
<td><strong>Physics - ONR</strong></td>
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</tr>
<tr>
<td>Atomic,Molec, Quantum Physics</td>
<td>Tommy Willis</td>
<td>703 696 4214</td>
<td><a href="mailto:richard.t.willis@navy.mil">richard.t.willis@navy.mil</a></td>
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<tr>
<td>Chaos/Non-linear Physics</td>
<td>Michael Shlesinger</td>
<td>703 696 5339</td>
<td><a href="mailto:mike.shlesinger@navy.mil">mike.shlesinger@navy.mil</a></td>
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<tr>
<td>Directed Energy</td>
<td>Quentin Saulter</td>
<td>703 696 2594</td>
<td><a href="mailto:quentin.saulter@navy.mil">quentin.saulter@navy.mil</a></td>
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<tr>
<td>Superconducting Technol</td>
<td>Deborah van Vechten</td>
<td>703 696 4219</td>
<td><a href="mailto:deborah.vanvechten@navy.mil">deborah.vanvechten@navy.mil</a></td>
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### Physical Sciences – DARPA DSO

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<th>Field</th>
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<th>Number</th>
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<tr>
<td>Photonics</td>
<td>Prem Kumar</td>
<td>703 526 2709</td>
<td><a href="mailto:prem.kumar@darpa.mil">prem.kumar@darpa.mil</a></td>
</tr>
<tr>
<td>Quantum, Photonics</td>
<td>James Gimlett</td>
<td>703 526 2874</td>
<td><a href="mailto:james.gimlett@darpa.mil">james.gimlett@darpa.mil</a></td>
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*chart updated June 2015*
Multidisciplinary University Research Initiatives (MURI in URI budget line)

**What:**
Supports University teams that involve one or more traditional science/engineering disciplines
Topics down-selected by agencies from OXR PO suggestions
~20-25 new topics announced annually by DOD
For prior topics and University awardees from 2007 to present, ask DC Office

**How Much:**
~$1-2.5M/yr for three years + two additional option years; typically 1.2-1.5M/yr
For FY16

**When:**
Announcement (16 Jun 2015)
White paper (strongly encouraged, not required) (08 Sep 2015)
Full proposal (07 Dec 2015)

**Where:** ARO / AFOSR / ONR BAA

<table>
<thead>
<tr>
<th>USC MURI awardees</th>
<th>FY16</th>
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<tbody>
<tr>
<td><strong>2006</strong></td>
<td>Nealson</td>
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<tr>
<td><strong>2008</strong></td>
<td>USC</td>
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<tr>
<td><strong>2009</strong></td>
<td>Sukhatme</td>
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<tr>
<td><strong>2010</strong></td>
<td>USC</td>
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<tr>
<td><strong>2011</strong></td>
<td>Tambe</td>
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<tr>
<td><strong>2015</strong></td>
<td>USC</td>
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</table>
Defense University Research Instrumentation Program (DURIP in URI)

What: Acquisition of major equipment to augment current, or develop new, research capabilities to support research in the technical areas of interest to the DoD
Provide equipment to conduct research and to educate new scientists/engineers
Matching funds not required, but is helpful (especially for larger grants)
DOD research grant not required, but is very helpful
OXR program officer support very, very helpful

How Much: >$50K, <$1.5 M per award (expect ~180 awards averaging $290K in FY16)
Total funds fluctuate somewhat depending on MURI selections

When: In past, typically due in late Aug / early Sept (25 Sep 2015 for FY16)

Where: ARO / AFOSR / ONR webpages for the DURIP BAA

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USC Awardees

2011  
Christe  High energy density materials (ONR)
Molisch  Distributed electronic warfare applications (ONR)
Debevec  Improve the photorealism of simulations to enhance training (AFOSR)

2012  
Cronin  Atomic Layer Deposition System (ONR)
Narayan  A Versatile Thin-Film Deposition System for Advanced Power Sources Research (ARO)
Sukhatme  Robotic Platform for Study of Human-Robot Interaction, Motor Control, Perception (ONR)
Zhou  Maskless Photolithography for Nanoelectronic Device Prototyping and Fabrication (ONR)

2013  
Malmstadt  Instruments for High-throughput analysis of oxidative cell membrane damage (ONR)
Vashishta  Computing platform for simulation and visualization of insensitive nanoenergetic (ONR)
Hodge  Instrumentation for TEM sample prep (ONR)

2014  
Armani  Laser for non-linear optics and biophotonics (ONR)
Egolfopoulos  Hi-resol diagnostics for velocity and scalar field study in turbulent reacting flows (AFOSR)

2015  
Armani  Inverted fluorescent microscope (ONR)
Haiges  A Raman spectrometer for the characterization of high-energy-density materials (ONR)
Hashemi  Wideband high-dynamic arbitrary signal generator (ONR)
Sha  Understanding representation learning (ARO)
Spedding  Experiments in developing wakes of submerged bodies (ONR)
**Defense Medical Research and Development Program (DMRDP)**


**What:** The Defense Medical Research and Development Program (DMRDP), part of the Defense Health Program (DHP), contributes to the Defense Department’s overall investment for medical research and development (R&D) with Research, Development, Testing, and Development (RDT&E) dollars.

The objectives of the DMRDP are:

1. To discover and explore innovative approaches to protect, support, and advance the health and welfare of military personnel, families, and communities;
2. To accelerate the transition of medical technologies into deployed products; and
3. To accelerate the translation of advances in knowledge into new standards of care for injury prevention, treatment of casualties, rehabilitation, and training systems that can be applied in theater or in the clinical facilities of the Military Health System.

The DMRDP has six major program areas:

- Medical Training and Health Information Sciences JPC-1
- Military Infectious Diseases JPC-2
- Military Operational Medicine JPC-5
- Combat Casualty Care JPC-6
- Radiation Health Effects JPC-7
- Clinical and Rehabilitative Medicine JPC-8

Each major research program area is managed by a committee, called a Joint Program Committee or JPC, which consists of DoD and non-DoD medical and military technical experts. These experts work through a coordinated effort to translate guidance into research and development needs.

**When:** See program announcements

**Where:** Executed through the CDMRP process - as recent examples

- W81XWH-BAA-15-1 USAMRMC Extramural Medical Research (generic)
- W81XWH-15-JPC-8-CRMRP-NMSIRA Neuromusculoskeletal Injuries Research Award
- W81XWH-15-DMRDP-MSISATUMN Medical Simulation and Information Sciences
- W81XWH-15-OPORP-OORA Orthotics and Prosthetics Outcomes Research Program
- W81XWH-15-CRMRP-VPPSA Vision Prothesis Pilot Study Award
- W81XWH-15-DMRDP-FPC1-JRoute Hand-offs, Patient Transfers, and Systems Interoperability
Congressionally Directed Medical Research Program

cdmrp.army.mil

What:
Research Programs included in the FY15 CDMRP are ($M):
248  Peer Reviewed Medical Research (only for specified topics)
125  Traumatic Brain Injury and Psychological Health
120  Breast Cancer Research
 80  Prostate Cancer Research
 50  Peer Reviewed Cancer – skin, pediatric brain, genetic, non-invasive ablation treatment
 30  Spinal Cord Injury
 30  Peer Reviewed Orthopaedic
 20  Ovarian Cancer Research
 20  Gulf War Illness Research
 15  Reconstructive Transplant
 15  Neurofibromatosis Research
 15  Neurotoxin Exposure treatment Parkinson’s Research
 12  Alzheimer
 10  Lung Cancer Research
 10  Vision
  8  Epilepsy
  8  Amyotrophic Lateral Sclerosis
  8  Military Burn
  6  Autism Research
  6  Tuberous Sclerosis Complex Research
  5  Multiple Sclerosis
  4  Alcohol and Substance Abuse
  3  Bone Marrow Failure
  3  Duchenne Muscular Dystrophy

Proposals undergo two stage review - first peer, then program.

How Much:
1-5 year grants, average of $150K/yr (direct)
If multiyear funded, all funds come from the FY15 appropriation

When:
Various – see website program announcement

Where:
Pre-applications submitted electronically via the eBRAP System (https://ebrap.org).
Full applications submitted electronically to the Grants.gov website (http://grants.gov).

FY15 ~$1200M
**Department of Homeland Security**

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**Intelligence Community**

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What: Within its Basic Research Portfolio, S&T generally funds quality research projects that meet at least one of these selection criteria:
  * Addresses an important Department issue without a near-term solution.
  * Pursues a creative solution that addresses a unique, long-term Department need, which is not addressed elsewhere.
  * Exploits new scientific breakthroughs (for example, from universities, laboratories, or industry) that could strengthen homeland security.

Generic areas (DHS S&T Divisions) are:
- Border and Maritime Security (BMD) - Tools and Technologies to improve security
- Chem / Bio (CBD) - Awareness and Countermeasures (not in Amendment 6 version)
- Cybersecurity (CSD) - Cybersecurity and information assurance solutions
- Explosives Countermeasures (EXD) - Detection, Mitigation, Response
- First Responder Group (FRG) - identifies/validates/fixes capability gaps
- Office of Standards (STN) - develop/promote use of standards (not in Amendment 6 of BAA)
- Resilient Systems (RSD) - develop and deploy solutions

How Much: Nothing specified

When: A white paper submission anytime up to 31 Dec 2018 for LRBAA 14-02

Where: DHS S&T LRBAA14-02 (amendment 6, May 2015)
       DHS CSD HSHQDC-14-R-B0005  (Five year BAA for Cybersecurity Division only)
What: Domestic Nuclear Detection Office (DNDO) within the Department of Homeland Security (DHS) invests in frontier research at academic institutions. The ARI Program has two primary objectives:

1. Engage the academic community to advance fundamental knowledge for nuclear and radiological threat detection, nuclear forensics and related sciences with emphasis on fundamental research to solve long-term, high-risk challenges and
2. Develop human capital for the nuclear science and engineering profession.

Topics of interest identified in the latest BAA
- RTA-01 Advanced Analytics supporting the Global Nuclear Detection Architecture (GNDA)
- RTA-02 Studies on Wearable Nuclear Detection and Interdiction
- RTA-03 Model Validation for Nuclear Forensic Applications

How Much: ~$3M for new starts in FY16
Single Investigator Awards will average approximately $150K per year
Multi-disciplinary Awards will average approximately $350K per year for durations up to five years.

When: For FY16 funding, full proposal deadline 12 June 2015

Where: DHS 15-DNDO-077-001
Intelligence Advanced Research Projects Agency (IARPA)
http://www.iarpa.gov/

What:
Anticipating Surprise (OAS) Characterize/ reduce uncertainty through anticipatory intelligence
Incisive Analysis (IA) Maximize insight from the information we collect, in a timely fashion.
Safe & Secure Operations (SSO) Counter new capabilities that would threaten our ability to operate freely and effectively in a networked world.
Smart Collection (SC) Dramatically improve the value of collected data from all sources.

In addition to generic BAAs, there are specific, directed funding opportunities throughout the year.

Seedling ideas are to be for topics that are not addressed by emerging or ongoing IARPA programs or solicitations. It is primarily intended for early stage research that may lead to larger, focused programs through a separate BAA in the future, so periods of performance generally will not exceed 12 months.

Offerors are strongly encouraged to submit a five-page white paper describing their proposed research as their first formal submittal to IARPA before preparing a full proposal.

How Much: DARPA-like funding profiles

When: Early preferred, but at any time up to 10 May 2016 for current generic solicitations

Where:
SMART COLLECTION IARPA-BAA-15-01 generic
INCISIVE ANALYSIS IARPA-BAA-15-02 generic
SAFE AND SECURE OPERATIONS IARPA-BAA-15-03 generic
ANTICIPATING SURPRISE IARPA-BAA-15-04 generic
What:
The Director's Innovation Initiative provides a risk-tolerant environment to invest in cutting edge technologies and high payoff concepts relevant to the NRO’s mission. The projects focus on NRO R&D thrusts such as developing new intelligence sources and methods to solve intractable intelligence problems.

The DII Program funds basic research efforts, e.g., technology readiness levels 1-3, that substantially enhance mission performance and address the areas of interest listed below. The two main areas of interest categories are:

- Aperture Synthesis
- High Bandwidth Quantum-Secured Communications

We anticipate that proposals will be sought from US domestic educational institutions, non-profit and not-for-profit organizations and private industry.

How Much:
Selected projects will receive a maximum of $450K over 3 years

When:  For FY2016 call issued Mar 19, 2015 with response date of 24 Apr 2015

Where:  BAA NRO000-15-R-0104
 Defense Intelligence Agency

What:
DIA is interested in the full range and full scope of possible innovative ideas from all interested and qualified sources, to include participation by, and potentially with, both "traditional and non-traditional " members (e.g. large businesses, small businesses, independent consultants, academic institutions, consortium participants, other).

The DIA is interested in all potential "innovative" concepts/ideas of interest that may fill current gaps, to include effort focused principally on maximizing agency operating efficiency and effectiveness, and access by the DIA to potential or existing state-of-the-art innovations, both technical and otherwise, that may not currently be in use by the agency or that may be in limited use and in need of leveraging across a greater expanse of the collective enterprise. Areas of need, as listed on DIA’s Needipedia webpage are:

1. Prevent Strategic Surprise through Improved Acquisition Support
2. New Analysis Technologies and Methods
3. Enhance Counterintelligence and Security
4. Intelligence Collections
5. Mission Enhancing Science and Technology
6. Improves Mission Support Capabilities
7. Increase Organizational Effectiveness
8. Empower Partnerships

How Much: Smaller (<$650K) initiatives preferred

When: white papers (required) accepted from throughout the open period - to 26 Nov 2018

Where: DIA-BAA-14-01 issued 27 Nov 2013, revised 26 Nov 2014
NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA)
ACADEMIC RESEARCH PROGRAM (NARP)
https://www1.nga.mil/PARTNERS/RESEARCHANDGRANTS/Pages/AcademicResearchProgram.aspx

What:
Path-breaking GEOINT research in areas of potential interest to NGA, the DoD, and the Intelligence Community (IC). Example areas are:

- Access to GEOINT data and services
- Advancing Geolocation and data uncertainty
- Anticipatory Analysis
- Computer Vision
- Earth, Ocean, and Atmospheric Science supporting GEOINT
- Exploiting data from new sources and sensors
- GEOINT tradecraft
- Geolinguistics
- Video Indexing and Search
- Video Content Extraction

Graph methods for geospatial data
Image Science
Massive data
Predictive intelligence
Signature development & discovery
Spatio-temporal analysis
Strategic indications and warning
Understanding human activities
Visual analytics for GEOINT

University Research Initiatives (NURI) awards focused on fundamental research in Geospatial Intelligence topics such as those listed above.

Outstanding New Scientific and Technical Innovative Researcher (ONSTIR) Program grants are open to faculty employed by eligible institutions who are U.S. citizens, U.S. nationals, or permanent U.S. residents who have held their doctorate degrees (PhD or equivalent) for less than five years at the time of application.

Offerors are highly encouraged to submit white papers prior to submitting proposals

How Much:
NURI awards have a 2yr base period with a value of up to $300K, with up to 3 one-year options valued at up to $150K per option year.
ONSTIR award grants have a 2yr base period valued up to $200K, with a up to one-year option valued at $100K.

When: White papers anytime before 31 August 2017

Where: Broad Agency Announcement (BAA) HM0210-14-BAA-0001
## Guide to Dept of Energy Funding

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# DOE Science and Engineering

## Principal Funding Offices

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### National Nuclear Security Administration

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What:
• The mission of the DOE Office of Science is to deliver the scientific discoveries and major scientific tools that transform our understanding of nature and advance the energy, economic, and national security of the United States.
• Prior to submission of an application for a research grant, the PI is encouraged to contact the program manager whose areas of expertise and responsibilities most closely match the topic of the proposed research activities to learn about current funding opportunities and the nature of the work
• Based on the interaction with a program manager, the PI may be encouraged to submit a pre-application
• Based on a review of the proposed research, the principal investigator will be either encouraged or discouraged to submit a full application
• All grants that are funded undergo external peer review
• The usual term for a new award is three or four years, divided into one-year budget periods.

How much: Varies with the program

When:
Applications may be submitted at any time. However, it is recommended that a full application be sent between June 1st and November 30th in order that SC can make a funding decision by June of the following year.

Where:
DE-FOA-0001204  - FY2015 Continuation of Solicitation for the SC Financial Assistance Program Applications must be submitted through Grants.gov to be considered for award.
What: The programs support research and development of energy efficiency or renewable energy technologies:

Energy Efficiency
- Advanced Manufacturing
  http://energy.gov/eere/efficiency/advanced-manufacturing
- Buildings
  http://energy.gov/eere/efficiency/buildings
- Government Energy Mgmt
  http://energy.gov/eere/efficiency/government-energy-management
- Homes
  http://energy.gov/eere/efficiency/homes

Renewable Power
- Geothermal
  http://energy.gov/eere/renewables/geothermal
- Solar
  http://energy.gov/eere/renewables/solar
- Wind
  http://energy.gov/eere/renewables/wind
- Water Power
  http://energy.gov/eere/renewables/water

Transportation
- Bioenergy
  http://energy.gov/eere/transportation/bioenergy
- Hydrogen and Fuel Cells
- Vehicles
  http://energy.gov/eere/transportation/vehicles

When: Various

What: Predictive Science Academic Alliance Program
The centers are either Multidisciplinary Simulation Centers (MSC) or Single-Discipline Centers (SDC) solving a problem that advances basic science/engineering; verification and validation/uncertainty quantification; and contributing towards achieving effective exascale computing, to demonstrate predictive science in a High Performance Computing environment.
How Much: Up to $4M/yr for MSC; $2M/yr for SDC
When: due by June 2012
Where: DE-FOA-0000728

What: Stewardship Science Academic Program
The SSAA Program was developed to support state-of-the-art research at U.S. academic institutions in areas of fundamental physical science and technology of relevance to the Stockpile Stewardship Program mission.
   - Properties of Materials under Extreme Conditions and/or Hydrodynamics
   - Low Energy Nuclear Science
   - Radio Chemistry
How Much: typically $50-300K/yr for up to 3 years
When: due by 27 Oct 2014
Where: DE-FOA-0001067

What: Nuclear Science and Engineering Nonproliferation Research Consortium
A successful consortium is a rich collaborative environment between the university members, their student and faculty researchers, and the DOE National Laboratory scientists and staff. Priority on skill sets:
- nuclear science and engineering;
- nonproliferation, arms control and related verification work;
- remote technologies for proliferation detection;
- nuclear security;
- radiochemistry;
- mass spectrometry.
How Much: $5M for one award as a cooperative agreement to the lead University
When: due by 19 Aug 2015
Where: DE-FOA-0001300
Guide to **NASA** Research Funding

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NASA Principal Research Funding Offices
(NSPIRES web site http://nspires.nasaprs.com/external/)

- **Science Mission Directorate (SMD)**
  science.nasa.gov/
  Research Opportunities in Space and Earth Sciences (ROSES, NRA-NNH15ZDA001N)

- **Aeronautics Research Mission Directorate (ARMD)**
  www.aeronautics.nasa.gov/
  Research Opportunities in Aeronautics (ROA, NRA - NNH15ZEA001N)
    Aeronautics Research generates the innovative concepts, and technologies that will enable revolutionary advances in future aircraft

- **Human Exploration and Operations Systems Mission Directorate (HEO)**
  www.nasa.gov/directorates/heo/home/index.html
  Human Exploration Research Opportunities (HERO, NRA NNJ15ZSA001N)
    Joint NASA/ National Space Biomedical Research Institute (NSBRI) research solicitation in support of space exploration, focused on health effects from space radiation and human physiological changes associated with exploration.

- **Space Technology Mission Directorate**
  www.nasa.gov/directorates/spacetech/home/index.html
  Space Technology Research, Development, Demonstration and Infusion 2015 (NNH15ZOA001N)

- **Office of Education**
  www.nasa.gov/offices/education/about/index.html
  Education Opportunities in NASA STEM (EONS, NRA NNH14ZHA001N)

NRA NASA Research Announcement
What: Supporting research in science and technology is an important part of NASA's overall mission. NASA solicits this research through the release of various research announcements in a wide range of science and technology disciplines. NASA uses a peer review process to evaluate and select research proposals submitted in response to these research announcements.

To submit a research proposal to NASA, individuals and the organizations with which they are affiliated must be registered in NSPIRES.

When: Various

Guide to **NIST** Research Funding

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Measurement Science and Engineering (MSE) Research Grant Program (2015-NIST-MSE-01)
Support NIST laboratories with research in fields such as: material measurement; physical measurement; engineering; fire research; information technology; neutron research; nanoscale science and technology; standards services; and law enforcement standards.

Precision Measurement Grants (2015-NIST-PMGP-01)
Support researchers in U.S. colleges and universities for experimental and theoretical studies of fundamental physical phenomena

Standards Services Curricula Development Cooperative Agreement Program (2015-NIST-SSCD-01)
The recipients will work with NIST to strengthen education and learning about standards and standardization.

Nanoelectronics
Supports research and innovation in nanoelectronics through a partnership between NIST and the Semiconductor Research Corp. (SRC).

Centers of Excellence (at Universities) (http://www.nist.gov/coe/)
Establish four competitively selected Centers of Excellence in measurement science areas defined by NIST that will leverage and expand NIST research capabilities.
- Materials at Northwestern University in 2014
- Community Resilience at Colorado State University in 2015
- Forensics Sciences at Iowa State University in 2015

National Network for Manufacturing Innovation (NNMI) - Federal in scope but coordinated at NIST
http://www.nist.gov/amo/
The key objective of the NNMI is to accelerate innovation and transition technology to US manufacturing enterprises. Using redirected Agency funds, a number of institutes are being / have been created:
- DOD - Additive Manufacturing, Digital Manufacturing and Design, Lightweight Metals, Integrated Photonics, and Flexible Hybrid Electronics
- DOE - Wide Bandgap Semiconductors for Power Applications, and Advanced Composites

Institutes that are being competed
- DOD - “Revolutionary Fibers and Textiles”
- DOE - “Smart Manufacturing: Advanced Sensors, Controls, Platforms and Modeling for Manufacturing”
NIST
Extramural Funding Opportunities

**What:** Current Funding Opportunities website
Federal Funding Opportunity (FFO) Announcements will be posted in this section (URL below) upon the opening of the applicable application periods. Click on a URL to view the full FFO which contains information about the opportunity, applicant eligibility, application requirements, and directions on how to apply

**When:** Various

**Where:** Office of the Director, NIST Program Information, Current Funding Opportunities
http://www.nist.gov/director/grants/grants.cfm
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</table>
NOAA OAR Climate Program Office

Funding Opportunity Number: NOAA-OAR-CPO-2016-2004413

What:
NOAA conducts and supports climate research, essential oceanic and atmospheric observations, modeling, information management, assessments, interdisciplinary decision support research, outreach, education, and stakeholder partnership development.

Ten competitions covered by the annual (2016) announcement are as follows:

- COM - In Situ Technologies to Contribute to the Tropical Pacific Observing System (TPOS 2020) Project
- AC4 - Fires in the Western US: Emissions and Chemical Transformations
- CVP - AMOC-Climate Linkages in the North and/or South Atlantic
- MAPP – NOAA Climate Test Bed - Accelerating Transition of Research into Operations
- MAPP – Research to Advance Prediction of Subseasonal to Seasonal Phenomena
- COCA - Ecosystem Services for a Resilient Coast in a Changing Climate
- SARP - Water Resources and Extreme Events
- SARP - Coping with Drought Initiative in support of the National Integrated Drought Information System (NIDIS)
- RISA - Existing Regions
- RISA - New Regions

When: Annual Solicitation, for FY2016 (released July 2015)
Letters of Intent for all Competitions due TBD
Full applications for all Competitions due TBD

How Much:
In FY 2016, approximately $14 million will be available for approximately 90 new awards pending budget appropriations. It is anticipated that most awards will be at a funding level between $50K and $300K per year.

Where:
http://cpo.noaa.gov/GrantsandProjects.aspx

COM  Climate Observation and Modeling Program
AC4  Atmospheric, Chemistry, Carbon, Cycle and Climate Program
CVP  Climate Variability And Predictability Program
MAPP Modeling, Analysis, Predictions and Projections Program
COCA Coastal and Ocean Climate Applications Program
SARP Sectoral Applications Research Program
RISA Regional Integrated Sciences and Applications Program
What: OER supports a continuum of ocean science that makes discoveries via exploration and research, and transitions the new knowledge and capabilities to the rest of NOAA, and the national and international science, technology, and ocean management communities.

Its Strategic Plan outlines four strategic goals:
• Conduct scientific baseline characterizations of unknown or poorly-known ocean basin boundaries, processes, and resources
• Transition ocean exploration discoveries to new research areas and research results to new applications to benefit society
• Increase the pace, scope, and efficiency of exploration and research through advancement of underwater technologies
• Engage audiences through innovative means by integrating science, education and outreach

OER seeks bold, innovative proposals with interdisciplinary approaches and objectives which fall within one (or more) of three categories:
  - Ocean Exploration
  - Marine Archaeology
  - Ocean Exploration Education

When: Funding Opportunity: NOAA-OAR-OER-2015-2004292
  Two page pre-proposal due date 4 Dec 2014
  Full proposal due 29 Jan 2015

Where: Visit the Ocean Explorer website to see past and present OE-funded activities.
  http://oceanexplorer.noaa.gov/
Guide to **USDA** Research Funding  
**Index to MAPS Charts**

Information garnered from USDA Budget Submission Presentations, Justifications, and Webpages

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<td>17</td>
<td>Agriculture Research Service (intramural research)</td>
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What:
In the last several years NIFA has issued seven RFAs for the AFRI Program:
- Foundational Program addressing the six AFRI priority areas
  a) Plant Health and Production and Plant Products
  b) Animal Health and Production and Animal Products
  c) Food Safety, Nutrition, and Health
  d) Renewable Energy, Natural Resources, and Environment
  e) Agriculture Systems and Technology
  f) Agricultural Economics and Rural Communities
- Challenge Areas (6):
  a) Childhood Obesity Prevention
  b) Climate Change
  c) Food Safety
  d) Global Food Security
  e) Sustainable Bioenergy
  f) Water for Agriculture
- NIFA Fellowships Grant Program soliciting Pre and Postdoctoral applications

Applications for AFRI funds may also be solicited through other announcements including supplemental AFRI RFAs or in conjunction with multi agency programs

How Much:
$116M available in the Foundational Program in FY2015. Standard Grants not exceed $500K total (including indirect costs) for project periods of up to 5 years.

When: for the Foundational Program
Letter of Intent Deadline Required for some programs in the past
Application Deadline for FY2015 program, due dates range from Mar/Jun 2015


RFA - Request for Application NIFA - National Institute for Food and Agriculture
# Guide to ED Research Funding

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Information garnered from ED Budget Submission Presentations, Justifications, and Webpages

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What: Current Funding Opportunities (with Catalog of Federal Domestic Assistance number)

- Education Research Programs (84.305A)
- Education Research and Development Centers (84.305C)
  - Knowledge Utilization
  - Standards in Schools
  - Virtual Learning
- Statistical and Research Methodology in Education (84.305D)
  - Statistical and Research Methodology Grants
  - Early Career Statistical and Research Methodology Grants
- Partnerships and Collaborations Focused on Problems of Practice or Policy (84.305H)
  - Researcher-Practitioner Partnerships in Education Research
  - Continuous Improvement Research in Education
  - Evaluation of State and Local Education Programs and Policies
- Special Education Research Programs (84.324A)

Contact relevant Program Officer(s) for the topic(s) of interest
Submit your (optional but strongly encouraged) Letter of Intent.

When: for FY2016

- LOI: May 2015
- Full proposal: Aug 2015

Where: Federal Register / Vol. 80, No. 72 / Wed, April 15, 2015, page 20203
Webinars on the opportunities: http://ies.ed.gov/funding/webinars/previous_webinars.asp

The Institute of Education Sciences also considers unsolicited applications for research, evaluation, and statistics projects that would make significant contributions to the mission of the Institute. Unsolicited applications are defined as those that are not eligible for funding under the Institute's current grant competitions.
Guide to **EPA** Research Funding

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Information garnered from EPA Budget Submission Presentations, Justifications, and Webpages

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<td>National Center for Environmental Research Extramural Programs</td>
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EPA
National Center for Environmental Research (NCER)
Science to Achieve Results (STAR) Grant Program
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/recipients.welcome/displayOption/grants

**What:** NCER’s Science to Achieve Results or STAR program funds research grants and graduate fellowships in numerous environmental science and engineering disciplines through a competitive solicitation process and independent peer review.

In addition, through this same competitive process, NCER periodically establishes large research centers in specific areas of national concern. At present, these centers focus on children’s health, hazardous substances, particulate matter, and estuarine and coastal monitoring.

At present, STAR is focusing on the health effects of:
- particulate matter,
- drinking water,
- water quality,
- global change,
- ecosystem assessment and restoration,
- human health risk assessment,
- endocrine disrupting chemicals,
- pollution prevention and new technologies,
- children’s health, and
- socio-economic research.

**When:** Periodic, for 2015 none are listed (as of 22 Sep 2015)

**Where:** See website - http://www.epa.gov/ncer/rfa/
Guide to DOT Research Funding
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Information garnered from DOT Budget Submission Presentations, Justifications, and Webpages

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DOT Research Programs
http://www.rita.dot.gov/rdt/dot_research_programs.html

Aviation
• Federal Aviation Administration (FAA) Data and Research

Highway
• Federal Highway Administration (FHWA) Research
• Turner-Fairbank Highway Research Center

Maritime
• Maritime Administration (MARAD) Research and Development Activities

Motor Carrier
• Federal Motor Carrier Safety Administration (FMCSA) Analysis, Research and Technology

Hazardous Mat’ls
• Pipeline and Hazardous Materials Safety Administration (PHMSA) Research & Development

Highway Traffic Safety
• National Highway Traffic Safety Administration (NHTSA) Highway Safety Research and Evaluation Program
• NHTSA Vehicle Safety Research

Pipeline
• PHMSA Research & Development

Railroad
• Federal Railroad Administration (FRA) Research and Development

Transit
• Federal Transit Administration (FTA) Research, Technical Assistance & Training

Intermodal Research
• OST-R Intelligent Transportation Systems Joint Program Office
• OST-R Current Research and Publications
• OST-R Maps of Current Research
• DOT Climate Change Center

Cooperative Research Programs
• Airport Cooperative Research Program (ACRP)
• Hazardous Materials Cooperative Research Program (HMCRP)
• National Cooperative Freight Research Program (NCFRP)
• National Cooperative Highway Research Program (NCHRP)
• Transit Cooperative Research Program (TCRP)
Department of Transportation
Office of the Assistant Secretary for Research and Technology
Research, Development and Technology

What: Research Development and Technology
- Coordinates DOT's research and development activities and investments
- Awards and administers grants to universities, including
  - University Transportation Centers
  - FAA Centers of Excellence
  - FHWA University and Grants Programs
  - Sun Grant Initiative
- Sponsors advanced research

When: Various

Where: http://www.rita.dot.gov/rdt/
Guide to **DOJ** Research Funding

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Information garnered from DOJ Budget Submission Presentations, Justifications, and Webpages

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<td>Office of Juvenile Justice and Delinquency Programs (OJJDP)</td>
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What: NIJ awards grants and agreements for:

- Research, development and evaluation (CFDA 16.560). NIJ funds physical and social science research, development and evaluation projects about criminal justice through competitive solicitations. The focus of the solicitations varies from year to year based on research priorities and available funding.
- Forensic laboratory enhancement. NIJ provides funding through formula and discretionary awards to reduce evidence backlogs and improve the quality and timeliness of forensic science and medical examiner services. Programs include:
  - DNA Backlog Reduction Program (CFDA 16.471)
  - Paul Coverdell Forensic Sciences Improvement Grant Program (16.472)
- Research fellowships. NIJ funds two fellowships through annual solicitations. The focus of the solicitations varies from year to year. Fellowships include:
  - Graduate Research Fellowship (CFDA 16.562)
  - W.E.B. DuBois Fellowship (CFDA 16.566)
  - Visiting Fellowship

Where/When:

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<td>Graduate Research Fellowship in Science, Technology, Engineering, and Mathematics</td>
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<td>Fellowship on Violence Against Women</td>
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<td>Research and Evaluation on Justice Systems</td>
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Guide to **HHS (w/o NIH) Research Funding**  
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Information garnered from HHS Budget Submission Presentations, Justifications, and Webpages

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<td>Biomedical Advanced Research and Development Authority (BARDA)</td>
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Department of Health and Human Services
http://www.hhs.gov/grants/grants/index.html

What:
HHS expands scientific understanding of how to advance health care, public health, human services, biomedical research, and the availability of safe medical and food products. Chief among these efforts are the identification, implementation, and rigorous evaluation of new approaches in science, health care, public health, and human services that reward efficiency, effectiveness, and sustainability.

Pertinent Agencies in DHHS
- ACL  Administration for Community Living
  (Includes National Institute on Disability, Independent Living, and Rehabilitation Research)
- AHRQ  Agency for Healthcare Research and Quality
- CDC  Centers for Disease Control and Prevention
- FDA  Food and Drug Administration
- HRSA  Health Resources and Services Administration
- NIH  National Institutes of Health
- OASH  Office of the Asst Secretary for Health
- OPHS  Office of the Asst Secretary for Health, Office of Public Health and Science

Where:
Learn about the steps necessary to successfully compete for and manage a grant.

Learn about important policies and regulations related to HHS grants, including important information about audits, reporting, efficient spending, and grant reviews.

Grants Forecast http://www.acf.hhs.gov/hhsgrantsforecast/index.cfm
A database of planned grant opportunities proposed by DHHS agencies. Each Forecast record contains actual or estimated dates and funding levels for grants that the agency intends to award during the fiscal year.
### Guide to “Other” Research Funding

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### Humanities / Social Science Focused

| 13-16 | Department of State (DOS)                                             |                          |
|       | Bureau of Educational and Cultural Affairs (ECA)                      |                          |
|       | Bureau of Populations, Refugees and Migration (PRM)                   |                          |
|       | Bureau of Democracy, Human Rights and Labor (DRL)                     |                          |
|       | Embassy initiated                                                     |                          |
| 17-18 | National Endowment for the Arts (NEA)                                 |                          |
| 19-23 | National Endowment for the Humanities (NEH)                           |                          |
| 24-25 | National Archives and Records Administration (NARA)                   |                          |
| 26    | Institute of Museum and Library Services (IMLS)                       |                          |
| 27    | Corporation for National and Community Service                        |                          |

IHE - Institutions of Higher Education
National Institutes of Health (NIH)
Extramural Funding Opportunities
http://grants.nih.gov/grants/guide/

Agency Organization
- Largest agency of Department of Health & Human Services (DHHS)
- 27 Institutes and Centers
  - Organized according to disease focus
  - One center conducts most NIH peer reviews
- 24 institutes provide extramural research support

Broad Areas of Research Interest
- Research of directed or strong indirect relevance to understanding and preventing disease
- Research on basic biological and psychological processes of preferential interest if there is disease relevance

Five Themes toward Research Investment
- Applying high throughput technologies to understand fundamental biology, and to uncover the causes of specific diseases
- Translating basic science discoveries into new and better treatments
- Putting science to work for the benefit of health care reform
- Encouraging a greater focus on global health
- Reinvigorating and empowering the biomedical research community
What: The NIH provides financial support in the form of grants, cooperative agreements, and contracts. This assistance supports the advancement of the NIH mission of enhancing health, extending healthy life, and reducing the burdens of illness and disability. While NIH awards many grants specifically for research, we also provide grant opportunities that support research-related activities, including: fellowship and training, career development, scientific conferences, resource and construction.

See the announcements http://grants.nih.gov/grants/guide/
http://grants.nih.gov/grants/planning_application.htm#search

How Much: Varies with program - see announcement

Note that an NIH proposal requests direct monies, indirect costs are added from another account.

When: Varies with program - see the specific announcement

Where: http://grants.nih.gov/grants/submitapplication.htm
Suggestions for Success

Get to know the Agency Program Officer and his/her program interests

Participate in Agency activities
  Workshops, meetings
  Be a proposal reviewer (if available) - no better way to understand what constitutes a credible proposal for that agency / program officer

As you mature in your career, consider a rotational assignment at an Agency
  Very good way to establish / cement personal relationships with other POs
  Good opportunity to broaden one’s vistas

Know the Agency’s review process

Utilize the USC Center for Research Excellence workshops on proposal development

Use your colleagues and the DC Office staff to critique / guide your proposal
Know your program officer

Program officers (PO) have variable latitude at project level (depending on agency)
(DOD - DOE - NASA - NIH - NSF)

Their reputation / professional advancement is tied in part to your success

Make contact with Program Officer before submitting a white paper or proposal

• Be informed - read the descriptive paragraph on the website/announcement, the MAPS PO datasheet, and information on prior awards (available from DC office for selected agencies)
• Use “elevator pitch” to open contact, gain attention - your unique idea(s) and impact
• Be ready for a dialogue - not monologue
• Plumb his/her current interest – website paragraphs are likely dated. This can significantly enhance your prospects by tailoring your ideas to the PO’s interests
• If lukewarm/disinterested response, ask for suggestions on other POs who might be interested
• Also ask after availability of funds – his/her resources may be fully committed

Watch for new Program Officers - they will be interested in creating “their” program
Project Officer Background:
Laura Kienker was a Research Biologist within the Counterterrorism and Forensic Science Research Unit of the FBI Laboratory, where she managed outsourced research projects pertaining to automating the forensic analysis of biological evidence. Prior to joining the FBI, Dr. Kienker directed a Sequencing and Microarray Core Facility for the Center for Immunology at the University of Texas Southwestern Medical Center in Dallas, where she was an Assistant Instructor in the Department of Internal Medicine.

Education
B.A. in Biology and Chemistry from Oberlin College
Ph.D. in Immunology from the University of Pennsylvania

Program:
Metabolic Engineering
The Office of Naval Research (ONR) Metabolic Engineering Program targets the fundamental understanding of metabolic processes in microbes or plants for the production of chemicals of potential utility to the Navy.

Biomaterials and Bionanotechnology
The Office of Naval Research (ONR) Biomaterials and Bionanotechnology Program supports fundamental research that enables the generation of novel, Navy relevant, nano-scale materials and devices.

Illustrative Publications Reflecting Project Officer Research Interests:
Both V(D)J recombination and radio resistance require DNA-PK kinase activity, though minimal levels suffice for V(D)J recombination
Kienker LJ; Shin EK; Meek K
NUCLEIC ACIDS RESEARCH 28(14), 2752-2761 JUL 15 2000
What to Say - and Not Say - to Program Officers
Michael Spires, Office of Sponsored Projects, Smithsonian Institution

“most scholars and researchers would rather undergo a root canal without anesthesia than call a program officer”

Shalts
1. Do your homework
2. Be as specific as possible
   concentrate on big picture, especially outcomes
   why should they be excited by your proposed work (and its outcomes)
3. When in doubt, ask

Shalt Nots
1. Do not call at the office “just to chat”
2. Do not cold call
   send short email first, summarizing issue(s)
   ask for PO to call you (with your available dates/times) or to email you back with suggestions on when to contact him/her
3. Do not pester - but be persistent
Keys to a Compelling Proposal
adapted from
George Hazelrigg, NSF Program Officer
Paul Ronney, USC AME, Active Researcher and Reviewer
S. Joseph Levine, Michigan State, Emeritus Professor

Hazelrigg
Know the program you are engaging
Pay attention to program requirements
Know the review process
Frame your project around others work
Formulate an appropriate objective
State your research objective clearly
Develop a viable research plan
Know Yourself
Format and brevity are important
Grammar and spelling count
Proofread your proposal before it is sent
Submit on time and confirm its correct transmission

Ronney
What has been done / its deficiencies
At least one really novel, clever idea
Don’t say “just trust me”
Pose specific, testable hypotheses
Avoid kitchen sink mentality - what is key
Where’s the beef
Explain your end game - outcome(s)

Levine
How extend prior work
Needs an original idea
Strong rationale
Focused Proposal
Problem must be important
Well defined outcomes

Appropriate experience/resources - but don’t dwell on your past work
A picture is worth a thousand words
PI has pertinent experience
Clear Writing
What Makes a Strong Proposal?

- New and original ideas (what?)
- Sound, succinct, detailed focused plan (how?)
- Preliminary data and/or feasibility calculations
- Relevant experience (why me/us?)
- Important & timely within field (why now?)
- Clarity concerning future direction (so what?)
- Well-articulated broader impacts specific to this project
The Heilmeyer Catechism
Questions New Program Pitches Must Answer

- What are you trying to do? Articulate your objectives using absolutely no jargon
  - Example: “take anthrax off the table as a threat to our forces”
  - What is the new military capability that Semantic Web Services could provide?

- How is it done today, and what are the limits of current practice?
  - Why is this specifically a technology problem?

- What’s new in your approach and why do you think it will be successful?
  - All software is Turing-equivalent, so software methodology is usually not relevant
  - What is your argument/analysis that a 10x difference in a technology will result in a new capability?

- Who cares? If you are successful, what difference will it make?
  - Who is the customer for the new idea, and what evidence do you have that any transition will be successful?

- What are the risks and the payoffs?

- How much will it cost? How long will it take?

- What are the midterm and final exams to check for success?
  - Metrics and experimentation plans defined up front
DARPA Illustration for White Paper / Elevator Pitch Ingredients

**Topic/project/effort description**
Performer Name (Seedling, SBIR, Congressional, etc)

**[PROJECT-NAME] ACHIEVEMENT**

**MAIN ACHIEVEMENT:**
- Placeholder explanatory text. Replace with text and diagrams as necessary.

**HOW IT WORKS:**
- Placeholder explanatory text paragraph. Replace with text and diagrams as necessary.

**ASSUMPTIONS AND LIMITATIONS:**
- Limitation or assumption.
- Another limitation or assumption.

**END-OF-PHASE GOAL**
- What are the end-of-phase goals?
  - First key insight.
  - Second key insight.
  - Add other points as necessary.

**QUANTITATIVE IMPACT**
- First item planned. Add more text as necessary.
- Second item planned. Add more text as necessary.
- Add other points as necessary.

**STATUS QUO**
- Primary answer here. Add more text as necessary.
  - First bullet.
  - Additional as necessary.

**NEW INSIGHTS**
- What are the key new insights?
  - First key insight.
  - Second key insight.
  - Add other points as necessary.

**A Sentence Why It Is Important/Useful**
### Proposal Development
**NSF Vice Mission Agencies**

<table>
<thead>
<tr>
<th>NSF</th>
<th>Mission Agency - Basic Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Interest in most S&amp;E</td>
<td>Interest restricted to S&amp;E pertinent to mission need a proposal must interest the program officer</td>
</tr>
<tr>
<td>most proposals will “fit somewhere”</td>
<td>Use inspired (agency mission) - Pasteur Quadrant likely more funding in engineering than in science</td>
</tr>
<tr>
<td>1b. Knowledge inspired - Bohr Quadrant</td>
<td>Basic, but applied monies may be also available (applied tends to have milestones and deadlines)</td>
</tr>
<tr>
<td>more funding in science than in engineering</td>
<td>Impact on S&amp;E knowledge and addressing agency mission priorities essential</td>
</tr>
<tr>
<td>(but can include Pasteur when addressing topics of societal importance)</td>
<td>Generally none - perform the promised research</td>
</tr>
<tr>
<td>1c. Basic monies only, with tweaks such as I-CORP, I/UCRC, GOALI, SBIR/STTR</td>
<td></td>
</tr>
<tr>
<td>1d. Impact on S&amp;E knowledge</td>
<td></td>
</tr>
<tr>
<td>addressing national/Intl priorities useful</td>
<td></td>
</tr>
<tr>
<td>2. Additional requirements for:</td>
<td></td>
</tr>
<tr>
<td>broadening participation</td>
<td></td>
</tr>
<tr>
<td>education, underrepresented</td>
<td></td>
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<tr>
<td>wider-scale Impact, International data management</td>
<td></td>
</tr>
<tr>
<td>Post Doc nurturing</td>
<td></td>
</tr>
<tr>
<td>3. Program officer triage for rule compliance</td>
<td>Program officer triage on basis of content / interest</td>
</tr>
<tr>
<td>except for EAGER, RAPID, INSPIRE</td>
<td></td>
</tr>
<tr>
<td>4. Review by panel</td>
<td>Review by program officer with possible input from others</td>
</tr>
</tbody>
</table>

**Acronyms**
- **EAGER**: Early Concept Grants for Exploratory Research
- **RAPID**: Rapid Response Research Grants
- **INSPIRE**: Integrated NSF Support Promoting Interdisciplinary Research and Education
- **I/UCRC**: Industry University Cooperative Research Program
- **GOALI**: Grant Opportunities for Academic Liaison with Industry
- **I-CORP**: Innovation Corp
- **SBIR/STTR**: Small Business Innovative Research / Small Business Technology Transfer
Office of Research Advancement

Assets Available for Assistance

http://web-app.usc.edu/web/ra_maps/search/
DC Office of Research Advancement alerts - roughly daily

**Federal Websites**
Grants.gov http://www.grants.gov/applicants/email_subscription.jsp
GrantsNet (medical/biological) http://sciencecareers.sciencemag.org/funding

**Agency E-mail Alerts**
Institute for Educational Sciences (ED) http://ies.ed.gov/newsflash/
Environmental Protection Agency (EPA) http://epa.gov/ncer/listserv/
Office of Space Science Research Announcements (NASA) http://spacescience.nasa.gov/announce/listserv.htm
National Endowment for the Arts (NEA) http://arts.gov/grants/apply-grant/grants-organizations/deadlines
National Endowment for the Humanities (NEH) http://www.neh.gov/grants/rss_deadlines.xml
National Institute of Justice (NIJ) http://nij.gov/funding/Pages/welcome.aspx
National Science Foundation (NSF) https://public.govdelivery.com/accounts/USNSF/subscriber/new?qsp=823

**Grant Forward**
Grant Forward, by Cazoodle, is a database of grants where users can search for funding opportunities (federal-, state-, foundation- and institution-sponsored research) across all fields, including the sciences, humanities, and arts. Free (i.e., prepaid) to all USC employees. Creating an account is a simple two-step process – just follow the instructions on the New User Quick Guide

**Funding Opportunity Search**
- Search for funding opportunities spread across 39 subject areas and 2009 categories
- Large Database of Sponsors comprising Foundation, Federal and Institutions
- Set up alerts and get opportunities delivered straight to your inbox

**Researcher Profiles**
- Infers researcher's interests from publication pages and other sources to identify funding opportunities that match
- Each funding opportunity is matched to researchers based on research interests and career stage
Mission Agency Program Summary (MAPS)
http://web-app.usc.edu/web/ra_maps/search/

The DC Office of Research Advancement has created the Federal Mission Agency Program Summaries (MAPS) website to:

1. Connect PIs with appropriate funding agency programs/program officers
2. Assist in development of white papers/charts/elevator pitches

The website can be accessed using one’s USC NetID and Password.

It has the following resources:

1. **Search Tab** for a searchable database of programs/program officers
   - At that website one can do keyword searches to locate the associated mission agency (DHS, DOD, DOE, DOT, ED, EPA, INTEL, NASA, NIST, NOAA and USDA) programs and program officers.

2. **Mission Agency Tab** (DHS, DHHS, DOD, DOJ, DOE, DOT, ED, EPA, INTEL, NASA, NIST, NOAA, USDA)
   - Guide to Agency Funding for FYXX - Chart numbers in the Guides reference the Agency Research Program Chart files.
   - Agency Research Program Charts
   - Agency Planning Documents

3. **Presentation Tab** for charts from recent USC Center of Excellence in Research workshops

4. **Proposal Tab** for reports / guides on writing proposals

5. **Email Alerts Tab** for URLs at which one can arrange for automatic solicitation updates

6. **Grantee Tab** for URLs at which one can find information on previous agency awardees

7. **Visiting DC Tab** for information about DC Office services
Agency Sites Providing Information on Previously Funded Awards

AHQR  http://www.gold.ahrq.gov/

CDC  http://wwwn.cdc.gov/fundingprofiles/fundingprofilesria/

DOE SC  https://pamspublic.science.energy.gov/WebPAMSExternal/interface/awards/AwardSearchExternal.aspx

DTRA  http://www.dtrareviews.com/register.html (infer from presentations)


EPA  http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/recipients.welcome/displayOption/grants

NIH  http://report.nih.gov/

NIJ  http://nij.gov/funding/awards/Pages/welcome.aspx

NIST  the various program websites generally have a list of prior awardees for that program

NSF  http://www.nsf.gov/awardsearch/

NEA  http://arts.gov/grants/recent-grants

NEH  the various program websites have a list of prior awardees for that program

NRC  http://www.nrc.gov/about-nrc/grants/awards/index.html

Website Providing Searchable Information on Federal Grants/Contracts

http://usaspending.gov/

(but does not identify the funding agency program officer or the awardee PI)
## Resources for Proposal Writing

(available in MAPS or at shown URL)

### NSF CAREER

- CAREER Proposal Writing
- CAREER Proposal Writing Tips
- CAREER Program Presentation (2013)
- Writing a Successful CAREER Proposal
- Broad(er) impacts of the NSF CAREER Proposal

**Hazelrigg, NSF**

**Pei**

**LA Salle, NSF**

**Vigeant, Univ Hartford**

**Schmitz, UNCC**

### Other

- USC Research Advancement
- A Tips for Authoring Grant Proposals
- Tips on Writing a Competitive Grant Proposal
- Writing a good grant Proposal
- Guide for Writing a Funding Proposal
- Obtaining Federal Funding
- NSF Guide for Proposal Writing
- The R&D Proposal
- Demystifying DoD Research Funding
- NASA Writing Research Proposals
- NIH Writing your application
- USDA NIFA General Proposal Writing Tips
- EPA Writing a Competitive Proposal

**http://research.usc.edu/for-investigators/proposal-and-grantwriting/**

**Hill, Univ Wisc-Madison**

**Clary, Western SARE**

**Jones, Microsoft**

**Levine, Mich State Univ.**

**Wardle, NSF**

**NSF 04-016**

**Yoder, Office of Naval Research**

**Palmer, Army Research Office**

**Hertz, NASA Headquarters**

**http://grants.nih.gov/grants/writing_application.htm**

**http://www.csrees.usda.gov/funding/nri/pdfs/general_tips.pdf**

**http://www.epa.gov/ogd/recipient/tips.htm**

### USC Center for Excellence in Research Workshops

- Developing Funded Research Proposals
- Writing Compelling NSF Proposals
- Developing NIH Grant Applications
- Obtaining DOD Medical Research Funding
- Writing Persuasive Proposals
- NSF CAREER Award Proposal Workshop

**Randy Hall**

**Paul Ronney**

**Steve Moldin**

**Carl Castro**

**Bonnie Lund**

**Phillip Taylor**
Postdoctoral Fellowships
Selected Opportunities - some continuing, others ephemeral

Science.gov
Grant Forward
http://www.science.gov/internships/graduate.html
https://www.grantforward.com/index

DOD/EPA/FHWA/NIST laboratories
NRC Research Associateship Program
http://sites.nationalacademies.org/pga/rap/
http://nrc58.nas.edu/RAPLab10/Opportunity/Programs.aspx

ASEE
http://www.asee.org/fellowship-programs/post-doctoral

ORAU
http://www.orau.org/arlpostdocfellowship/

Intel Community
Postdoctoral Fellows Res Program
http://www.icpostdoc.org/

NASA
http://nasa.orau.org/postdoc/
New (Early Career) Investigator Program in Earth Science - ROSES 2015 A-35
Fellowships for Early Career Researchers - ROSES 2015 C-16
Nancy Grace Roman Technology Fellowships in Astrophysics for Early Career Researchers - ROSES 2015 D-9
National Space Biomedical Research Institute Fellowships - http://www.nsbri.org/firstaward/

NSF
Arctic Research Opportunities
Atmospheric and Geospace Sciences Postdoctoral Research Fellowships
Centers of Research Excellence in S&T (CREST) and HBCU Research Infrastructure for S&E (RISE)
Documenting Endangered Species
GeoPrisms Program
International Research Fellowship Program
Law and Social Sciences
Mathematical Sciences Postdoctoral Research Fellowships
NSF Astronomy and Astrophysics Postdoctoral Fellowships
NSF Earth Sciences Postdoctoral Fellowships
NSF Fellowships for Transformative Computational Science using CyberInfrastructure
Pan-American Advanced Studies Institutes Program
Postdoctoral Research Fellowships in Biology
SBE Postdoctoral Research Fellowships
ASEE/NSF Corporate Postdoctoral Fellowship for Engineers

USDA NIFA
AFRI Education and Literacy Initiative
http://nifa.usda.gov/program/afri-education-and-literacy-initiative
USC DC Research Advancement Office

Services

Research Funding
- Research initiative alerts
- Collaborations across schools, other institutions
- Federal funding agency advocacy / connections / intel
- Strategically targeted activities
- Proposal preparation - biosketch, letters of support, editorial, budget, and scientific
- Repository with Mission Agency Program Summary (MAPS) resources
- Searchable MAPS Program/Program Officer database

Visibility/Prestige
- (Inter)national conferences / workshops
- Strategic partnerships
- Advisory/planning committees

Faculty Development
- Grant-writing courses
- Talks – staff from DC Office, federal funding agencies
- Faculty recruitment

Proposal: Budget/Presentation  Technical
Richard May - manager  rlmay@usc.edu  Steve Moldin - biology, medical, bit of everything  moldin@usc.edu
Dan Barker - editorial  djbarker@usc.edu  Jim Murday - physical sciences/engineering  murday@usc.edu
Alexis Takahashi - editorial  alexist@usc.edu  Al Olson - cyber and intelligence  alolson@usc.edu