University of Southern California

USC

13 Nov 2024

Developing and Submitting a Successful Mission Agency Grant Application with emphasis on DOD, DOE

and some insights for NSF and NIH

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18 years at USC

40 years in Dept of Defense S&T at NRL / ONR / OSD

Agenda for this event

Suggestions for Success

How to identify/approach “your” program officer

What is in a successful proposal

Examples of successful USC faculty

Examples of Federal Agency opportunities / expectations
with emphasis on DOD and DOE

Assets to assist your endeavors

Overarching Suggestions for Success

- **Prepare yourself professionally - enhance your personal assets**
- **Utilize the USC Center for Excellence in Research (CER) workshops on proposal development, examples:**

  Moldin Developing NIH Grant Applications
  Ronney Writing Compelling NSF Proposals
  Schwartz Grant Writing (NSF, NIH, NEH, foundations, corporate, etc)

- **Take advantage of USC's Research Strategy and Development (RSD) and your School's / Department's resources**
  - email alerts when solicitations of interest to you are released
  - federal agency program officer data sheets
  - records of prior program awards
  - statistics about tendencies evident with winning proposals
  - successful USC PIs
  - library of Federal Agency and NASEM workshop reports
  - editorial expertise
  - experience with creating non-technical proposal sections such as outreach, data management,…
- **Get feedback on proposal drafts - peers, USC Research and Innovation (incl RSD)**
- **Provide suggestions for reviewers to the Program Officer (PO)**

Professional Development

- **Participate in Agency Activities**

  Opportunities that provide a head start - the possibility that your personal interests are incorporated into a solicitation.

  Examples - Workshops

  NSF - Convergence Accelerator

  DOD - Future Directions (Basic Research),…

  DOE Office of Science - Important Research Areas,…

  NIH - NMRI Annual Workshop,…

  Engineering Research Visioning Alliance (NSF ENG)

  Sandboxes (NSF)

  Membership in an Agency Advisory Committee

  Participation in a NASEM committee addressing an issue

  Agency request for information - “RFI solicitations”

  Informal meetings with POs at professional conferences

  Be a panel proposal reviewer - no better way to understand what constitutes a credible proposal for that agency / program

- **Professional Society Leadership**
- R**otational Assignment at an Agency**

  Very good way to establish / cement personal relationships with other POs

  Good opportunity to broaden one’s vistas

Program Officers

Know your program officer

- RSD can provide Program Officer (PO) data sheets with individualized perspectives
- POs at different agencies have different latitudes for funding decisions, but all POs are important to your success
- Remember - PO reputation / professional advancement is tied in part to the impact of projects they fund

How to engage your program officer (especially at mission agencies)

- Be informed - read the descriptive material on his/her website and/or solicitation
  - get information on prior awards (available from RSD for some agencies)
- Use email "elevator pitch" to open contact. You are one of many supplicants - gain attention by **your unique idea(s) and the potential impact (science and societal)**
- Ask for "clarifications" on the published solicitation; are your ideas fully responsive?
- Probe his/her current interests – anything written on a website is likely dated
- Be ready for a dialogue - not monologue - the goal is to align both perspectives

  Dialogue can significantly enhance your prospects by tailoring your ideas to the PO's interests

Watch for new Program Officers - they will be interested in creating "their" program, i.e., there will be higher turnover in any program they inherited.

USC Unique Asset
Program Officer Data Sheet
Abbreviated Example

Dr. Fariba Fahroo
Dynamical Systems and Control (RTA2) AFOSR
(703) 696-8429
fariba.fahroo@us.af.mil

Biosketch:

1992- Visiting Asst Prof then Assoc Prof of Math, Naval Postgraduate School
1991 - 1992 University of Southern California, Research Assistant Professor

Education
PhD - Brown University, 1991
MA - University of Wisconsin, Madison, 1987
BA - UC Berkeley, 1985

Program:

Computational Mathematics BAA FA9550-19-S-0003

Program Description: This program seeks to develop innovative mathematical methods and fast, reliable and scalable algorithms aimed at making radical advances in computational science and large-scale engineering and design. Research in computational mathematics underpins the fundamental understanding of complex physical phenomena and leads to predictive simulation capabilities that are crucial to the design and control of future U.S. Air Force systems, and their lifetime expectancy.

Illustrative Publications Reflecting Personal Research Interests:

Costate Computation by a Chebyshev Pseudospectral Method
Gong Qi; Ross I. Michael; Fahroo Fariba
Journal of Guidance Control and Dynamics 33(2), 623-628 2010

Miriam Heller, former NSF Program Director (2000-07) and USC RSD Professional (2007-08)

Meet the Program Officer: Rationale

- What you can take away
  - Program scope, focus and objectives
  - New solicitations, cross-cutting opportunities
  - Program data (budgets, award rates etc.)
  - Relationship with other programs, divisions, directorates
  - Test your research ideas

- What you can give
  - Become a resource for expertise and ideas
  - Influence NSF programs and funding
  - *Never submit a workshop or Small Grants for Exploratory Research (SGER) without talking to the PO*

Meet the Program Officer: Prepare

- Do your homework
  - Be able to define your research project as clearly as possible
  - Be able to state or ask succinctly how your research project matches a specific solicitation, standing program, or NSF strategic goals
  - Provide motivation for your research project, e.g., its uniqueness, especially within the NSF community
  - Search the award abstracts database
  - Scour websites for program information, strategic plans, budgets
- Make an appointment to talk with the PO at
  - Workshops
  - Various society meetings and conferences
  - NSF during scheduled visits, panel meetings etc.
  - Your institution during a scheduled visit by your PO

Miriam Heller, former RSD Professional (2007-08) and NSF Program Director (2000-07)

Meet the Program Officer: Do's at the Meeting

- Be brief and to the point
- Listen to your PO - dialogue!
- Be ready to state: "The objective of my research is…"
- Ask for related NSF brochures, announcements, contacts and advice
- Volunteer to serve as a panelist for NSF proposal review panels
- Leave a short biography and your business card with the PO…

Miriam Heller, former RSD Professional (2007-08) and NSF Program Director (2000-07)

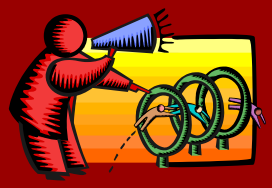
Meet the Program Officer: Dont's at the Meeting

- Wait for the PO to end the meeting
- Talk to yourself about yourself from your own perspective
- Start a 40-minute laptop presentation
- Overwhelm your PO with papers, etc.
- Explain to your PO what NSF does
- Force-fit your interests to programs and vice versa
- Push your PO for emergency funding before a crisis…
- Repeat how great your past work or upcoming proposal is – remember who your audience is

Miriam Heller, former RSD Professional (2007-08) and NSF Program Director (2000-07)

Meet the Program Officer: After the Meeting

- Optimize use of the PO's information and advice
  - Learn more on NSF from brochures and the web (www.nsf.gov)
  - Implement your PO's suggestions in your proposals and grants
- Let your PO know how your meeting has served you
- Prepare for your next meeting with your Program Officer…(meet not too often, not too seldom…)



Your NSF Program Officers
are looking forward to meeting you…

Miriam Heller, former RSD Professional (2007-08) and NSF Program Director (2000-07)

Meet the Program Officer: After an Award or Decline

- Get constructive feedback from proposal reviews and advice on how to improve your project
- Get information on other funding sources
- Keep the PO informed of your progress
- Explore long-term planning and support strategies
- Provide your PO with feedback and suggestions to improve the Program performance
- Participate in Program activities and opportunities
- Arm the PO to get public leverage for your funding (articles, web pages, samples, media clips etc.)

Miriam Heller, former RSD Professional (2007-08) and NSF Program Director (2000-07)

Meet the Program Officer: Learning from a Decline

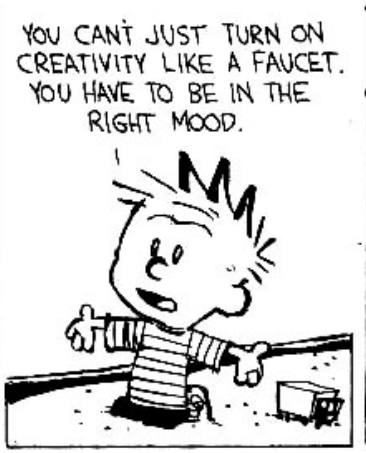
- Remember you are almost certainly in the majority
  - Never enough budget to fund all the good proposals
  - Consider the experience a chance to learn
- You can access written Reviews/Panel Summary
  - What guidance was provided for shaping the research and future proposals?
  - Did reviewers misunderstand your intentions?
  - Were reviewers from outside your field confused?
  - Was proposal submitted to the wrong NSF program?
  - Remember reviews were tempered by panel discussion
- Reconsideration is an official process – contact PO

Miriam Heller, former RSD Professional (2007-08) and NSF Program Director (2000-07)

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	Ronney	Levine
Know the program you are engaging Pay attention to program requirements Know the review process		
Frame your project around others work	What has been done / its deficiences	How extend prior work
	At least one really novel, clever idea	**Needs an original idea**
Formulate an appropriate objective State your research objective clearly Develop a viable research plan	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)	Strong rationale Focused Proposal Problem must be important Well defined outcomes
Know Yourself	Appropriate experience/resources - but don't dwell on your past work	PI has pertinent experience
Format and brevity are important Grammar and spelling count	A picture is worth a thousand words	Clear Writing
Proofread your proposal before it is sent Submit on time and confirm its correct transmission		



Honing your Proposal Writing Skills

Adapted from
George Hazelrigg, NSF Engineering

A. Not only will a **clear, crisp statement of your research objective** help you write a better research approach section in your proposal, it will, by itself, raise your rating.

Put your research objective right up top in your proposal

I know of only four ways to state a research objective.

1. "The research objective of this proposal is to test the hypothesis H."
2. "The research objective of this proposal is to measure parameter P with accuracy A."
3. "The research objective of this proposal is to prove the conjecture C."
4. "The research objective of this proposal is to apply method M from disciplinary area D to solve problem P in disciplinary area E." This research integrates knowledge from one disciplinary area into another. To do this often involves the resolution of inconsistencies across the disciplines.

The very statement of your research objective should lead you directly to your methodology. If it does not, you don't have a clear statement of research objective.

B. **Typical problems with proposals** include:

5. **Failure to follow submission guidelines**-NSF, for example, will return without review proposals that do not follow guidelines published in their Grant Proposal Guide. If you're going to take a month or two of your life to write a proposal, I strongly advise that you take an hour to read the GPG. If you are submitting to another agency, read their proposal guidelines carefully.
6. **Use of small fonts and illegible materials**-It makes no sense whatever to submit a proposal in a format that cannot be read. As many as half the proposals received at NSF include totally illegible materials, particularly figures and tables, where fonts have been compressed to micron sized grey blobs. I strongly recommend only approved 12-point fonts and nothing smaller, including tables and figures. Smaller only aggravates the reviewers. Use smaller fonts only if you want a lower rating.
7. **Misspellings and poor grammar** are commonplace - I find that about one in thirty proposals (give or take) has a misspelling in the title. This is a degree of sloppiness that does not impress reviewers. Bad grammar simply makes the proposal difficult to read. NSF (and most other Federal agencies) do not use grammar as a review criterion, but I'm here to tell you that it counts. It really doesn't matter how good your idea is if the reviewers can't understand it.

These things are so obvious that you may be wondering why I bother to note them. Well, I note them because upwards of two-thirds of the proposals I see have substantial problems in at least one of these three areas.

Proposal Development
NSF Vice Mission Agencies

	NSF	Mission Agency - Basic Research
1a.	Interest in most S&E most proposals will "fit somewhere"	Interest restricted to S&E pertinent to mission need **a proposal must interest the program officer**
1b.	Knowledge inspired - Bohr Quadrant more funding in science than in engineering (but can include Pasteur when addressing topics of societal importance)	Use inspired (agency mission) - Pasteur Quadrant likely more funding in engineering than in science
1c.	Basic monies only outside of TIP, with tweaks such as-CORP, I/UCRC, GOALI, SBIR/STTR	Basic, but applied monies may be also available (applied tends to have milestones and deadlines)
1d.	Impact on S&E knowledge addressing national/Intl priorities useful	Impact on S&E knowledge and addressing agency mission priorities essential
2.	Additional requirements for: broadening participation education, underrepresented data management wider-scale Impact, International Post Doc nurturing	Generally less important - perform the promised research (caveats - under Biden's admin broadening participation is is becoming more prevalent in Federal Agencies and data management is pervasive)
3.	Program officer mostly triage for rule compliance except for EAGER, RAPID, INSPIRE	Program officer triage on basis of interest / content
4.	Review by panel, with panel recommendation	Review by program officer with input from others

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

What Makes a Strong Proposal?

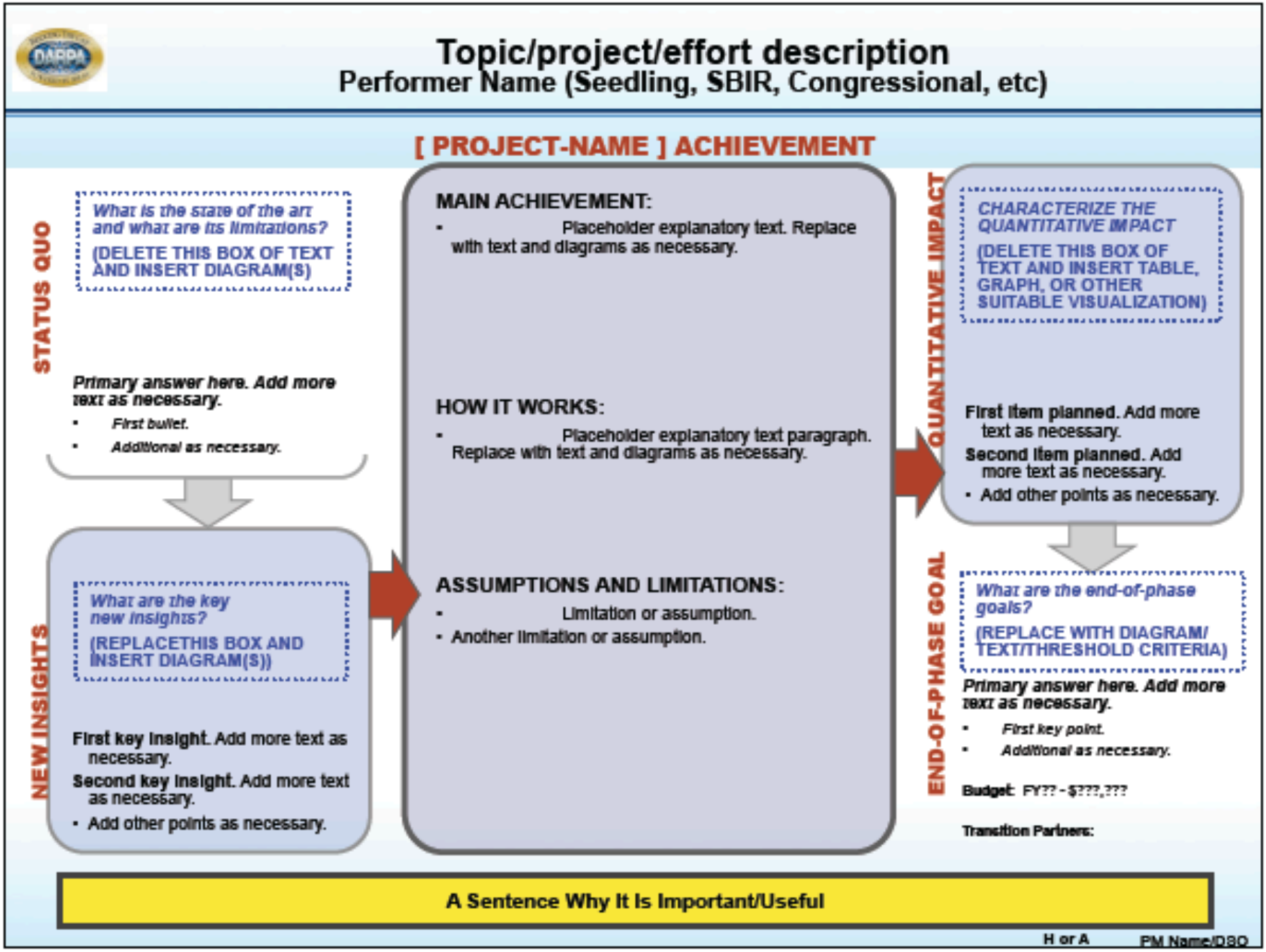
- **New and original ideas (what?)**
- **Sound, succinct, detailed focused plan (how?)**
- **Preliminary data and/or feasibility calculations**
- Relevant experience (why me/us?)
- Important & timely within field (why now?)
- Clarity concerning future direction (so what?)
- Well-articulated broader impacts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

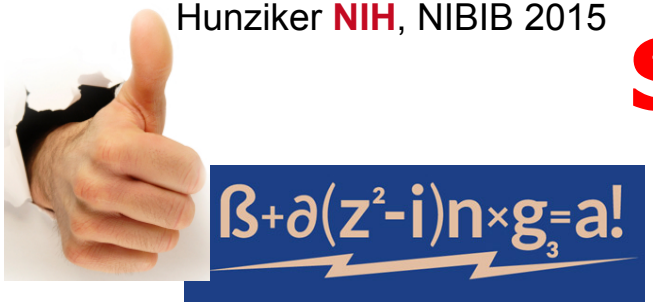
The Heilmeyer Catechism

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 Logic Flow / Elevator Pitch Ingredients





SPECIFIC AIMS Page: Formula for Success

Tell your story in five compelling, concise, plain-language paragraphs!

1. **Outline an important medical problem and your timely, innovative solution.** Describe the big picture quantitatively. How can science/ engineering help?

2. **Define the challenge for this application.** What is your specific target and hypothesis? How will you get there? How do you know?

3. **State each of your (three) Specific Aims in a single sentence in bold face.** Then, identify strategies, methods, assays to be used, and data expected.

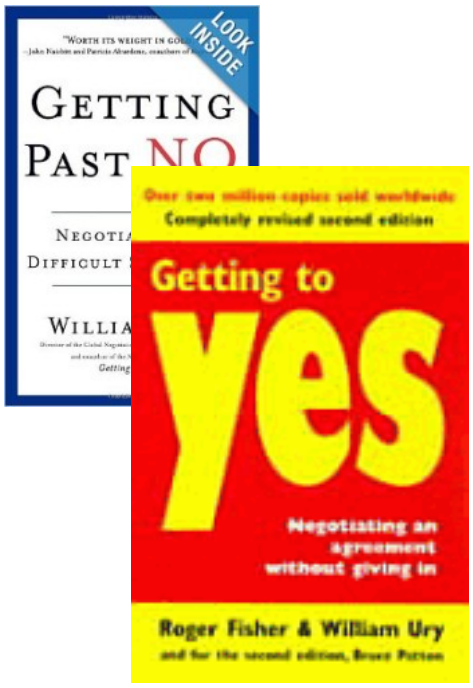
4. **Overview the competencies of the team and the resources.** Why is this the right group at the right place and time? Outline your specific skill sets.

5. **What happens when you succeed? What are the next steps?** How will paradigms shift or treatment change, and what will this project contribute?

Significance – Innovation – Investigator(s) – Approach – Environment

How to Win Over the Peer Reviewers

- Own impact: tackle an important and difficult problem
  - engineers beware: lead with an urgent issue, NOT your cool tools/technologies
  - discovery (basic) science plus technology development (non-hypothesis driven)
- Hit all Review Criteria on the "Specific Aims" page
- Balance "the possible" with "the exciting"
  - feasibility = most relevant preliminary data + sound, logical pathway
  - defend assertions with publications (citing reviewers a plus)
  - inspiration << invention = innovation
  - short term objectives inform long term goals
  - milestones > bold, general ideas
  - experience, expertise count
- Define success and point to the next grant/activity
- Good grantsmanship
  - limit jargon/acronyms
  - reinforce (don't repeat) important ideas
  - use legible/sensible figures
  - strategically place an overview as "eye candy"
  - proofread!



When/How to Submit

1. Generic Open BAAs
   - Determine PO's decision time line
     - Contact via elevator pitch
     - White Paper if invited, full proposal if invited.
   - Spring submission generally most opportune
   - A WP might enable a sweep up funding opportunity, generally around June

   - Agency budget pressures to commit as early as possible after start of Fiscal Year
   - Offset by Congressional history on appropriations legislation.

2. Specific topic BAAs
   - Follow the BAA guidance

3. How to Approach a PO - remember they have many supplicants - need get out of "noise"
   a. ID appropriate POs, have interaction with them – usually e-mail to start. Have a one paragraph elevator pitch – problem, SoA and its inadequacies, your insights toward fixing those inadequacies, potential impact. It they are interested there will likely be an invite to submit a white paper.
   b. White paper 2-5 pages depending on Agency.
   c. PO will collect WP from various supplicants and then down select some for full proposal
   d. Full proposal, if invited by PO (frequently late spring/early summer)

Examples of Successful USC Faculty

DOD

Avir Avestimehr	Navy, Army
Steve Cronin	Army, AF, DURIP
Mercedeh Khajavikhan	Navy, AF
Kristina Lerman	Army, AF
Pierluigi Nuzzo	DARPA, Navy
Jaykanth Ravichandran	Army, AF
Maryam Shanechi	Army, Navy
Geoff Spedding	Navy, AF
Alan Willner	Navy, AF

DOE

Steve Cronin	BES
Mercedeh Khajavikhan	BES
Smaranda Marinescu	BES
Priya Vashishta	BES, ASCR

NSF
Principal S&E Funding Divisions

https://www.nsf.gov/staff/orglist.jsp

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

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

Directorate for Geosciences
Atmospheric & Geospace Sciences (AGS)
Earth Sciences (EAR)
Ocean Sciences (OCE)
Polar Programs (OPP)
Research, Innovation, Synergies and Education (RISE)

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)

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

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

Directorate for STEM Education (EDU)
Equity for Excellence in STEM (EES)
Graduate Education (DGE)
Research on Learning in Formal & Informal Settings (DRL)
Undergraduate Education (DUE)

Directorate for Technology, Integration and Partnership (TIP)
Innovation and Technology Ecosystems (ITE)
Strategic Partnerships Office (SPO)
Technology Frontiers (TF)
Translational impacts (TI)

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

Technology, Innovation and Partnerships Directorate

https://new.nsf.gov/tip/latest

A new NSF directorate that creates breakthrough technologies; meets societal and economic needs; leads to new, high-wage jobs; and empowers all Americans to participate in the U.S. research and innovation enterprise. Emphasizes "use-inspired", i.e., applied research and translation.

Program Examples

Accelerating Research Translation https://new.nsf.gov/funding/opportunities/accelerating-research-translation-art
Supports IHEs to build capacity and infrastructure for translation of fundamental academic research into tangible solutions that benefit the public.

America's Seed Fund (SBIR/STTR): https://seedfund.nsf.gov/
Offers funding for early stage R&D and take no equity in your company

Assessing and Predicting Technology Outcomes https://new.nsf.gov/funding/opportunities/assessing-predicting-technology-outcomes-apto
A cohort of projects that will work together to complement each other's research and development (R&D) efforts on technology outcome models to accurately describe *technology capabilities*, *technology production*, and *technology use*.

Convergence Accelerator: https://new.nsf.gov/funding/initiatives/convergence-accelerator
Teams that complete the convergence research phases are expected to deliver high-impact solutions that meet societal needs and continue to have an impact after NSF support ends.

Innovation Corps (I-Corps): https://new.nsf.gov/funding/initiatives/i-corps
An immersive, entrepreneurial training program that facilitates the transformation of invention to impact

Partnerships for Innovation: https://new.nsf.gov/funding/initiatives/pfi
Offers researchers a technology testbed to gain market insights, launch a commercial application or facilitate industry adoption

Pathways to Enable Open-Source Ecosystems: https://new.nsf.gov/funding/opportunities/pathways-enable-open-source-ecosystems-pose
Harnesses the power of open-source development for new technology solutions to problems of national and societal importance

Regional Innovation Engine https://new.nsf.gov/funding/initiatives/regional-innovation-engines
catalyze and foster innovation ecosystems across the U.S.

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, fully conforms to PAPPG, frequently core programs)
- named 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 **-** many opportunities have specific deadlines, but there is growing use of no submission deadlines

Where: NSF Fastlane has been replaced by **research.gov** (**https://www.research.gov/research-web/**)

How: NSF Days - https://www.nsf.gov/events/event_group.jsp?group_id=20013&org=NSF

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:

NSF Proposal and Award Policies and Procedures Guide (PAPPG), NSF 23-1
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp

NSF Grants.gov Application Guide, Jan 2023, NSF 23-006
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide1021&org=NSF

NSF Prospective New Awardee Guide, Jun 2020, NSF 20-032
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pnag

NSF Publication: A Guide for Proposal Writing, NSF 04-016 - is now listed as archived; no replacement named
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04016

NSF Proposal - Generic Structure

adapted from Paul Ronney, USC AME

# pages	Topic	
1	Introduction	- what your topic is and why it is important
3	Previous work	- what has been done in this area
		- note **what key knowledge is lacking** (not incremental)
1	Objectives	- very specifically what you will do (**your new insights**)
		- how it extends the prior work
		- the **impact (scientific / technological) of your results**
1	Hypotheses	- what you think will happen
5	Approach	- how you will test the hypotheses
		- experimental or computational apparatus, etc.
2	Closure	- what you will do with the data once you have it
2	Broader Impact	- applications of the research results and educational merit

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 time costs), so there may be a somewhat different process - check with the NSF program manager.

NSF Programs
with only Internal Review by NSF Program Officers

Early Concept Grants for Exploratory Research (EAGER)

https://www.nsf.gov/about/transformative_research/submit.jsp

The EAGER funding mechanism can be used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work could be considered especially "high risk-high payoff" in the sense that it, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. Exploratory proposals may also be submitted directly to an NSF program. Principal Investigators (PIs) must contact the NSF program officer(s) whose expertise is most germane to the proposal topic prior to submission of an EAGER proposal to determine the appropriateness of the work for consideration under the EAGER mechanism.

Rapid Response Research Grants (RAPID)

The RAPID funding mechanism is used for proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events. PI(s) must contact the NSF program officer(s) whose expertise is most germane to the proposal topic before submitting a RAPID proposal.

Planning Proposal

A planning proposal is a type of proposal used to support initial conceptualization, planning and collaboration activities that aim to formulate new and sound plans for large-scale projects in emerging research areas for future submission to an NSF program.

Career Life Balance (CLB) Supplemental Funding Request

Provide a description of how the technician, research assistant, or equivalent would be used to sustain the research effort while the PI, co-PI or other member of the senior personnel is on family leave, the postdoctoral researcher or graduate student is on family leave, or the NSF Graduate Research Fellow is on medical deferral due to a family leave situation

Guide to Defense Basic Research Funding

Basic Research (6.1, or BA1)

- Service Research Offices (OXR's)
- Defense Advanced Research Projects Agency (DARPA)
- Defense Threat Reduction Agency (DTRA)
- Army Research Inst for Behavioral & Social Science (ARI)
- Army Medical Research and Materiel Command (ARMRC)
- Congressionally Directed Medical Research Program (CDMRP)

Applied Research (6.2 or BA2) and Exploratory Development (6.3 or BA3)

- Air Force Materiel Command / Air Force Research Laboratories (AFRL)
- US Space Force
- Combat Capabilities Development Command / Army Research Lab
- Army Corps of Engineers / Engineer Research and Development Center (ERDC)
- Office of Naval Research (ONR) / Naval Warfare Centers / Naval Postgraduate School
- Defense Advance Research Projects Agency (DARPA)
- Defense Threat Reduction Agency (DTRA)
- Combatting Terrorism Technical Support Office (CTTSO)
- Defense Forensics Biometrics Agency (DFBA)
- Defense Logistics Agency (DLA)
- Missile Defense Agency (MDA)
- Special Operations Command (SOCOM)
- Environment (SERDP/ESTCP)
- Advanced Manufacturing (SBIR/STTR, Rapid Innovation Fund, ManTech, Manuf Innovative Inst)

Revised Aug 2023

DOD RDT&E Taxonomy - Primer

Science and Technology ($18B in FY24)

BA1 6.1 Basic Research (TRL 0-1)	**greater knowledge of fundamental aspects of phenomena – largely use inspired, but program officers can take on high risk/high payoff ideas**
BA2 6.2 Appl Research (TRL 2-3)	determine means by which a specific need may be met
BA3 6.3 Adv Technol Development (TRL 4-6)	development / integration of hardware for field expt

Development ($125B in FY24)

BA4 6.4 Adv Component Development (TRL 6-7)	evaluate integrated technology in realistic environment
BA5 6.5 System Develop and Demon	for projects without approval for full rate production
BA6 6.6 RDT&E Management Support	program managers, ranges, test facilities,…
BA7 6.7 Operational Sys Development	support of development acquisition programs or upgrades
BA8 6.8 Defensive Cyber	

Defense Health

Congressionally Directed Medical Research

SBIR / STTR – 3.2% / 0.45% tax on R&D funding

BA Budget Activity
RDT&E Research, Development, Test & Evaluation
SBIR Small Business Innovation Research
STTR Small Business Technology Transfer
TRL Technology Readiness Level

DOD Basic Research - Principal Funding Offices

https://basicresearch.defense.gov/

https://www.cto.mil/

Service Research Offices (OXR's)

Army Research Office (ARO)	https://www.arl.army.mil/www/default.cfm?page=29
Air Force Office of Scientific Research (AFOSR)	https://www.afrl.af.mil/AFOSR/
Office of Naval Research (ONR)	https://www.onr.navy.mil/

Defense Advanced Research Projects Agency (DARPA)

Defense Science Office (DSO)	https://www.darpa.mil/about-us/offices/dso
Biological Technologies Office (BTO)	https://www.darpa.mil/about-us/offices/bto
Microsystems Technology Office (MTO)	https://www.darpa.mil/about-us/offices/mto
Information Innovation Office (I2O)	https://www.darpa.mil/about-us/offices/i2o

Defense Threat Reduction Agency (DTRA) https://www.dtra.mil/

Chemical and Biological Technologies Department

(Joint Science and Technology Office, JSTO)

Army Medical Research and Materiel Command https://mrdc.health.mil/

DMRDP (Defense Medical Research and Development Program)	https://cdmrp.health.mil/dmrdp/default
CDMRP (Congressional adds and DMRDP, fully open competition)	https://cdmrp.health.mil/

Army Research Inst for Behavioral & Social Sci https://ari.altess.army.mil/

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 – 250K/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

Multidisciplinary University Research Initiatives (MURI, in the URI budget line)

What: Supports University teams that involve more than one traditional science/engineering disciplines

Topics down-selected by agencies from OXR PO suggestions

~20 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 FY25
When: Announcement	(23 Feb 2024)
White paper (strongly encouraged, not required)	(17 May 2024)
Full proposal	(6 Sep 2024)

Where: ARO / AFOSR / ONR BAAs

USC MURI awardees

2017	Tambe	ARO - Realizing Cyber Inception
	USC	supporting institute in three other MURI awards
2018	El-Naggar	ONR - Living Electronics for Biologically-Enhanced Info
	USC	supporting institution in three other MURI Awards
2019	Boedicker	ARO - microbial community interaction networks
2020	Khajavikhan	AFOSR - light matter interactions
	USC	supporting institution in 3 other MURI Awards
2021	Ravichandran	ARO - anomalous polar textures in quasi-1D
	USC	supporting institution in 4 other MURI Awards
2022	USC	supporting institution in 2 MURI Awards
2023	Dan Lidar	ARO - quantum error correction under control
	USC	supporting institution in 2 MURI Awards
2024	USC	supporting institution in 2 MURI Awards

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

(~170 awards out of ~725 proposals in 2020)

Total funds fluctuate somewhat depending on MURI selections

When: In past, typically due in May to Aug (12 May 2023 for FY24)

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

USC Awardees

2019	Egolfopoulous	Scalar Diagnostics for High-Speed Turbulent Reacting Flows (AFOSR)
	Gratch	Analytical Equipment for Studying Human Teaming (AFOSR)
	Hodge	Versatile Sputtering Deposition System (AFOSR)
2020	Mirkovic	RE-engineering Deterlab for Scalability robusTness And Reliability (ARO)
	Willner	Signal Source Analyzer for Frequency Comb (AFOSR)
2021	Meng	Precision Laser Micromachining System (ONR)
	Jagannathan	Flexible Quantum Limited Sensing Testbed (ARO)
	Levenson-Falk	Superconducting Q-bit Measurement (AFOSR)
	Madhukar	Single Photon Emission (AFOSR)
2022	Bouteiller	Efficient Scale-bridging Methodologies for Modeling of the Nervous System (ARO)
	Cronin	Widely Tunable Ultrafast Photon Source for Interrogation of Hot Electrons (ARO)
	Ravichandran	Growth and In-situ Characterization of Thin Films (AFOSR)
	Sideris	Advanced Petascale Numerical Methods for Massive Computational Physics Problems (AFOSR)
2023	Madhukar	Mesatop Single Quantum Dot Arrays (AFOSR)
	Prasanna	Enabling Low Latency AI/ML Workloads via Wafer Scale Acceleration (ARO)
2024	Gomez	GPU Cluster for Empowering Res Distributed Optimization and Learning in Massive-Scale Systems (AFOSR)
	Levenson-Falk	A Cryogen-Free Helium Dilution Refrigerator for Quantum Information Science (AFOSR)
	Ravichandran	Crystal Growth and Processing for Anisotropic and Non-Linear Infrared Materials (ONR)

Defense Medical Research and Development Program (DMRDP)

https://cdmrp.health.mil/dmrdp/default.aspx

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 Simulation and Information Sciences	JPC-1
• Military Infectious Diseases (MID)	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.

The DMRDP is administered via the CDMRP selection process

When: See program announcements

Where:

Executed through the CDMRP process - recent examples

HT9425-24-DMRDP-PTRCTA	Psychedelic Treatment Research Clinical Trial Award
HT9425-23-DMRDP-TIRA	Trauma Immunology Research
W81WH-22-DMRDP-BWMIR	Battlefield Wound Management and Infection Research
W81XWH-21-DMDRP-ERCA	EnRoute Care
W911QY-20-R-0022	Smart Surrogates for Medical Simulation and Training

Congressionally Directed Medical Research Program (CDMRP)

https://cdmrp.health.mil/default

What: Research Programs included in the FY23 CDMRP are ($M):

Alcohol and Substance Use Disorders	4
Amyotrophic Lateral Sclerosis	40
Autism	15
Bone Marrow Failure	7.5
Breast Cancer	150
Chronic Pain Management	15
Combat Readiness-Medical	5
Duchenne Muscular Dystrophy	10
Epilepsy	12
Hearing Restoration	5
Joint Warfighter Medical	25
Kidney Cancer	50
Lung Cancer	25
Lupus	10
Melanoma	40
Military Burn	10
Multiple Sclerosis	20
Neurofibromatosis	25
Orthotics and Prosthetics Outcomes	15
Ovarian Cancer	45
Pancreatic Cancer	15
Parkinson’s	16
Peer Reviewed Alzheimer's	15
Peer Reviewed Cancer	130
Peer Reviewed Medical	370
Peer Reviewed Orthopaedic	30
Prostate Cancer	110
Rare Cancers	17.5
Reconstructive Transplant	12
Spinal Cord Injury	40
Tick-Borne Disease	7
Traumatic Brain Injury / Psychological Health	175
Tuberous Sclerosis Complex	8
Vision	20

Proposals undergo two stage review - peer, then program

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

When: Various – see website program announcement

Where: Proposal submission to be done via grants.gov

Guide to Dept of Energy Funding

Basic Research

Office of Science (SC)

Applied Research, Development, Demonstration and Deployment

Assistant Secretary for Energy Efficiency and Reliable Energy (EERE)
Assistant Secretary for Fossil Energy and Carbon Management (FECOM)
Assistant Secretary for Nuclear Energy (NP)
Assistant Secretary for Electricity (OE)
Office of Clean Energy Demonstrations (OCED)
Office of Manufacturing and Energy Supply Chains (MESC)
Arctic Energy Office (AE)
Artificial Intelligence and Technology Office (AITO)
Advanced Research Projects Agency – Energy (ARPA-E)
Cybersecurity, Energy Security, and Emergency Response (CESER)
National Nuclear Security Administration (NNSA)

DOE Principal Funding Offices
Basic Research - Office of Science

Advanced Scientific Computing Research https://www.energy.gov/science/ascr/advanced-scientific-computing-research	ASCR
Biological and Environmental Research https://www.energy.gov/science/ber/biological-and-environmental-research	BER
Basic Energy Sciences https://www.energy.gov/science/bes/basic-energy-sciences	BES
Fusion Energy Sciences https://www.energy.gov/science/fes/fusion-energy-sciences	FES
High Energy Physics https://www.energy.gov/science/hep/high-energy-physics	HEP
Nuclear Physics https://www.energy.gov/science/np/nuclear-physics	NP
Isotope R&D and Production https://www.energy.gov/science/ip/isotope-rd-and-production-doe-ip	IP
Accelerator R&D and Production https://science.osti.gov/hep/Research/Accelerator-Stewardship	ARDAP
Workforce Develop for Teachers and Students https://www.energy.gov/science/wdts/workforce-development-teachers-and-scientists	WDTS

DOE Office of Science (SC)
Core Basic Research Programs

https://www.energy.gov/science/office-science

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.
- Anticipate growing solicitations jointly sponsored by SC and the applied DOE Offices.

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-0003432 - FY2025 Continuation of Solicitation for the SC Financial Assistance Program
Applications must be submitted through Grants.gov to be considered for award.

Topical Funding Opportunities
Office of Science - Basic Research
Recent Examples

Advanced Scientific Computing Research (ASCR)
Program: Date Reduction for Science
Announcement Number: DE-FOA-0003266
Submission Deadline for Pre-Applications: Mar 19, 2024

Biological and Environmental Research (BER)
Program: Environmental System Science
Announcement Number: DE-FOA-0002437
Submission Deadline for Pre-Applications: Dec 11, 2024

Basic Energy Sciences (BES)
Program: Energy Frontier Research Centers
Announcement Number: DE-FOA-0003258
Submission Deadline for Pre-Applications: Mar 27, 2024

DOE Principal Funding Offices
Research, Development. Demonstration and Deployment (RDDD)

Energy Efficiency and Reliable Energy — EERE
https://www.energy.gov/eere/funding/eere-funding-opportunities
Mission Offices: Buildings and Industry, Renewable Energy, Sustainable Transportation and Fuels

Arctic Energy Office — AE
https://www.energy.gov/arctic/arctic-energy-office

Artificial Intelligence and Technology Office — AITO
https://www.energy.gov/ai/artificial-intelligence-technology-office

Fossil Energy and Carbon Management — FECM
https://www.energy.gov/fecm/office-fossil-energy-and-carbon-management

Nuclear Energy — NP
https://www.energy.gov/ne/office-nuclear-energy

Electricity — OE
https://www.energy.gov/oe/office-electricity

Cybersecurity, Energy Security, and Emergency Response — CESER
https://www.energy.gov/ceser/about-us

Advanced Research Projects Agency – Energy — ARPA-E
https://arpa-e.energy.gov/about

National Nuclear Security Administration — NNSA
https://www.energy.gov/nnsa/overview-nnsas-programs-students-and-principal-investigators

Topical Funding Solicitations
Research, Development, Demonstration and Deployment
Recent Examples

EERE https://www.energy.gov/eere/funding/eere-funding-opportunities
Biological Engineering Technologies Office (BETO)
Regional Resource Hubs for Purpose-Grown Energy Crops
Announcement Number: DE-FOA-0003209
Submission Deadline for Concept Paper Applications: Mar 14, 2024

Advanced Materials and Manufacturing Technologies Office (AMMTO)
Smart Manufacturing Technologies for Material and Process Innovation
Announcement Number: DE-FOA-0003329
Submission Deadline for Applications: 19 Jul 2024

Vehicle Technologies Office (VTO)
Fiscal Year 2024 Vehicle Technologies Office Batteries Funding
Announcement Number: DE-FOA-0003383
Submission Deadline for Concept Papers: Sep 9. 2024

Solar Energy Technologies Office (SETO)
Fiscal Year 2024 Solar Energy Supply Chain Incubator
Announcement Number: DE-FOA-0003289
Submission Deadline for Concept Paper Applications: Sep 13, 2024

FECM https://www.energy.gov/fecm/solicitations-and-business-opportunities
GASIFICATION OF ALTERNATIVE FEEDSTOCKS
Announcement Number: DE-FOA-000303394
Submission Deadline for Applications: Nov 22, 2024

ARPA-E https://arpa-e-foa.energy.gov/
GALVANIZING LEAPS IN ADVANCED SUPER INSULATING GLASS
Announcement Number: DE-FOA-0003488
Submission Deadline for Concept Paper Applications: Nov 26, 2024

Guide to Homeland Security / Intelligence Community Research Funding

Department of Homeland Security
- Science and Technology Directorate

Intelligence Community
- Director of National Intelligence (DNI)
- Intelligence Community (IC) Postdoc Program
- Intelligence Advanced Research Projects Agency (IARPA)
- Centers of Academic Excellence
- National Security Agency (NSA)
- National Reconnaissance Office (NRO)
- Defense Intelligence Agency (DIA)
- National Geospatial Intelligence Agency (NGA)

Revised Oct 2022

Department of Homeland Security (DHS)
Science and Technology Directorate

https://www.dhs.gov/science-and-technology

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.

The current six key mission areas are:

Managing Incidents	Preventing Terrorism
Protecting from Terrorist Attacks	Securing Aviation
Securing Borders Securing	Cyberspace

How Much: Nothing specified

When: A white paper submission anytime up to 31 May 2029 for LRBAA 24-01

Where: DHS S&T LRBAA18-01 Amendment 01

Office of the Director National Intelligence (ODNI)

Intelligence Advanced Research Projects Agency (IARPA)

https://www.iarpa.gov/

What:

Analysis	Maximize insight from the information we collect, in a timely fashion.
Collection	Dramatically improve the value of collected data from all sources.
Research &Technol Protection	Identifies and safeguards information with impact on national security.

Areas of Interest:

- AI
- Quantum Computing
- Machine Learning
- Synthetic Biology

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.
https://www.iarpa.gov/index.php/working-with-iarpa/seedling-information

Offerors are strongly encouraged to interact with the Program Managers and 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

Where: Specific topic calls in 2024
Superior Options for Long-life Solar Technologies with Impressive Conversion Efficiencies Proposer day
Video Linking and Intelligence from Non-Collaboratve Sensors Proposer Day

National Reconnaissance Office (NRO)

Director's Innovation Initiative (DII)

https://www.nro.gov/Work-with-NRO/Directors-Innovation-Initiative/

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 main areas of interest categories are:

- Remote Sensing
- Apertures
- Communications
- Satellite System design
- Sense-making
- Other disruptive concepts and technology

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 $500K over 9 months

When: Spring 2024

Where: DII is accepting applications via the ARC (acq.westfields.net)

Defense Intelligence Agency

https://www.dia.mil/Business/Needipedia.aspx

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. Artificial Intelligence and Machine Learning
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
9. Machine-Assisted Analytic Rapid-Repository System (MARS)
10. Emerging Technologies

Periodically over the 5-year period, proposal call announcements (CALLS) may be issued in the FedBizOps under HHM402-19-S-0001 to request proposals for specific topic areas.

When: white papers (required) accepted from throughout the open period - to 25 Dec 2023
Call announcements will specify due dates for the call topic

Where: HHM402-19-S-0001 with annual updates.

NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA)

ACADEMIC RESEARCH PROGRAM (NARP)

https://www.nga.mil/resources/NGA_Academic_Research_Program.html

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

- Geospatial information science
- Physics
- Mathematics
- Statistical forecasting
- Geography
- Computer science
- Visual cognition
- Data Science & Data Analytics
- Computational Modeling
- Human Computer Interaction
- Astrophysics
- Remote Sensing

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

New Investigator Awards (NIP) for individuals with less than 5 years from PhD

Research Collaboration Forums (NRCF) to encourage collaboration forums

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 u to $150K per option year.

When: Open continuously to 2023. Amendments to this BAA announced response dates for individual topic areas.

Where: Broad Agency Announcement HM0476-23-BAA-0001, open to 14 Dec 2026

Index: Guidance to NASA Research Funding

NASA Principal Research Funding Offices

(NSPIRES web site https://nspires.nasaprs.com/external/)

- **Science Mission Directorate (SMD)**
  https://science.nasa.gov/
  Research Opportunities in Space and Earth Sciences (ROSES, NRA-NNH23ZDA001N)

- **Aeronautics Research Mission Directorate (ARMD)**
  https://www.nasa.gov/aeroresearch
  Research Opportunities in Aeronautics (ROA, NRA - NNH23ZEA001N)
  Aeronautics Research generates the innovative concepts, and technologies that will enable revolutionary advances in future aircraft

- **Exploration Systems Development Mission Directorate (HEO)**
  https://www.nasa.gov/directorates/heo/index.html
  Human Exploration Research Opportunities (HERO, NNJ23ZSA001N)
  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 Operations Mission Directorate (SOMD)**
  https://www.nasa.gov/directorates/space-operations-mission-directorate
  SOMD manages NASA's current and future space operations in and beyond low-Earth orbit (LEO)

- **Space Technology Mission Directorate (STMD)**
  https://www.nasa.gov/directorates/spacetech/home/index.html
  Space Technology Research, Development, Demonstration and Infusion 2023 (80HQTR23NOA01)

NRA NASA Research Announcement

NASA
Research Opportunities Website

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

Where: NASA Solicitation and Proposal Integrated Review and Evaluation Systems (NSPIRES)
https://nspires.nasaprs.com/external/solicitations/solicitations.do?method=open&stack=push

Department of Commerce
NIST Extramural Funding Opportunities

https://www.nist.gov/about-nist/work-nist

Measurement Science and Engineering (MSE) Research Grant Program (2024-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 (2024-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 (2023-NIST-SCOCD-01)
The recipients will work with NIST to strengthen education and learning about standards and standardization.

Centers of Excellence (at Universities) (https://www.nist.gov/coe)
Establish 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, renewed in 2019
- Community Resilience at Colorado State University in 2015, renewed in 2020
- Forensics Sciences at Iowa State University in 2015, renewed in 2020

Manufacturing USA - National Network for Manufacturing Innovation (NNMI) **- Federal in scope but coordinated at NIST**

https://www.manufacturingusa.com/

The key objective of the NNMI is to accelerate innovation and transition technology to US manufacturing enterprises.
Using redirected Agency funds, DOD, DOE, NIST have created:

DOD - America Makes (additive manuf), Digital Manufacturing and Design, Lightweight Metals, Integrated Photonics, Flexible Hybrid Electronics, Advanced Functional Fabrics, Advanced Regenerative Manufacturing, and Robotics in Manufacturing

DOE - Wide Bandgap Semiconductors for Power Applications, Advanced Composites and Smart Manufacturing: Advanced Sensors, Controls, Platforms and Modeling for Manufacturing; Rapid Advancement in Process intensification Deployment, and Reducing Embodied-energy and Decreasing Emissions

NIST - Biopharmaceutical

Department of Commerce
National Oceanic and Atmospheric Administration (NOAA)
Research Funding

National Marine Fisheries Service (NMFS)
https://www.fisheries.noaa.gov/

National Ocean Service (NOS)
https://oceanservice.noaa.gov/

National Weather Service (NWS)
https://www.weather.gov/

Oceanic and Atmospheric Research (OAR)
https://research.noaa.gov/

NOAA OAR
Climate Program Office

What:
Funding Opportunity Description: Climate variability and change present society with significant economic, health, safety, and national security challenges. NOAA advances scientific and technical programs to help society cope with, and adapt to, today's variations in climate and to prepare for tomorrow's. Toward this end, the agency conducts and supports climate research, essential oceanic and atmospheric observations, modeling, information management, assessments, interdisciplinary decision support research, outreach, education, and stakeholder partnership development. These investments are key to NOAA's mission of "Science, Service, and Stewardship" and are guided by the agency's vision to create and sustain enhanced resilience in ecosystems, communities, and economies, as described in NOAA's Next Generation Strategic Plan (NGSP).

The 6 competitions covered by the 2024 announcement are as follows:

AC4: Methane Across Scales
COM: Precipitation-related Dataset Development and Analysis
MAPP/NIDIS: Science for the 21st Century Western US Hydroclimate
MAPP: Climate Futures - Projection for Societally Relevant Problems
ERB/AC4/CVP: Applications of Satellite Data to Aerosol Research
CAFA: Promoting Resilience and Adaptation of US Marine Fisheries and Fishing Communities

When: August/Sept 2024

How Much:
In FY 2023, approximately $11 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: Multiple Solicitations

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		

NOAA OAR

Office of Exploration and Research (OER)

https://oceanexplorer.noaa.gov/

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 address at least one of four themes:
1) Interdisciplinary baseline characterizations of unknown or poorly known ocean areas, processes, and resources
2) Discovery and initial characterization of underwater cultural heritage;
3) Technological innovation to advance ocean exploration objectives.

When: Funding Opportunity: NOAA-OAR-OER-2025-25557
Two page pre-proposal due date 30 May 2024
Full proposal due 3 Oct 2024

Where: Visit the Ocean Explorer website to see past and present OE-funded activities.
https://oceanexplorer.noaa.gov/about/funding-opps/welcome.html

US Department of Agriculture (USDA)
Basic Research Funding

National Institute for Food and Agriculture (NIFA)
https://www.nifa.usda.gov/grants

Forest Service
https://www.fs.usda.gov/research/

USDA/NIFA

Agriculture and Food Research Initiative (AFRI)

https://www.nifa.usda.gov/grants/programs/competitive-agriculture-and-food-research-initiative-AFRI

What:

In the last several years NIFA has issued a variety of RFAs for the AFRI Program:

- Education and Workforce Development
- Foundational and Applied Science Program
  - Priority Areas
    - Plant Health and Production and Plant Products
    - Animal Health and Production and Animal Products
    - Food Safety, Nutrition, and Health
    - Bioenergy, Natural Resources and Environment
    - Agriculture Systems and Technology
    - Agriculture Economics and Rural Communities
- Sustainable Agricultural Systems
- Interagency Programs

How Much:

Standard Grants ~$650K total (including indirect costs) with project periods of up to 5 years.

When:

Applicants considering applying to the FY 2023 funding cycle should check the AFRI RFA webpage and www.grants.gov for the Funding Opportunity Number and Application Kit, as well as for any programmatic changes.

Where: https://www.nifa.usda.gov/grants/programs/agriculture-food-research-initiative-afri/afri-request-applications

RFA - Request for Application NIFA - National Institute for Food and Agriculture

Joint Fire Science Research Collaborative, including USDA

https://www.doi.gov/wildlandfire/wildland-fire-research-funding-opportunity

What:

JFSP research priorities directly and indirectly support the three goals of the 2014 National Cohesive Wildland Fire Management Strategy ("Cohesive Strategy"):

- Resilient landscapes
- Fire-adapted communities
- Safe and effective wildfire response

The Joint Fire Science Program (JFSP) is a partnership of seven federal wildland fire management and research agencies that have a shared need to address problems associated with managing wildland fuels, fires, and fire-impacted ecosystems. The partnering agencies include the U.S. Department of Agriculture (USDA), Forest Service (FS) and five bureaus in the U.S. Department of the Interior (DOI): Bureau of Indian Affairs, Bureau of Land Management, National Park Service, Fish and Wildlife Service, and Geological Survey. The DOI also is represented by the Office of Wildland Fire. Funding to support the program is provided by both DOI and FS.

How Much

The award size will depend on the number of meritorious applications and the availability of appropriated funds.

Where

2023 NOFO0024-002 Joint Fire Science Program

Department of Education

Institute of Education Sciences (IES)

https://ies.ed.gov/

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

- Education Research Programs (84.305A)
- Research Training Programs in the Education Sciences (84.305B)
- Education Research and Development Centers (84.305C)
- Statistical and Research Methodology in Education (84.305D)
- Partnerships and Collaborations Focused on Problems of Practice or Policy (84.305H)
- Low-cost Short-Duration Evaluation of Education Interventions (84.305L)
- Research Networks Focused on Critical Problems of Education Policy and Practice (84.305N)
- Research Grants Focused on Systematic Replication (84.305R)

- Special Education Research Programs (84.324A)
- Research Training Programs in Special Education (84.324B)
- Low-cost, Short-duration Evaluation of Special Education Interventions (84.324L)
- Research Networks Focused on Critical Problems of Policy and Practice (84.324N)
- Research Grants Focused on NAEP Process Data for Learners with Disabilities (84.324P)
- Research Grants Focused on Systematic Replication (84.324.R)

Contact relevant Program Officer(s) for the topic(s) of interest in a given fiscal year

When: for FY2025

Full proposal due date: 7 Mar 2025

Where: Detailed RFAs posted at: https://ies.ed.gov/funding/

Webinars on the opportunities: https://ies.ed.gov/funding/webinars/index.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.

Environmental Protection Agency (EPA)
Research Funding

https://www.epa.gov/research

What: The Office of Research and Development is EPA's scientific research arm. On this page you can access our products, tools, and events, and learn about grant and job opportunities

Research Topics:

- Air
- Climate change
- Ecosystems
- Emergency Response
- Health
- Human Health Risk Assessment
- Land and Waste Management
- Safer Chemicals
- Water

People, Prosperity and the Planet (P3) Student Design Competition

When: Was sporadic, but becoming more prevalent under the Biden Administration

Where: See website - https://www.epa.gov/research-grants

Department of Transportation
Office of the Assistant Secretary for Research and Technology
Research, Development and Technology
https://www.transportation.gov/administrations/research-and-technology

What: The Office of the Assistant Secretary for Research and Technology (OST-R) is a part of the Office of the Secretary of Transportation (OST).

University Transportation Centers (UTC)
https://www.transportation.gov/utc/current-competition

ARPA-I (Infrastructure)
https://www.transportation.gov/arpa-i/about

Aviation	Federal Aviation Administration (FAA):
	Environment and Energy Research and Development
	NextGen
Maritime	Maritime Administration (MARAD):
	MARAD Innovation, Research and Technology
Pipelines	Pipeline and Hazardous Materials Safety Administration (PHMSA)
	PHMSA Research and Development
Railroads	Federal Railroad Administration (FRA):
	FRA Research, Development and Technology
Roadway Modes	Federal Highway Administration (FHWA):
	Biking and Walking Safety
	FHWA Research and Technology Program
	Infrastructure Research (highways, structures, pavement, construction)
National Highway Traffic Safety Administration (NHTSA):	
	NHTSA Research and Data (vehicles, vehicle safety, crashes)
	NHTSA Human Factors (drivers, driver behavior)
Federal Motor Carrier Safety Administration (FMCSA):	
	FMCSA Analysis, Research, and Technology (trucks, motor coaches, commercial drivers)
Transit	Federal Transit Administration (FTA):
	FTA Research and Innovation

Department of Justice - National Institute of Justice

https://nij.ojp.gov/funding
https://justicegrants.usdoj.gov/

What: NIJ awards grants and agreements for:

- Research, development and evaluation (ALN 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 (ALN 16.471)
  - Paul Coverdell Forensic Sciences Improvement Grant Program (ALN 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 (ALN 16.562)
  - W.E.B. DuBois Fellowship (ALN 16.566)
  - Visiting Fellowship

<u>Examples of FY2023 Solicitations</u>

Reducing Racial and Ethnic Disparities
Services for Victims of Crimes
Trafficking in Persons
School Safety
Juvenile Justice
Correction Culture and Climate

When: Varies with solicitation; typically late spring to summer

Where: See website

National Institutes of Health (NIH)

Extramural Funding Opportunities

https://grants.nih.gov/funding/index.htm

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

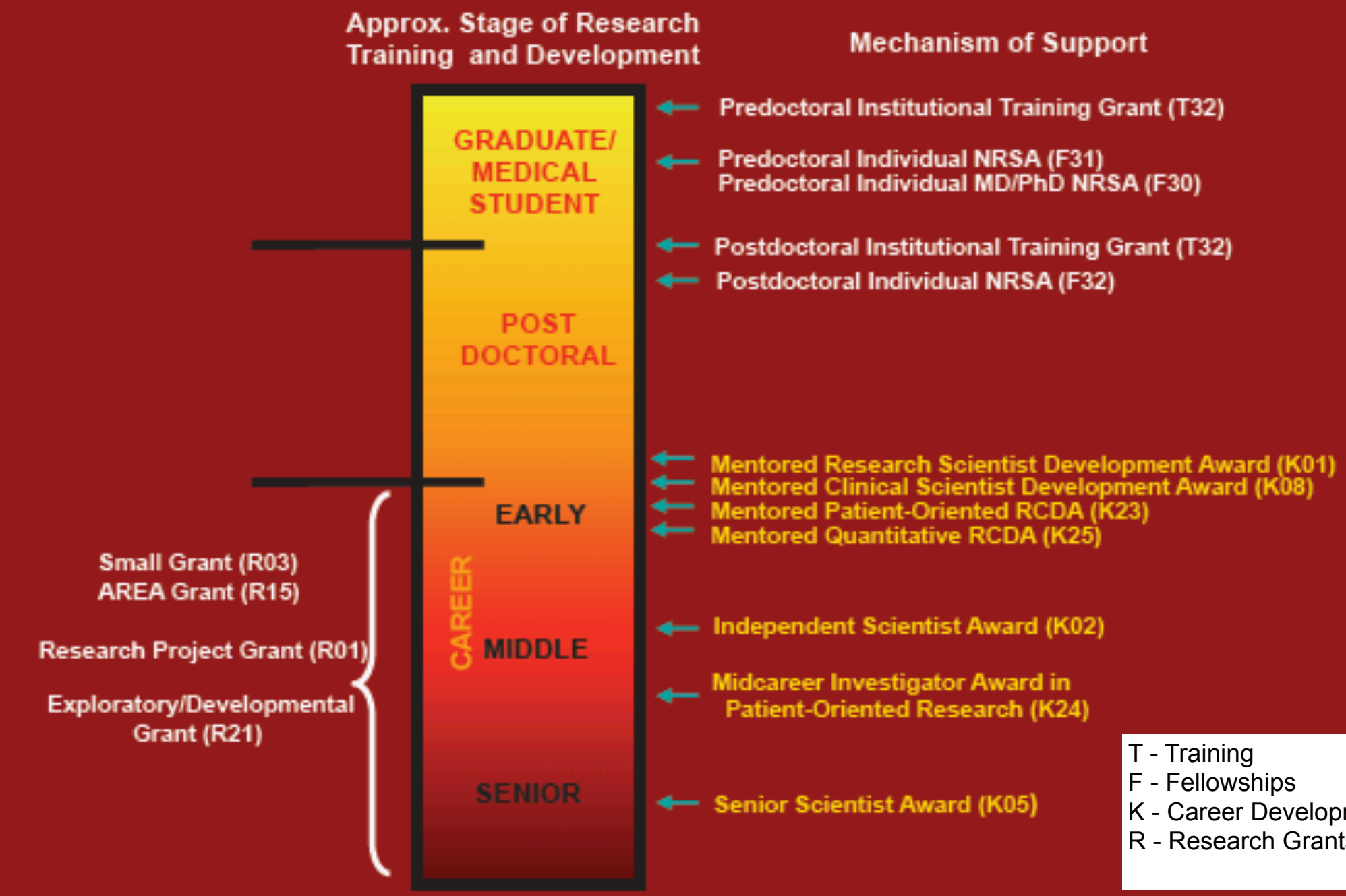
Five Themes toward Research Investment

- 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

University of Southern California

USC

NIH Grant Mechanism Timetable



T - Training
F - Fellowships
K - Career Development
R - Research Grants

NIH Research Funding Opportunities

Center for Excellence in Research Workshops by Steve Moldin and Sylvia da Costa

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	https://grants.nih.gov/funding/index.htm https://grants.nih.gov/grants/planning_application.htm#search
Guide to writing proposals	https://grants.nih.gov/grants/grant_basics.htm

How Much: Varies with program - see announcement

Note that an NIH proposal requests direct monies, indirect costs are added from another account. This differs from most other agencies.

When: Varies with program - see the specific announcement

Where: https://grants.nih.gov/grants/submitapplication.htm

Path to Success at NIH

Step #1: Do your homework; learn a bit about the grant process and the options.

Office of Extramural Research:
Basics - http://grants.nih.gov/grants/grant_basics.htm
Overview - http://grants.nih.gov/grants/grants_process.htm

IC priorities: http://www.nih.gov/icd/index.html

NIH Guide Provides Weekly Updates on Funding Opportunities:
http://grants.nih.gov/grants/guide/

NIH RePORTer – lots of statistics and abstracts of funded grants
http://report.nih.gov/

Step #2: Contact us because…
We're from the Government,
we're here to help you!

Take Home Messages

Lots of directions and opportunities at the NIH

- **Monitor Institute websites and the NIH Guide** (http://grants.nih.gov/grants/guide/)
- **Get to know the Program Director(s) for your scientific area and discuss your ideas**
  - Fit with institute mission and priorities
  - Best grant mechanism or program
  - Best study section for review
- **Participate in workshops and symposia**
  - Get fresh ideas and directions for your research
  - Become known to your peers (i.e. reviewers)
- **Participate in review of grant applications (serve on study sections)**

Assets Available for Assistance

CER Resources

Steve Moldin, Interim Assoc VP of Research Strategy and Innovation
- Developing NIH Grant Applications

Paul Ronney, Prof AME
- Writing Compelling NSF Proposals

James Murday, Director of Physical Sciences, Office of Research Advancement
- Developing A Successful Mission Agency Grant
- Proposal Writing for Mission Agency Young Investigator / Early Career Opportunities
- Larger Scale Multidisciplinary Research Opportunities
- Developing a Successful Humanities/Social Sciences Proposal for Federal Agencies

Hossein Pourmand, Assistant VP of Research Initiatives
- Funding from Foundations for STEM
- Securing Corporate Funding for Research

Dana Irwin, Assoc Dir of Development of Corporate and Foundation Relations
- Funding from Foundations for Arts and Humanities

University of Southern California

USC

Research Strategy & Development (RSD) Organization Chart

Senior Vice President
Research & Innovation

Ishwar Puri

Associate Vice President
Research Strategy &
Innovation

Steven Moldin

Physical Sciences
James Murday

National Security
Allan Olson

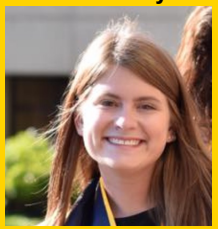
Med/Bio Sciences
Steven Moldin

Program Manager
Robyn Hejmej

Project Specialist - Admin
Amber Gray

Project Specialist
Ashley Gordon

Senior Grant Writer
Jordan Locy



Grant Writer
Aaron Nordman

Grant Writer
Ethan Bochicchio

Grant Writer
Helen Immerso

USC DC Research Advancement Office

Services

Research Funding

- Research initiative alerts
- Collaborations across schools, other institutions
- Federal funding agency advocacy / connections / intel
- Surrogate representation at DC area events
- Strategically targeted activities
- Proposal preparation - biosketch, letters of support, editorial, budget, and scientific
- Mission Agency Program Summary (MAPS) resources
- Program/Program Officer database
- Observations/Suggestions on proposal drafts

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	
Robyn Gill - manager	robyngil@usc.edu
Helen Immerso - writer	immerso@usc.edu
Jordan Locy - writer	locy@usc.edu
Aaron Nordman - writer	anordman@usc.edu
Ashley Gordon - specialist	ashleygo@usc.edu
Ethan Bochicchio - writer	ebochicc@usc.edu

Technical		
Steve Moldin	- biology, medical, bit of everything	moldin@usc.edu
Jim Murday	- physical sciences/engineering	murday@usc.edu
Al Olson	- cyber and intelligence	alolson@usc.edu

Mission Agency Program Summary (MAPS)

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

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

It has the following:

Mission Agency (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

Charts from recent USC Center of Excellence in Research workshop presentations

Reports / guides on writing proposals

URLs at which one can arrange for automatic solicitation updates

URLs at which one can find information on previous agency awardees

Information about DC Office services

Timely Access to new Opportunities

DC Office of Research Advancement alerts - roughly daily

Federal Websites

Grants.gov	https://www.grants.gov/web/grants/home.html
SAM.gov	https://sam.gov/

Agency E-mail Alerts

Institute for Educational Sciences (ED)	https://ies.ed.gov/newsflash/
Environmental Protection Agency (EPA)	https://www.epa.gov/grants/forms/subscribe-epa-grants-update-listserv
Guide to Grants and Contracts (NIH)	https://grants.nih.gov/grants/guide/listserv.htm
National Institute of Justice (NIJ)	https://service.govdelivery.com/accounts/USDOJOJP/subscriber/new?topic_id=USDOJOJP_8
National Science Foundation (NSF)	https://public.govdelivery.com/accounts/USNSF/subscriber/new?qsp=823

Grant Forward https://www.grantforward.com/index

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

Agency Sites Providing Information on Previously Funded Awards

DOD	
DOE SC	https://pamspublic.science.energy.gov/WebPAMSExternal/interface/awards/AwardSearchExternal.aspx
DOT	https://researchhub.bts.gov/search
ED IES	https://ies.ed.gov/funding/grantsearch/index.asp
EPA	https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/recipients.welcome/displayOption/grants
NIH	https://report.nih.gov/
NIJ	https://nij.ojp.gov/funding/awards/list
NIST	the various program websites generally have a list of prior awardees for that program
NSF	https://www.nsf.gov/awardsearch/
NEA	https://www.arts.gov/grants/recent-grants
NEH	the various program websites have a list of prior awardees for that program
NRC	https://www.nrc.gov/about-nrc/grants/awards/index.html

Website Providing Searchable Information on Federal Grants/Contracts

https://www.usaspending.gov/#/

(but does not identify the funding agency program officer or the awardee PI)

Resources for Proposal Writing

(available from MAPS or at shown URL)

NSF CAREER

CAREER Proposal Writing	Hazelrigg, NSF
CAREER Proposal Writing Tips	Pei
CAREER Program Presentation (2013)	LA Salle, NSF
Writing a Successful CAREER Proposal	Vigeant, Univ Hartford
Broad(er) impacts of the NSF CAREER Proposal	Schmitz, UNCC

Other

A Tips for Authoring Grant Proposals	Hill, Univ Wisc-Madison
Tips on Writing a Competitive Grant Proposal	Clary, Western SARE
Writing a good grant Proposal	Jones, Microsoft
Honing your Proposal Writing Skills	Hazelrigg, NSF
Guide for Writing a Funding Proposal	Levine, Mich State Univ.
Obtaining Federal Funding	Wardle, NSF
NSF Guide for Proposal Writing	NSF 04-016
The R&D Proposal	Yoder, Office of Naval Research
Demystifying DoD Research Funding	Palmer, Army Research Office
NASA Writing Research Proposals	Hertz, NASA Headquarters
NIH Writing your application	https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm
USDA NIFA General Proposal Writing Tips	https://nifa.usda.gov/resource/general-grant-writing-tips-success

How to Develop and Write a Grant Proposal

From Congressional Research Service - RL32159 Aug 10, 2023

Proposal Writing Websites

- How do I write a grant Proposal? (Candid)
  https://learning.candid.org/resources/knowledge-base/grant-proposals/
- How to Write a Winning Grant Proposal (Candid)
  https://blog.candid.org/post/how-to-write-a-grant-proposal/
- Online Proposal Writing Course (Candid)
  https://learning.candid.org/training/courses/online-proposal-writing-course/
- Document Checklist for Grant Proposals (Candid)
  https://blog.candid.org/post/document-checklist-for-grant-proposals-part-1/
- Tips for a Successful Grant Application (Environmental Protection Agency)
  https://www.epa.gov/ports-initiative/tips-successful-grant-application
- 20 Tips for Grant Writing Success (U.S. Department of Agriculture, NIFA)
  https://www.nifa.usda.gov/sites/default/files/2022-03/20TipsforGrantWritingSuccess_FactSheet.pdf
- Developing and Writing Grant Proposals (Rutgers)
  https://njms.rutgers.edu/research/rast/DevelopingAndWritingGrantProposals.htm
- Writing a Winning Grant Proposal (Education Money)
  https://www.educationmoney.com/fed_write_proposal.html

Budget Development Websites

- Introduction to Project Budgets
  https://learning.candid.org/training/courses/introduction-to-project-budgets/
- Creating a Sound Proposal Budget
  https://learning.candid.org/training/creating-a-sound-proposal-budget/
- What Do Funders Look for in Grant Proposal Budgets?
  https://blog.candid.org/post/what-do-funders-look-for-in-grant-proposal-budgets/
- How to Answer Budget Questions Funders Will Ask
  https://www.tgci.com/blog/2019/10/how-answer-budget-questions-funders-will-ask%C2%A0