“To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense...”

Basic research ... results in general knowledge and an understanding of nature and its laws. This general knowledge provides the means of answering a large number of important practical problems ....

- Vannevar Bush

NSF by the Numbers

- $8B FY 2017 budget request
- 12,000 awards funded
- 2,000 NSF-funded institutions
- 350,000 NSF-supported researchers
- 93% funds research, education and related activities
- 50,000 proposals
- 121 Nobel Prize winners
NSF FY 2017 Budget Request
Total: $8 billion

NSF Funds All Fields of S&E

NSF Support of Academic Basic Research in Selected Fields (as a percentage of total federal support)
Inclusion and Diversity
Clean Energy
Food/Energy/Water
Risk and Resilience
Understanding the Brain

Characteristics of NSF

Ubiquity
S&E advances are permeating the way we work, communicate, learn, and discover.

Urgency
Rapidly evolving and accelerating the pace of discovery and innovation, with profound societal and economic impact.

Engagement
The key strength and asset of NSF is the scientific community and the general public and their engagement.
What Makes NSF Unique

Distributes 93% of its budget through the merit review process

Funds broad fundamental research -- longer lead time for identifying results

Drives U.S. economy
Enhances American security
Advances knowledge
to sustain U.S. global leadership.

Office of Legislative and Public Affairs (OLPA)

OLPA Mission
To advance awareness of NSF and its mission through strategic communications to external audiences
OLPA’s Goals and Priorities

NSF engages the public and increases scientific literacy

- Broaden awareness and understanding of NSF
- Communicate NSF’s vital mission
- Highlight success stories
- Strengthen NSF’s brand and image
- Leverage the expertise/credentials of NSF’s leadership
- Forge strategic partnerships to bolster outreach.

Congress
Arc of Science

Showcased impacts of research on daily lives and careers of Americans.

General Public
New Mediums

Monthly photo galleries show off NSF-funded science.
High profile events
USA Science and Engineering Festival
April 2016
April 7-8, 2018

High profile events
2017 Washington Auto Show . . . 2018?
Keynote by NSF Director.
Exhibition of NSF’s funded autonomous vehicle, highlighting AI research and new technologies.
Rush hour drives on Capitol Hill with reporters and Hill staff.

Robust Social Media
Usage metrics since inception, current as of March 2017

www.nsf.gov/social
Jodie Jawor  
Division of Integrative Organismal Systems (IOS)  
jjawor@nsf.gov

Program director for the Behavioral Systems Cluster in IOS  
Serving as a temporary program director for the Graduate Research Fellowship Program  
Behavioral endocrinologist and affiliate research faculty at New Mexico State University  
Reads (almost obsessively) about Tudor Era England
**Biological Sciences (BIO)**

**PRIORITIES**

- Investigator-driven projects in all areas of biological research
- Brain Research through Advancing Innovative Neurotechnologies (BRAIN)
- Macrosystems Biology
- Plant Genome Research Program (PGRP)
- New: Enabling Discovery through Genomic Tools (EDGE)
- New: Understanding the Rules of Life, Predicting Phenotype
- New: U.S.-Israel Binational Science Foundation (BSF) Collaborative Proposals

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**NSF Directorates and Offices**

**Computer & Information Science & Engineering (CISE)**

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**Computer & Information Science & Engineering (CISE)**

**Jie Yang**  
Division of Information and Intelligent Systems (IIS)  
jyang@nsf.gov

Responsible for IIS: Core Programs

- National Robotics Initiative 2.0: Ubiquitous Collaborative Robots (NRI-2.0)
- NSF/Intel Partnership on Visual and Experiential Computing (VEC)
- Smart and Autonomous Systems (S&AS)
- Smart and Connected Health (SCH)

Joined NSF in 2008; formerly at Carnegie Mellon
**Computer & Information Science & Engineering (CISE)**

- **James Kurose, AD**
- **Erwin Gianchandani, DAD**

**PRIORITIES**
- Core research programs across computer science (CS)
- Cross-directorate and cross-NSF programs (e.g., BRAIN, Cyberlearning, Secure and Trustworthy Cyberspace, Cyber-Physical Systems, Software Infrastructure for Sustained Innovation, BIG DATA, Smart and Connected Health/Communities)
- CS education – STEM+C
- Building cyber infrastructure for science and engineering

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**NSF Directorates and Offices**

**Education & Human Resources (EHR)**

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David Campbell  
Division of Research on Learning (DRL) in Formal and Informal Settings  
dcampion@nsf.gov  

Born and raised in Newport, Rhode Island  
Taught field marine science courses in Bermuda, Roatan, Maine, New Jersey, Florida, and the US Virgin Islands  
Selected for U.S. Embassy Science Fellowships in the Philippines and Palau  
Lives on a farm in Maryland and plants wheat, corn, and soybeans

Education & Human Resources (EHR)

William (Jim) Lewis, Assistant Director (Acting)

Division of Graduate Education (DGE)
Division of Human Resource Development (HRD)
Division of Research on Learning in Formal and Informal Settings (DRL)
Division of Undergraduate Education (DUE)

Education & Human Resources (EHR)

STEM Learning and Learning Environments
- Cognitive and “non-cognitive” foundations of STEM
- Creative uses of formal and informal STEM learning

Broadening Participation and Institutional Capacity Building in STEM
- Access to and success in high-quality STEM education for underrepresented groups

STEM Professional Workforce Development
- Capitalize on scientific advances
- Address not yet imagined global, social & econ challenges
Engineering (ENG)

Program Director, Optics and Photonics Program since 2014
Advanced optical sources & photo-detectors
Nanophotonics, plasmonic & metamaterials
Photonic integrated circuits and optical com
Nonlinear & ultrafast optics
Quantum photonic devices
Optical sensing & imaging

Professor of Optical Sciences,
University of Arizona, Tucson, since 1995

Mahmoud Fallahi
Division of Electrical Communication and Cyber System (ECCS)
mfallahi@nsf.gov
ENG Initiatives and Priorities
Address National Interests

- INFEWS
- Risk and Resilience – Resilient Infrastructure Systems
  - Urban Science
  - Smart and Connected Communities
- Clean Energy Technology
- Cyber-Enabled Materials, Manufacturing, and Smart Systems
  - Advanced Manufacturing
- NNI
- ERCs
- Communications & Cyberinfrastructure
- Education and Broadening Participation
  - NSF INCLUDES
  - IUSE: RED
- Understanding the Brain
- Optics and Photonics
- ICORPS
- GOALI
- IUCRC
- PFI
- SBIR/STTR

Geosciences (GEO)

Directorate for Geosciences (GEO)

Luciana Astiz
Division of Earth Sciences (EAR)
lastiz@nsf.gov

Joined NSF in 2015
Geophysics Program Director
“Fastlane Modernization” committee member
GRFP, review committee
Comprehensive Nuclear Test Ban Treaty Organization in Vienna, Austria - IMS
Scripps Institution of Oceanography – USArray EarthScope
Seismological Research Letters – Chief Editor
Directorate for Geosciences (GEO)

William Easterling  
Margaret Cavanaugh  
AD

Directorate for Geosciences (GEO)

PRIORITIES
Support basic research in the Earth, ocean, and atmospheric sciences, from equator to poles, from near to space and from seconds to billions of years
Support research facilities and infrastructure (instrument pools, research vessels, NCAR, Antarctic base, and more)
Promote education and diversity in the geosciences
PREDIETS: Prediction of and Resilience against Extreme EVENTS
INFEWS: Innovations at the Nexus of Food, Energy and Water Systems

Mathematical & Physical Sciences (MPS)
Mathematical & Physical Sciences (MPS)

Jacques Verstraete
Division of Mathematical Sciences (DMS)
jverstra@nsf.gov

- NSF Program Director (rotator) in the Combinatorics Program since 2015.
- Managed CAREER, MSRF panels
- management teams for FRGMS, MSII and Big Data
- Professor, Department of Mathematics, University of California, San Diego, since 2007

Mathematical & Physical Sciences (MPS)

- Directorate for Mathematical and Physical Sciences (MPS)
  - Division of Astronomical Sciences (AST)
  - Division of Chemistry (CHE)
  - Division of Materials Research (DMR)
  - Division of Mathematical Sciences (DMS)
  - Division of Physics (PHY)
- Office of Multidisciplinary Activities (OMA)

Mathematical & Physical Sciences (MPS)

- EMPHASIS AREAS
  - Physical sciences at the nanoscale
  - Quantum information science
  - Physics of the universe
  - Advances in optics and photonics
  - Data Driven Science, Big Data
  - Sustainability
  - Materials by design
  - World-class shared-use facilities
  - Broadening Participation
  - Complex systems (multi-scale, emergent phenomena)
  - Innovations at the Nexus of Food, Energy and Water Systems
Social, Behavioral, & Economic Science (SBE)

Permanent NSF Program Officer
Geography and Spatial Sciences Program
Coupled Natural and Human Systems
Nature-society relations research: analyzes landscape change in rural and urban settings and sustainable livelihoods (Brazilian Amazon, Mexico, and Kenya)
Editor, Global Urban Agriculture: Convergence of Theory and Practice (to be published by CABI International this month).
Social, Behavioral, & Economic Science (SBE)

Supports research on humans and their institutions across:
- Scales (neurons to global organizations and the world)
- Times (ancient civilizations to futuristic projections)
- Spaces (small towns in America to cities on other continents)

Funds research through:
- Award made by individual programs
- Participation in inter-directorate competitions

Supports scientific research:
- Quantitative analyses
- Qualitative work
- Mixed methods studies

Office of Integrative Activities (OD/OIA)

Office of Integrative Activities (OD/OIA)

Raffaella Montelli
Established Program to Stimulate Competitive Research (EPSCoR)
montelli@nsf.gov

NSF Program Manager since Jan. 2012
Recently joined OIA EPSCoR
First in GEO EAR, I/UCRC, I-CORPS, GOALI
Next ENG I/UCRC

Prior to NSF, served as senior geoscientist at ExxonMobil Exploration Company.
Established Program to Stimulate Competitive Research (EPSCoR)

IA: Science and Technology Centers - STC
IA: Major Research Instrumentation - MRI
IA: Integrated NSF Support Promoting Interdisciplinary Research and Education - INSPIRE
IA: Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science - INCLUDES - 17-522
EPSCoR: Research Infrastructure Improvement - RII
EPSCoR: Co-Funding; Outreach, Workshops
EAC: Evaluation and Assessment of Cross-cutting programs

Office of International Science & Engineering
Office of International Science & Engineering

Chuck Estabrook
Office of International Science & Engineering
cestabro@nsf.gov

NSF Program Director since 2010
Spent four years in GEO
Germany and Brazil portfolios
Helps GEO with international activities
Co-runs PIRE

Seismologist at Comprehensive Nuclear Test Ban
Treaty Organization in Vienna, Austria
Research Scientist at Geoscience Research Center
(GFZ) in Potsdam, Germany
Physicist and Computer Scientist in Silicon Valley

Office of International Science and Engineering

Rebecca Keiser,
Office Head

Overseas Offices
Rebecca Keiser,
Office Head

Programs and
Analysis
Anne Emig

Countries and
Regions
Jessica Robin

Administration
Jackie Moore

Budget
Analyst
Sam Howerton

Office of International Science & Engineering

PRIORITIES

• Advance the FRONTIERS of S&E via international collaboration
• Prepare a GLOBALLY-ENGAGED U.S. S&E workforce
• Develop GLOBAL KNOWLEDGE NETWORKS that link U.S. faculty and students to the world
• Leverage RESOURCES, EXPERTISE, FACILITIES around the globe
Use Grants.gov’s search feature

Additional Information on Resources
Join Directorate Specific Listserves!

What is the Proposal & Award Policies & Procedures Guide?

The Proposal & Award Policies & Procedures Guide (PAPPG) contains documents relating to NSF’s proposal and award process. It has been designed for use by both our customer community and NSF staff and consists of two parts.

Part I is NSF’s proposal preparation and submission guidelines

Part II is NSF’s award and administration guidelines

What is the Proposal & Award Policies & Procedures Guide?

• Provides guidance for preparation and submission of proposals to NSF
• Describes process – and criteria – by which proposals will be reviewed
• Outlines reasons why a proposal may not be accepted or returned without review
• Describes process for withdrawals, returns, and declinations
• Includes policies to guide, manage, and monitor the award and administration of grants and cooperative agreements
Proposals for a Program Description must follow the instructions in the PAPPG.

Proposals for a Program Announcement must follow the instructions in the PAPPG.

Proposals must follow the instructions in the Program Solicitation; the instructions in the PAPPG apply unless otherwise stated in the solicitation.

Dear Colleague Letters are notifications of opportunities or special competitions for supplements to existing NSF awards.

Types of Funding Opportunities

<table>
<thead>
<tr>
<th>Program Descriptions</th>
<th>Proposals for a Program Description must follow the instructions in the PAPPG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Announcements</td>
<td>Proposals for a Program Announcement must follow the instructions in the PAPPG.</td>
</tr>
<tr>
<td>Program Solicitations</td>
<td>Proposals must follow the instructions in the Program Solicitation; the instructions in the PAPPG apply unless otherwise stated in the solicitation.</td>
</tr>
<tr>
<td>Dear Colleague Letters</td>
<td>Dear Colleague Letters are notifications of opportunities or special competitions for supplements to existing NSF awards.</td>
</tr>
</tbody>
</table>

Types of Proposals

- Research
- RAPID
- EAGER
- RAISE
- GOALI
- Ideas Lab
- FASED
- Conference
- Equipment
- Travel
- Facility/Center
- Fellowship

Navigating a Program Description
Navigating a Program Solicitation

NSF Proposal & Award Process Timeline

Types of Proposal Submissions

Target Dates –
Talk to the Program Office if you think you might miss the date.
Types of Proposal Submissions

Deadline Dates –
Proposals will not be accepted after this date and time (5 pm submitter’s local time)

Submission Windows –
Closing date converts to a deadline date

Letters of Intent –
Enables better management of reviewers and panelists
Types of Proposal Submissions

Preliminary Proposals – Sometimes required, sometimes optional

Questions on Funding Opportunities?
Contact your NSF Program Officer
Work with your organization’s sponsored projects office
Ask Early, Ask Often
policy@nsf.gov

Things to Consider Before Writing a Proposal...
Five Key Elements

1. Great idea
2. Fit with current research expertise and career development plans
3. Ability to devise a strategy including benchmarks, timelines, and metrics
4. Adequate resources to accomplish your project
5. Assessment Plan

Developing your Proposal

Key Questions for Prospective Investigators

• What has already been done?
• Develop hunch or hypotheses for forward progress
• Obtain preliminary data
• What do you intend to do?
• Why is the work important or unique?

Proposal Development Strategies:

What Do You Need Besides $ ???

• Prepare to do the project
  – How are you going to do the work?
  – Realistically assess needs
  – Do you have the right team?
  – Determine available resources
  – Present to colleagues/mentors/students
• Determine possible funding sources
  (NSF may not be the right or the only one)
Proposal Development Strategies:
What details should you glean from the solicitation?

- Overall scope and mission
- Instructions (deviations from the PAPPG)
- How your proposed project fits with the solicitation
- Review procedures and criteria
- Deadlines

Proposal Development Strategies:
Who Should You Talk To?

**NSF Program Officer**
- Your proposed project
- Clarifications on specific program requirements/limitations
- Current program patterns

**Your Organization's Sponsored Projects Office**
- University guidelines for applications
- Institutional Review Board “IRB” Approvals
  - e.g. Institutional Animal Care and Use Committee (IACUC) approvals

Sections of a Proposal ...
Parts of an NSF Proposal

Project Summary Requirements:
Overview
Statement on Intellectual Merit
Statement of Broader Impacts
Special characters (e.g., formulas) may be uploaded as a PDF

Project Description Addresses:
What you want to do
Why you want to do it
How you plan to do it
How you measure success
What are the benefits
Results from prior NSF support

Parts of an NSF Proposal
Cover Sheet
Many of the boxes on the cover sheet are electronically prefilled as part of the FastLane login process.

Parts of an NSF Proposal

NSF PROPOSAL INGREDIENTS

- Cover Page
- Project Summary (1 page)
- Table of Contents (auto-generated)
- Project Description (15 pages)
- References Cited
- Biographical Sketches (for all senior personnel)
- Budget
- Current and Pending Support
- Facilities, Equipment, and Other Resources
- Post-doctoral mentoring plan (if applicable)
- Data management plan
- Supplementary Documentation (if applicable)
Parts of an NSF Proposal

A separate section, *Broader Impacts of the Proposal Work*, must be completed.

Budgetary Guidelines

Amounts should be:
- Realistic and reasonable
- Well-justified and should establish need
- Consistent w/program guidelines in solicitation and Proposal & Award Policies & Procedures Guide (PAPPG)

Eligible costs consist of:
- Personnel
- Equipment
- Travel
- Participant support
- Other (e.g., subawards, consultant and computer services, publications costs)
- Indirect costs (as appropriate)

NSF Cost Sharing Policy

Inclusion of *voluntary committed* cost sharing is prohibited in the budget of solicited & unsolicited proposals.

Organizations may, at their own discretion, continue to contribute *voluntary uncommitted* cost sharing to NSF-sponsored projects as part of the section for Facilities, Equipment, and Other Resources.
Sections of an NSF Proposal

**Facilities, Equipment, and Other Resources**
Used to assess the adequacy of the organizational resources available to perform the effort proposed. Should not contain quantifiable financial information.

**Current and Pending Support**
This section of the proposal requires reporting on all current and pending support for ongoing projects and proposals from any funding source.

Special Information and Supplementary Documentation

Letters of collaboration (no letters of support)
Postdoctoral mentoring plans
Data management plans
You should alert NSF officials to unusual circumstances that require special handling (i.e. proprietary information)
Solicitations may specify what is and is not allowed to be submitted

Mentoring for Postdoctoral Researchers

- Explicit description of the mentoring activities
- Must include a mentoring plan as a supplementary document (maximum one-page)
- For collaborative proposals, lead organization must submit a single mentoring plan for all postdoctoral researchers supported under the entire project.
Data Management Plan Requirements

Requirements may vary by Directorate or Office

Questions?

The Merit Review Process
Video

NSF’s Proposal & Award Process Timeline

Black Box?

Merit Review Criteria

**Intellectual Merit:**
the potential to advance knowledge

**Broader Impacts:**
the potential to benefit society and contribute to the achievement of specific, desired societal outcomes
When Preparing Proposals

- Read the funding opportunity; ask a Program Officer for clarifications if needed
- Address all the proposal review criteria
- Understand the NSF merit review process
- Avoid omissions and mistakes
- Check your proposal to verify that it is complete!
- Double Check that the proposal NSF receives is the one you intended to send

Merit Review Guiding Principles & Criteria

The Proposal & Award Policies & Procedures Guide (PAPPG) contains a description of the Merit Review Criteria

Review Format in FastLane

- Reviewers provide feedback to NSF based on the Review Criteria and the Review Elements
- Review Criteria and Elements are available as reviewers provide feedback
Over 2,000 proposals were RWR in FY 2014
6 most common reasons why

1. Not responsive to the GPG or program announcement/solicitation (960)
2. Does not meet an announced proposal deadline date and time (171)
3. It is inappropriate for NSF funding (74)
4. Duplicative or substantially similar to a proposal already under consideration (66)
5. Not substantively revised from a proposal that was previously reviewed and declined (37)
6. Duplicates another proposal that was already awarded (24)

Types of Reviews

• Ad Hoc
  – Proposals are sent out for review
• Panel
  – Face-to-Face sessions conducted with reviewers. Held at NSF, or virtually via assistive technologies such as WebEx or BlueJeans
• Combination
  – Some proposals may undergo supplemental ad hoc reviews before or after a panel review
• Internal
  – Reviewed by NSF Program Officers

How are Reviewers Selected?

• Three or more external reviewers per proposal are selected
• Types of Reviewers Recruited
  – Specific content expertise
  – General science or education expertise
• Sources of Reviewers
  – Former reviewers
  – Program Officer’s knowledge of the research area
  – References listed in proposal
  – Recent professional society programs
  – S&E journal articles related to the proposal
  – Reviewer recommendations included in proposal
What is the Role of the Reviewer?

- Review all proposal material and consider
  - The two NSF merit review criteria and any program specific criteria
  - Adequacy of the proposed project plan- including the budget, resources, and timeline
  - Priorities of the scientific field and of the NSF program
  - Potential risks and benefits of the project
- Make independent written comments on the quality of the proposal content and assign a rating: E,V,G,F,P

What is the Role of the Review Panel?

- Discuss the merits of the proposal with the other panelists
- Write a summary based on that discussion
- Provide some indication of the relative merits of different proposals considered

Why Serve on an NSF Panel?

- Gain first-hand knowledge of the merit review process
- Learn about common problems with proposals
- Discover proposal writing strategies
- Meet colleagues and NSF Program Officers managing the programs related to your research
How Do I Become a Reviewer?

Contact the NSF Program Officer(s) of the program(s) that fit your expertise

- Introduce yourself as a strong potential reviewer based on your research experience
- Offer to send a 2-page CV with current contact information
- Stay in touch if you don’t hear back right away

Conflicts of Interest (COI)

What is a COI?

How we address conflict of interest

NSF checks and avoids COIs in the review process

Institutional COIs

Personal COIs

Proposal Review and Processing
Funding Decisions
Reviews are Advisory to NSF

- The merit review process provides:
  - Review of the proposal and a recommendation on funding.
  - Feedback (strengths and weaknesses) to the proposers.

- NSF Program Officers make funding recommendations
guided by program goals and portfolio considerations.

- NSF Division Directors either concur or reject the
  Program Officers' funding recommendations.

Feedback from Merit Review

- Reviewer ratings (such as: E, V, G, F, P)
- Analysis of how well proposal addresses both
  review criteria: Intellectual Merit and Broader
  Impacts
- Proposal strengths and weaknesses
- Reasons for decline (if applicable)
- If you have any questions, contact
cognizant Program Officer.

Documentation from Merit Review

- Verbatim copies of individual reviews, excluding
  reviewer identities
- Panel summary or summaries
  panel review was used
- Context statement (usually)
- Program Officer to Principal Investigator
  comments (formal or informal, written, email or
  verbal) as necessary to explain a decision
**Examples of Reasons for Declines**

- Not considered competitive based on merit review criteria and program office concurrence
- Flaws or issues identified by the Program Officer
- Funds were not adequate to fund all competitive proposals

**Revisions and Resubmissions**

- Do the reviewers and the NSF Program Officer identify significant strengths in your proposal?
- Can you address the identified weaknesses?
- Can the proposal be significantly revised?
- Are there other ways your colleagues or you think a resubmission can be strengthened?

**Questions?**

**Contact your cognizant Program Officer!**

**Possible Considerations for Funding a Competitive Proposal**

- Addresses all review criteria
- Likely high impact
- Broadening participation
- Educational impact
- Impact on institution/state
- Special programmatic considerations (e.g. CAREER/RUI/EPSCoR)
- Other support for PI
- “Launching” versus “Maintaining”
- Portfolio balance
Proposal Review and Processing

For More Information
Go to NSF’s Home Page (www.nsf.gov)

Ask Early, Ask Often!
Contact the cognizant Program Officer
Questions?

Faculty Early Career Development Program
“CAREER”

www.nsf.gov/career

CAREER Awards
New Solicitation – 17-537

Cross-disciplinary perspectives

Due Dates: Next Deadlines:
• July 19, 2017 – BIO, CISE, EHR
• July 20, 2017 – ENG
• July 21, 2017 – GEO, MPS, SBE

Future Years - Third Wed, Thursday, Friday of July

www.nsf.gov/career
CAREER Awards

Foundation wide
Supports junior faculty
Research and education integration

PECASE (Presidential Early Career Award for Scientists and Engineers) eligibility

CAREER Awards

Stable support for 5 years
NSF wide: 500+/year
> $400K

An eligible institution must be:

An academic institution in the U.S., its territories or possessions, and the Commonwealth of Puerto Rico that award degrees in fields supported by NSF.
An eligible institution may also be:

- Non-profit, non-degree-granting (e.g. a museum, observatory or lab) if the eligibility requirements of the PI are satisfied.

NSF encourages proposals from different institutional types, including minority serving and undergraduate institutions.

CAREER varies across NSF

- Number of submitted CAREER proposals
- Review and Funding methods
- Other Proposals with which CAREERs compete

NSF CAREER Coordinating Committee
Sets NSF-wide goals

CAREER Proposals

Contact program manager liaison* and ask about:
- Expectations for scope of research and education
- Assessment of 2-page departmental letter
- Funding rate trend for regular proposals in program of interest

http://www.nsf.gov/crssprgm/career/contacts.jsp
Are CAREER awards right for you?

Yes, if:

Your proposed research is innovative, ambitious and within NSF’s the purview of research and education supported

You have support from your department/ organization, mentors.

You are at the right stage of your career.

CAREER Personnel and Budgets

Senior Personnel (Consultants, subawards, collaborators)

Academic year buyouts for teaching intensive institutions

CAREER Departmental 2 Page Letter

- Statement of PI CAREER program eligibility
- Support for PI’s proposed research and education activities
- Description of how the PIs career goals and responsibilities mesh with that of the organization and department
- Commitment to support professional development and mentoring of the PI
- NOT a letter of recommendation or endorsement of the PI or the research project
CAREER Awards Urban Myths

“You cannot apply because you have another NSF award. .”
“It is an entry program, so you must first apply to CAREER. .”
“I need to see a successful proposal to write a successful proposal. .”
“You have no chance, if you are not from a research intensive institution. .”
“CAREER proposals are more portable than other NSF funding.”
“The education component does not matter. .”
“I read on the web that to succeed, I have to....”

Traits of a Successful CAREER Proposal

High quality -- This is a highly competitive program!
Matches disciplinary program expectations
Includes an appropriate scope of activities for a 5-year plan, not one’s whole life!
Goes outside the education box of regular research proposals in the field
Strikes a balance between doable research activities and more risky pursuits

PECASE:
Presidential Early Career Awards for Science and Engineering
CAREER AWARDS BY DIRECTORATE
2011 to 2016

CAREER Awards Resources
www.nsf.gov/CAREER

CAREER Directorate/Division Contacts
Links to recent CAREER and PECASE awards

Questions?
Lunch Panel
Lessons Learned From Successful Principal Investigators

Andrea Burrows, Assistant Professor, Department of Secondary Education, UW
Brent Ewers, Professor, Department of Biology, UW
Barbara John, Professor of Geology and Geophysics, UW
John Moore, Professor and Head, Ecosystem Science and Sustainability, Director, Natural Resource Ecology Laboratory Colorado State University
Lisa-Joy Zgorski, NSF, Office of Legislative and Public Affairs (moderator)

Crosscutting & NSF-wide Opportunities
What Is meant by crosscutting?

Sponsored by >1 NSF unit....

Cuts across NSF in different ways...

Collaborative with other
U.S. government agencies...

Types of Crosscutting Activities

- International
- Interdisciplinary research – theme-based
  (e.g., Designing Materials, Hazards and Disasters)
- People-oriented (e.g., ADVANCE, CAREER, REU, Work-Life Balance)
- Infrastructure (e.g., MRI)
- Translational (ICorps, SBIR)
- Institutional, Centers
  (e.g., IUCRC, STC)

Find Funding for NSF-wide and
Crosscutting Opportunities

Go to:  https://www.nsf.gov/funding/pgm_list.jsp?type=xcut
Dynamics of Coupled Natural and Human Systems (CNH)

Interdisciplinary /cross directorate: BIO, GED, SBE

Examines human and natural system processes and the complex interactions among human and natural systems at diverse scales.

Small projects - up to $500K
Large projects - up to $1.8 m
Research Coordination Networks - RCNs
Deadline - Third Tuesday in Nov, annually
cnh@nsf.gov

Tribal Colleges and Universities Program
TCUP

Supports STEM capacity-building and instructional improvement in:

Tribal colleges and universities
Alaska Native-serving
Native Hawaiian-serving

Institutions of higher education (IHEs)

TCUP supports:

Curriculum Development
Undergraduate Research
Student Stipends
Equipment
Facilities
Travel and...
TCUP – what’s available?

- ICE-TI (our signature capacity-building track)
- TSIP (a limited version of ICE-TI)
- SGR (principally research)
- PAGE (promotes success in geosciences)
- PEPEC (promotes success in engineering)
- PADLE (promotes success in linguistics)
- SEA-PHAGES in TCUs (with HHMI)
- Pre-TI (to develop a strategic plan)

ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers

Goals:
- Strategies to undertake organizational change to address gender diversity issues in STEM
- Systemic approaches to increase the representation and advancement of women in academic STEM careers.
- Contribute to and inform the general knowledge base on gender equity in the academic STEM disciplines.

ADVANCE – COMPONENTS

COMPETITION WILL RUN EVERY OTHER YEAR
INSTITUTIONAL TRANSFORMATION
Preliminary Proposals – April 2019
Full Proposals – January 2020

ADAPTATION
Letter of Intent – August 9, 2017
Full proposal – September 13, 2017

PARTNERSHIPS
Letter of Intent – December 2018
Full proposal – January 2020
INCLUDES

* Networked-relationships
* Talent from all sectors
* STEM workforce
* Spur a national conversation for “bold visions”

1. Launch Pilots: planning for partners to share goals and purposes.
3. Backbone organizations: provide increased communications, interoperability, coordination, support and accountability for the Network of Alliances.

Understanding the Brain
nsf.gov/brain

To enable scientific understanding of the full complexity of the brain in action and in context through targeted, cross-disciplinary investments in research, technology, and workforce development

BRAIN Initiative

Thematic areas of BRAIN

- Multi-scale integration of the dynamic activity and structure of the brain
- Neurotechnology and research infrastructure
- Quantitative theory and modeling of brain function
- Brain-Inspired concepts and designs
- BRAIN Workforce Development
Research Experiences for Undergraduates

Goals:

– Initiate and conduct projects that engage a number of undergraduate students in research.
– Involve in research students who might not otherwise have the opportunity, particularly those from academic institutions where research programs are limited.

Research Experiences for Teachers

GOAL: Enable K-12 teachers and community college faculty to engage in STEM research and then adapt knowledge into their teaching.

- RET Sites and Supplements
- May be included in REU proposals
- Check Directorates for specific mechanism

Support for Undergraduates RUI, ROA for PUIs

RUIs and ROAs support research by faculty members at PUIs.
PUIs = accredited institutions that award Associate's, Bachelor's, and/or Master's degrees but have not awarded > 20 Ph.D./D.Sci. degrees in all NSF-supported fields during the combined previous two academic years.
ALL NSF directorates evaluate and fund RUIs and ROAs
They are funded within R & E program allocations

Directorate contacts found at: http://www.nsf.gov/crsspgrm/rui_roa/contacts.jsp
Graduate Research Fellowship Program

Goals
• Select, recognize, and financially support early in their careers individuals with demonstrated potential to be high achieving scientists and engineers
• Broaden participation in S&E of underrepresented groups, including women, minorities, persons with disabilities, and veterans

Key Elements
Five Year Award – $138,000/Fellow
Three years of support
$34,000 Stipend per year
$12,000 Educational allowance to institution
Career Life Balance (family leave)
Supercomputer access: XSEDE
Professional Development Opportunities

Recent Change: Graduate students are limited to only 1 application to the GRFP submitted either in the 1st year or in the 2nd year of graduate school.

Graduate Research Opportunities Worldwide

Professional Development Opportunities:
• International Research
• Federal Internships

Supercomputer access: XSEDE
**Graduate Research Internship Program (GRIP)**

**RESOURCES:**

- NSF GRFP FastLane Website: [www.fastlane.nsf.gov/grfp](http://www.fastlane.nsf.gov/grfp)
- Application, guides, announcements, FAQs: [GRFP Website](http://www.nsfgrfp.org)
- Current & former Fellows: [866-NSF-GRFP, info@nsfgrfp.org](mailto:info@nsfgrfp.org)

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**NSF Research Traineeship (NRT) Program**

- **Goals**
  - The **NRT** program encourages the development of innovative models for STEM graduate training
  - The **NRT Traineeship Track** supports training STEM graduate students in high priority interdisciplinary research areas
  - The **IGE Track** supports piloting, testing, and validating innovative and potentially transformative approaches to graduate education
NSF Research Traineeship (NRT) Program

**Traineeship Track**
$3,000,000 for up to 5 years

**Innovations in Graduate Education (IGE) Track**
$300,000 - $500,000 for 2-3 years

**Awards**
55 Funded Projects
- 34 Traineeships
- 21 IGE

Improving Undergraduate STEM Education “IUSE”

- Improve STEM Learning & Learning Environments
- Build the Professional STEM Workforce for Tomorrow
- Broaden Participation & Institutional Capacity for STEM Learning

Proposals should describe projects that build on available evidence and theory, and that will generate evidence and build knowledge.

IUSE Educational Practice and Research Cycle

1. Educational Practice
2. Questions
3. Answers
4. Insights
5. Educational Research
**IUSE: EHR**

**Two Program Tracks**

- **Engaged Student Learning**
  - Exploration & Design (smaller scale)
  - Development & Implementation (larger scale)
- **Institutional and Community Transformation**
  - Exploration & Design (smaller scale)
  - Development & Implementation (larger scale)

**The Most Recent Solicitation:**

- NSF 15-585

**Two Approaches**

- Exploration & Design (smaller scale)
  - Up to $300K
  - Up to 3 yrs
- Development & Implementation (larger scale)
  - Up to $600K
  - Up to 3 yrs

**Focus on design, development, implementation of and research on STEM learning models, approaches, and tools**

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**INFEWS: Innovation at the Nexus of Food, Energy, and Water Systems**

Food, energy and water systems are interrelated

- 10 percent of US energy is associated with food
- 40 percent of water withdrawals are power plant cooling
- 30 percent of water withdrawals are for irrigation
- 3 percent of electricity is used for pumping, treating, and transporting water

**INFEWS includes a central competition and DCLs associated with one or two directorates**

**Goal is to build a community of interdisciplinary scholars**

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505241

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**The Central INFEWS Competition**

Requires attention to food, energy and water systems

Requires involvement from disciplines support by 3 directorates

Requires a systems framework

Proposals go to one of three tracks:
- Modelling
- Decision support
- Solutions toward sustainability

Maximum funding: $2.5 M for 3 years, total future uncertain, probably return in FY2019
BIGDATA

Goals:
- Identify novel computation, statistical or mathematical techniques and technologies or novel analyses or experimental evaluation
- Identify Big Data Problem
- Advance the state-of-the-art core technologies
- Harness these to accelerate the pace of discovery in science and engineering
- High level of innovation required in all successful proposals

Two Criteria for BIGDATA Awards

Foundational (F):
- Novel techniques, or novel theoretical analysis

Innovative Applications (IA):
- Domain specific domain (BIO, GEO, ENG, EHR, MPS, SBE) application
- Advance both domain and the computational science
- High levels of innovation in computing, statistics, etc AND in domain discipline

National Robotics Initiative 2.0: Ubiquitous Collaborative Robots (NRI-2.0)

Current solicitation: NSF 17-518
Next deadline: January 11, 2018
Anticipated Funding Amount: $30,000,000 to $45,000,000

Open to US universities and colleges, as well as non-profit, non-academic organizations
NRI 2.0 Research Themes

- Collaboration
- Interaction
- Scalability
- Physical embodiment
- Lowering barriers to entry
- Societal impact

SaTC: Secure and Trustworthy Cyberspace

- NSF 16-580 [2017 solicitation is not yet out]
- Deadline: Oct/Nov/Dec 2017

NSF’s flagship program for research in cybersecurity

- Multiple NSF directorates: CISE, EHR, ENG, MPS, SBE
- U.S. colleges & universities, also open to US non-profits, and sometimes for-profits

- $80+M in FY14 grant cycle
- ~650 currently active grants

To enhance synergistic relationships
Mathematical sciences and NSF-supported disciplines

Research collaborations in research areas of high national priority:

- Advanced Manufacturing and Industries of the Future
- Clean Energy
- Earth Observations
- Information Technology and High-Performance Computing
- Innovation in Life Sciences, Biology, and Neuroscience
- Research and Development for Informed Policy-Making and Management
Major Research Instrumentation (MRI)

Goals:
- Support acquisition of major state-of-the-art instrumentation
- Foster development of the next generation of major instrumentation
- Integrate research with education
- Use, advance, expand the nation’s cyber-infrastructure and/or high performance computing capability
- Promote academic & private sector instrument development partnerships

Grant Opportunities for Academic Liaison with Industry - GOALI

- Promotes university-industry partnerships
- Supplies project funds or fellowships/traineeships
- Supports eclectic mix of industry-university linkages

Encourages Research that lies beyond that which industry would normally fund solo

Grant Opportunities for Academic Liaison with Industry - GOALI

Proposals accepted anytime however . . .

Proposals must be submitted to the appropriate disciplinary program and are subject to that program’s due dates. Contact the Program Officer in charge prior to submission.

NSF funds can only go to academic institution. The industry partner is expected to participate in the research effort to facilitate in the commercialization of the research.

**AIR-TT: Accelerating Innovation Research-Technology Translation**

Accelerate the derivation of societal and economic benefit from new knowledge created in the discovery process.

Opportunity for academic researchers to accelerate NSF-funded research results toward commercialization.

Develops innovation, entrepreneurship experience/knowledge for faculty and students.

Most Recent Solicitation: NSF 16-583
New solicitation: June 2017 (expected)
LOI Due: September 2017
Full Proposal Due: October 2017

http://www.nsf.gov/eng/iip/pfi/air-tt.jsp

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**AIR - Technology Translation: Leveraging NSF Investments**

1. **Technical**
   - Basic Research
   - Research Result
   - Technology/Innovation gaps
   - Early Stage Prototype

2. **Commercial**
   - Preliminary understanding of market need, potential competitive advantage, IP landscape, regulatory hurdles.
   - Enhanced commercial understanding, refined strategy toward commercialization.
   - Successful Commercialization

3. **Educational**
   - Student innovation/entrepreneurial experiences

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**The NSF Innovation Corps Program**

I-Corps Goals

Develops scientific and engineering discoveries into technologies, products and processes that benefit society;

Engages our nation’s faculty and students to transform discoveries into innovative technologies and strengthen our nation’s entrepreneurial ecosystem.
I-Corps Resources

I-Corps Solicitations
I-Corps Nodes: NSF 16-539
SBIR NSF 16-547
Teams: NSF 12-602

NSF I-Corps Home Page
About I-Corps
http://www.nsf.gov/news/special_reports/i-corps/about.jsp
The I-Corps Components
Resources
http://www.nsf.gov/news/special_reports/i-corps/resources.jsp

Small Business Innovation Research / Small Business Technology Transfer (SBIR/STTR) Program

SBIR/STTR Program Goals
Societal and economic benefit

- Catalyze private sector commercialization
- Increase incentives and opportunities for startups and small businesses to undertake cutting-edge, high-quality scientific R&D
- Facilitate cooperative R&D via STTR
  - Grants, not contracts – equity-free investment
  - Seed funding for start-up and early stage technology ventures
  - NSF funding reduces risks for other investors

NSF SBIR/STTR Program

WHAT IS FUNDED
- High-tech high-risk high-reward
- R&D only
- Focus on start-ups and early stage companies

2014 Program Stats:
- 72% of the companies < 5 years old
- 90% of the companies < 10 employees
- 30% of the companies no prior Phase II award

WHAT IS NOT FUNDED
- Basic research
- Incremental/evolutionary improvements
- Little chance of commercial success
- Sales and marketing, customer/market discovery

EFRI (Emerging Frontiers in Research and Innovation)
Serve a critical role
Helps ENG focus on important, emerging areas in a timely manner

COMMUNITY DRIVEN – Engages research community (DCLs) and ENG PDs to identify/fund a portfolio of projects in strategic emerging interdisciplinary areas

POTENTIALLY TRANSFORMATIVE - Addresses national need, grand challenge, potential for significant progress, i.e. high risk, high reward
Multidisciplinary– three or more disciplines

MIDSCALE BUDGET - Multi-PI at $2m for 4-year for