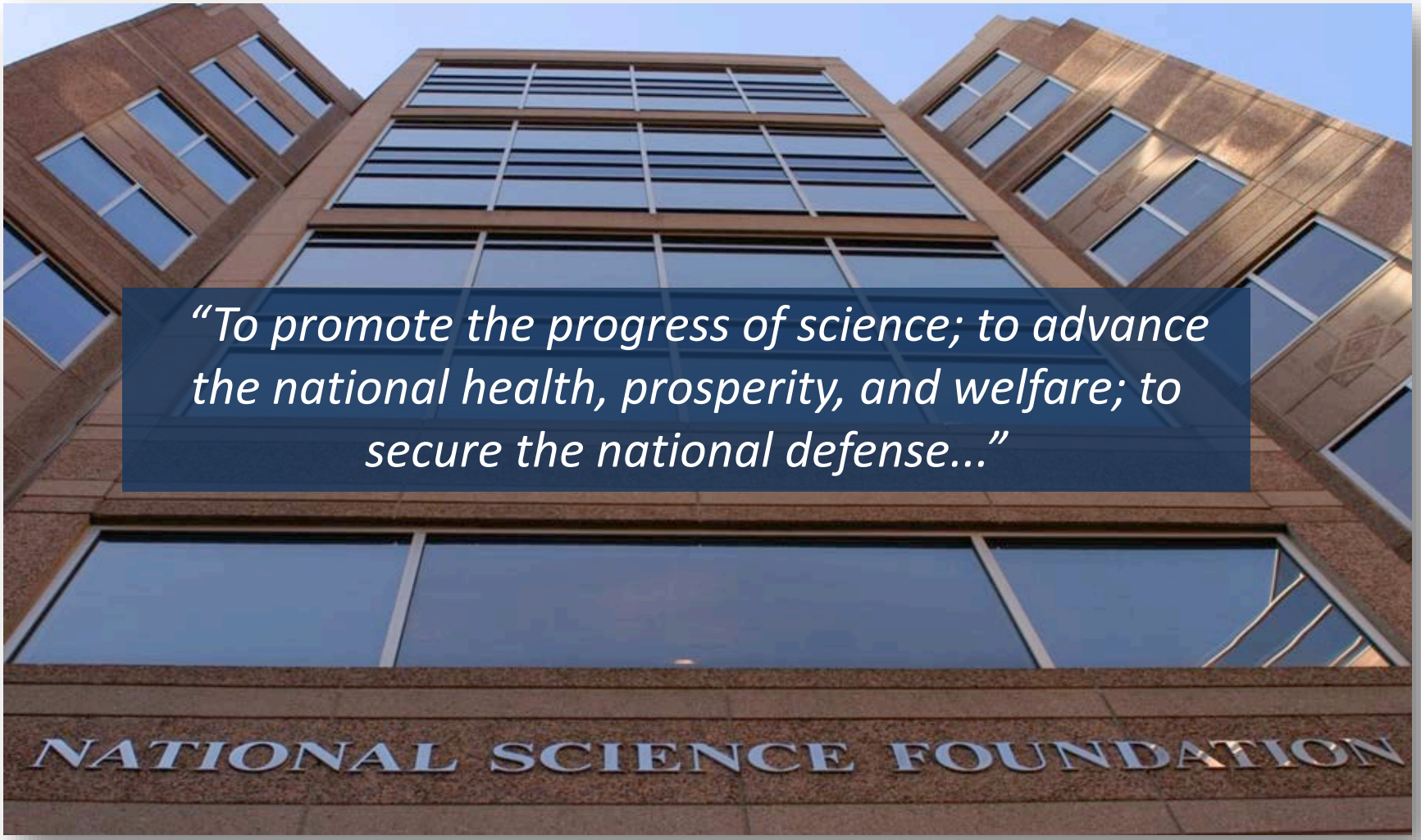
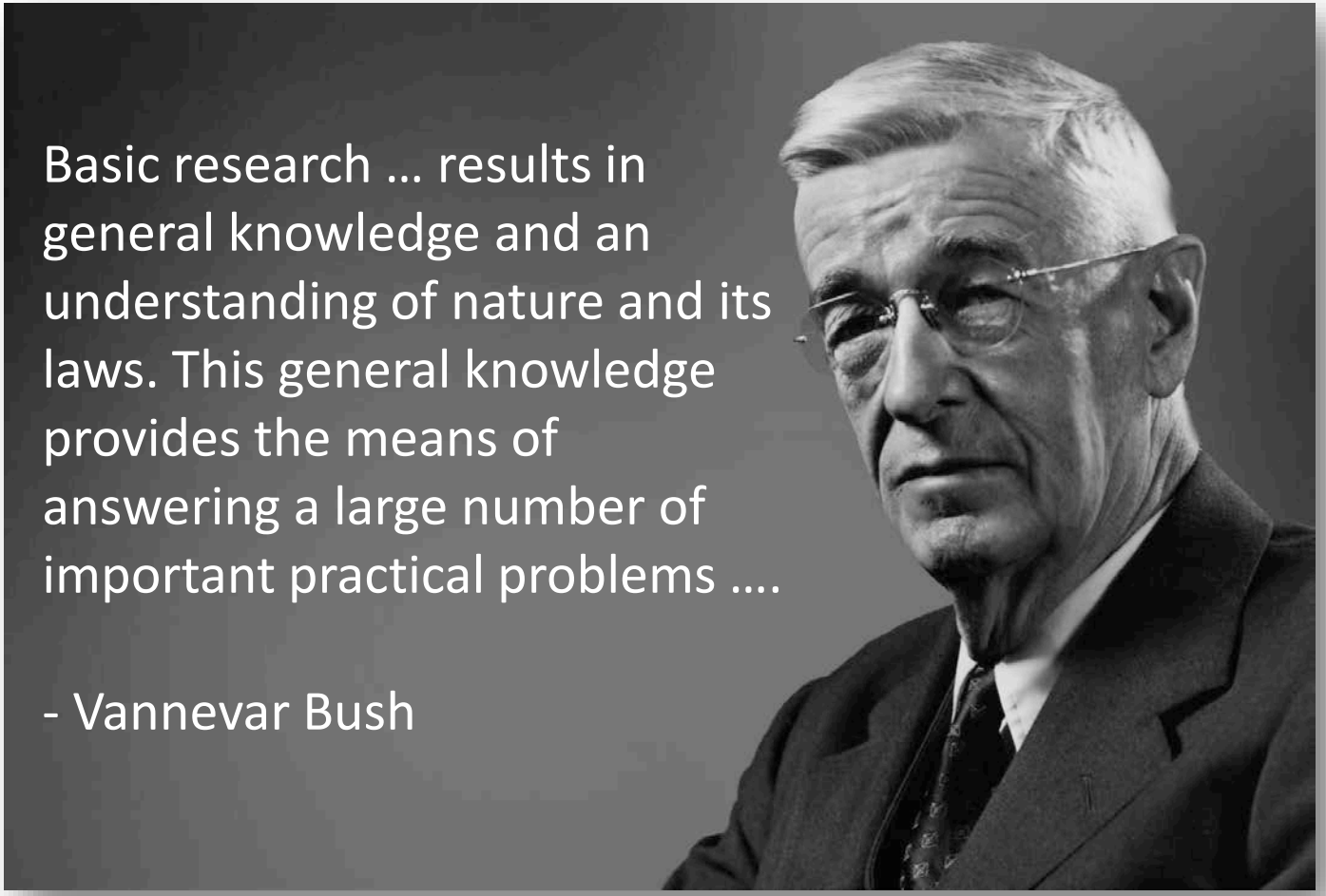
Welcome to NSF Day!

1865 THE UNIVERSITY OF MAINE

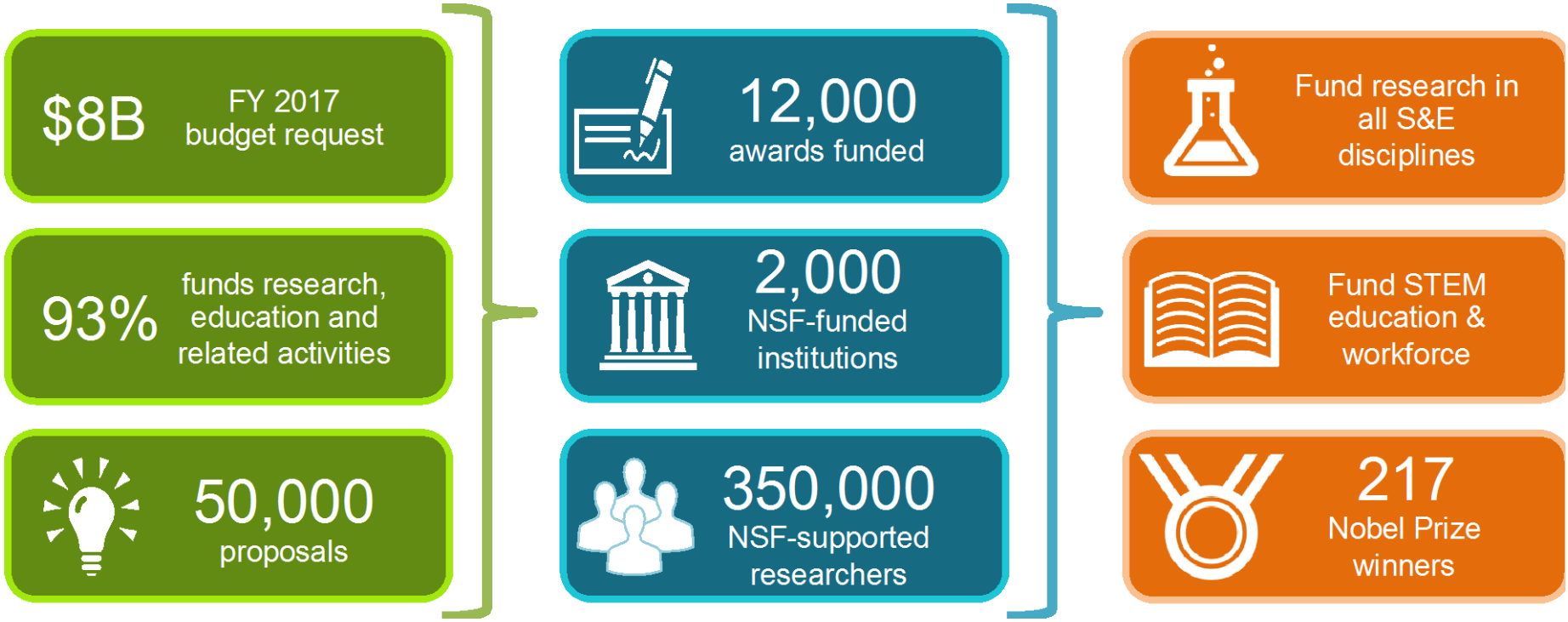
Thursday, October 13, 2016

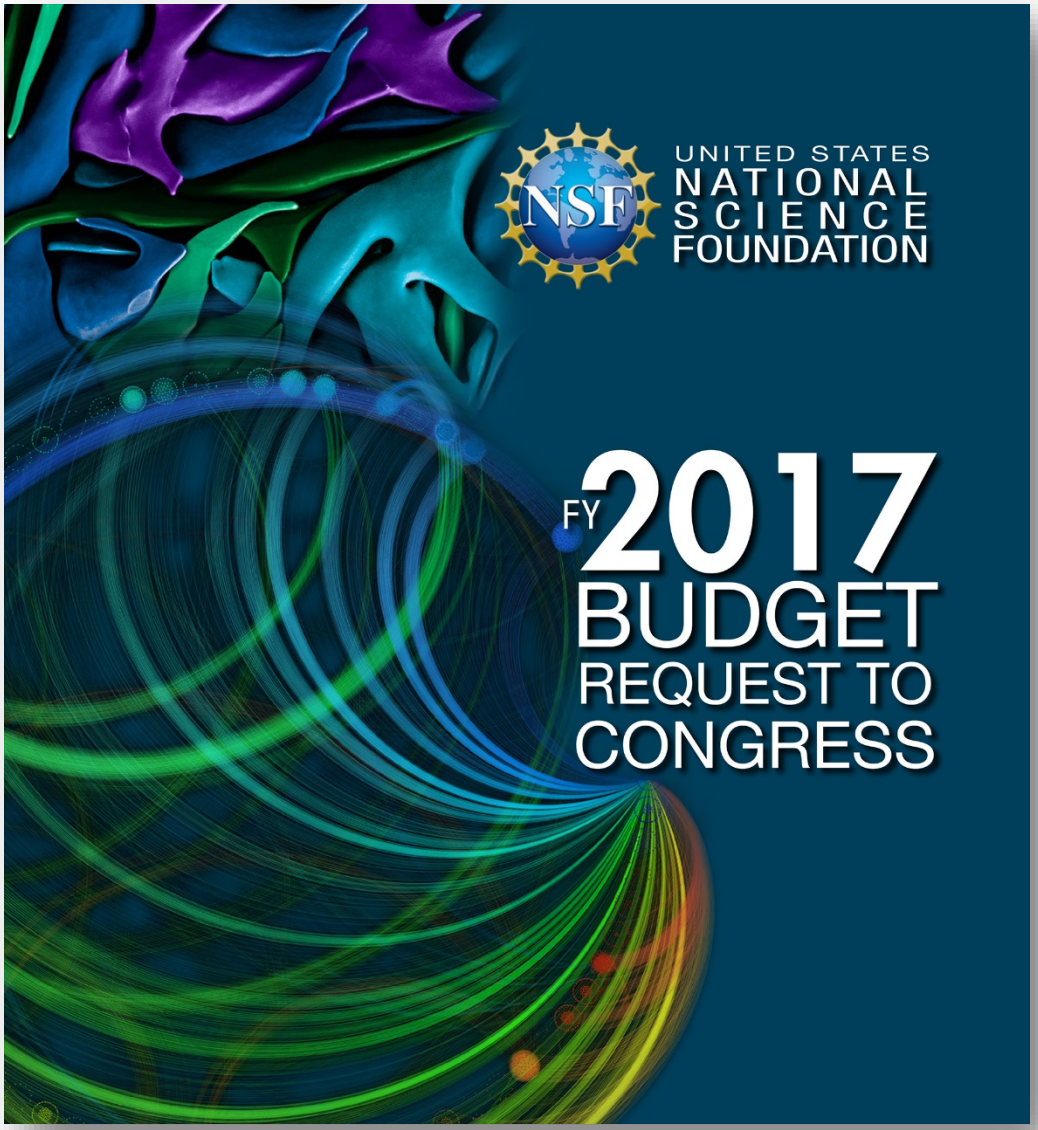
NSF Mission


"To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..."
NATIONAL SCIENCE FOUNDATION


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





NSF FY 2017
Budget Request

Total: $8 billion

Total NSF Request

$7.964 billion

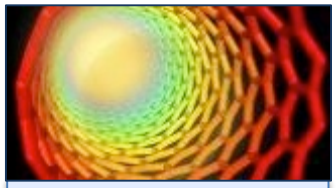
- +$501 million
- +6.7 percent over FY 2016 Enacted

Two Funding Sources

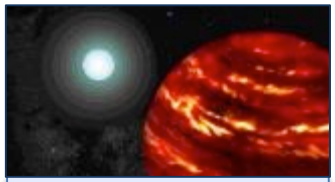
- $7.564 billion, discretionary funding (+1.3 percent)
- $400 million, new one-time mandatory/direct spending authority

NSF Funds All Fields of S&E

Biological Sciences



Engineering



Mathematical & Physical Sciences

Computer & Information Science & Engineering

Geosciences (including Polar Programs)

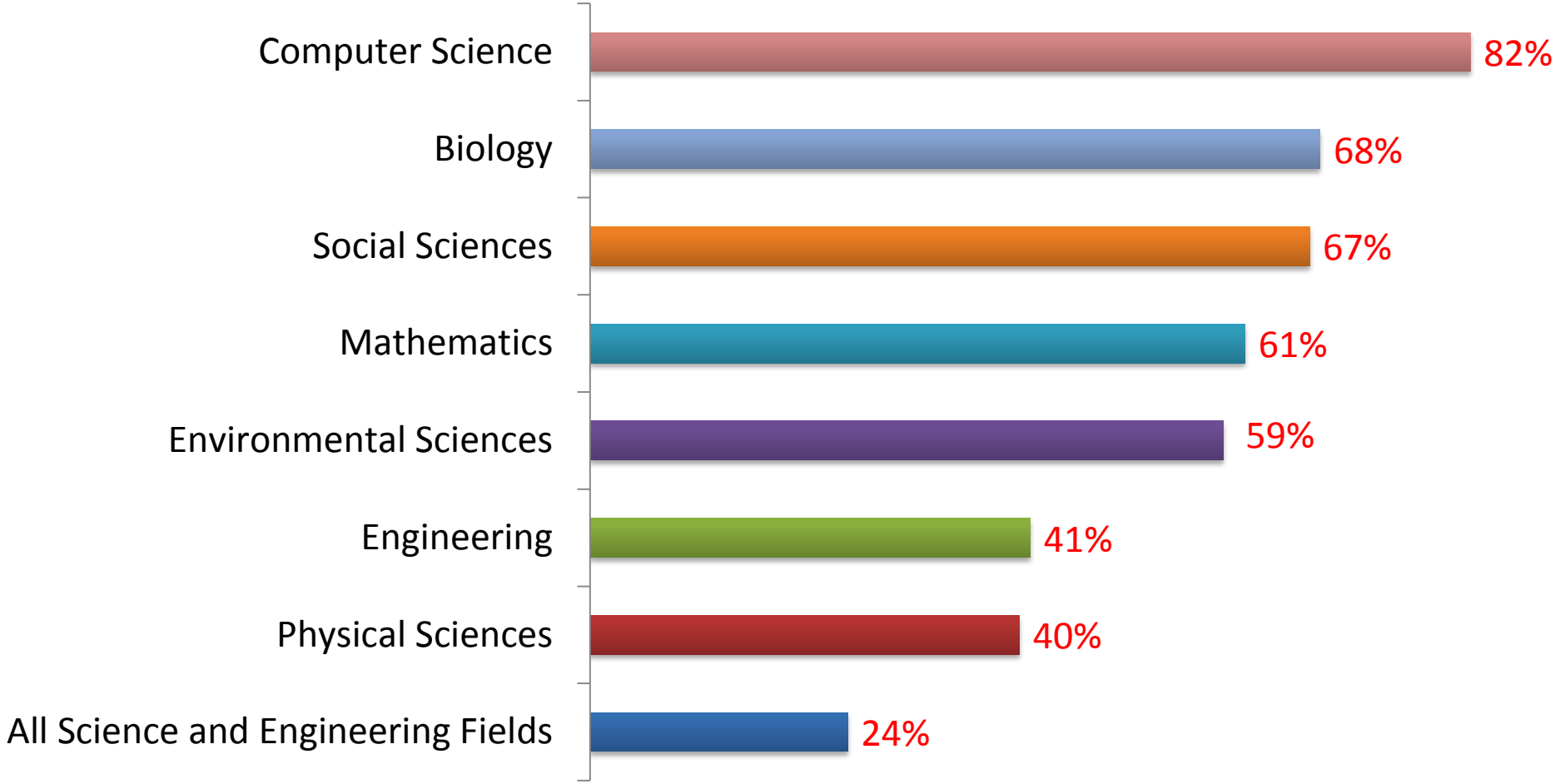
Integrative Activities

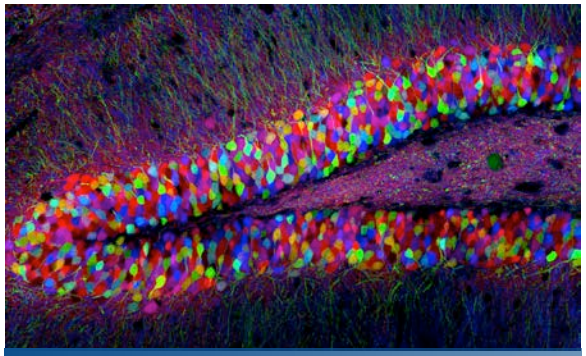
Education & Human Resources

Social, Behavioral & Economic Sciences

International Science and Engineering

NSF Support of Academic Basic Research in Selected Fields





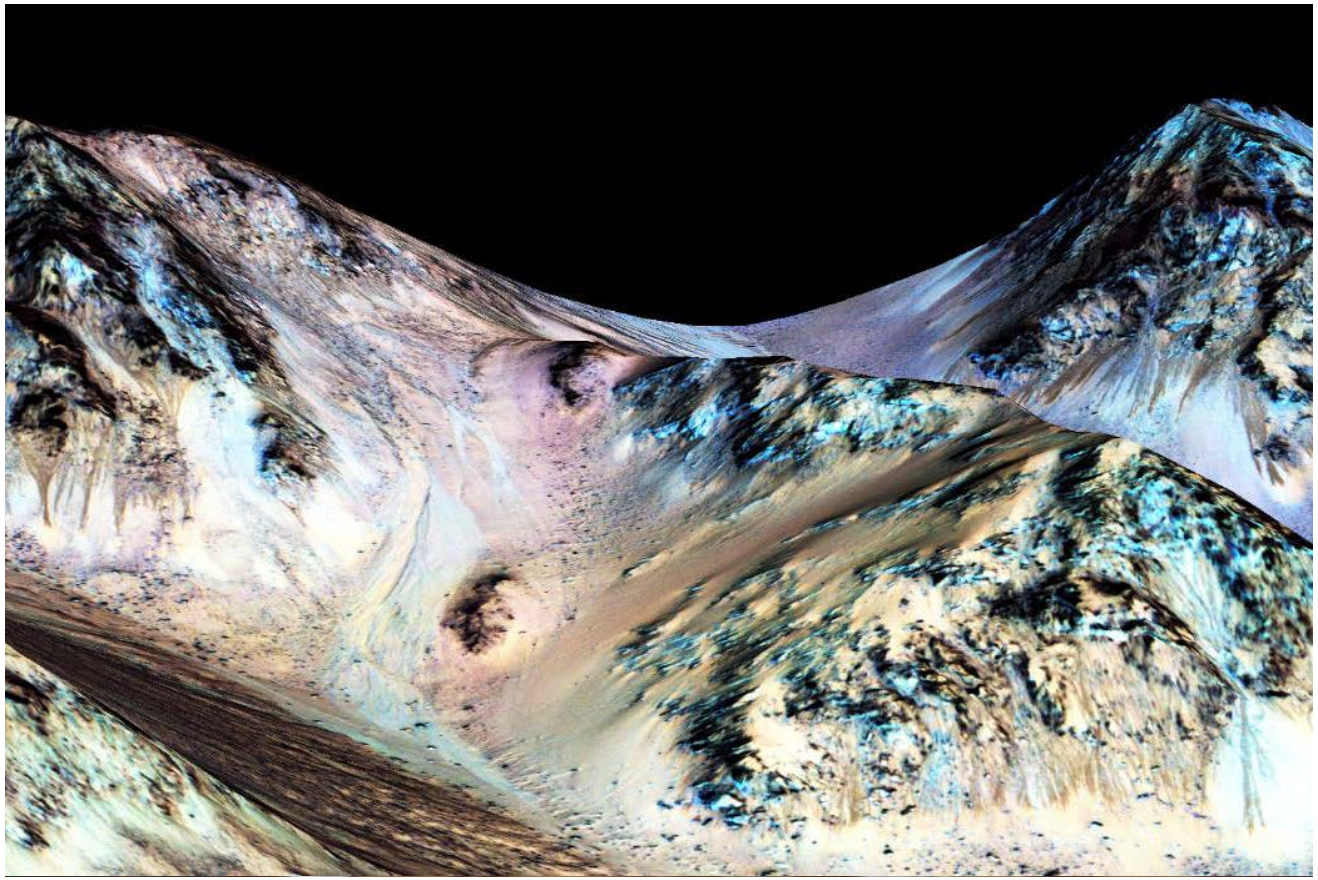
Understanding the Brain

Food/Energy/Water

Risk and Resilience

Inclusion and Diversity

Clean Energy



Characteristics of NSF

Ubiquity
Advances in science and engineering are permeating the way we work, communicate, learn, and discover.

Urgency
NSF research and education are 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.

1956
ASTRONOMY TRANSFORMED

1957
SCIENTISTS FROM AROUND THE WORLD UNITED BY IGY**

1953
RESEARCH STATISTICS COLLECTED

1965
AMERICAN SIGN LANGUAGE CATALOGED

1970s
BAR CODES POPULARIZED

1981
FOUNDATION FOR THE INTERNET LAID BY CSNET*

1985
SUPERCOMPUTING CENTERS BOOTED UP

1986
OZONE HOLE LINKED TO CFCs

1990
PLANT GENOMES DECODED

1995
DOPPLER RADAR WENT MOBILE

1990s
IMPROVED INTERNET SEARCH

Google

1998
LIGHT SHONE ON DARK ENERGY

2000
ROBOTS SERVED THE SICK

2005
THE AFRICAN SUPERPLUME SURVEYED

2009
CHANGES IN OCEAN CHEMISTRY CONFIRMED

2010
ECONOMIC THEORY MATCHED KIDNEY TRANSPLANTS

2012
COMPUTERS WENT QUANTUM

WHAT'S NEXT ?

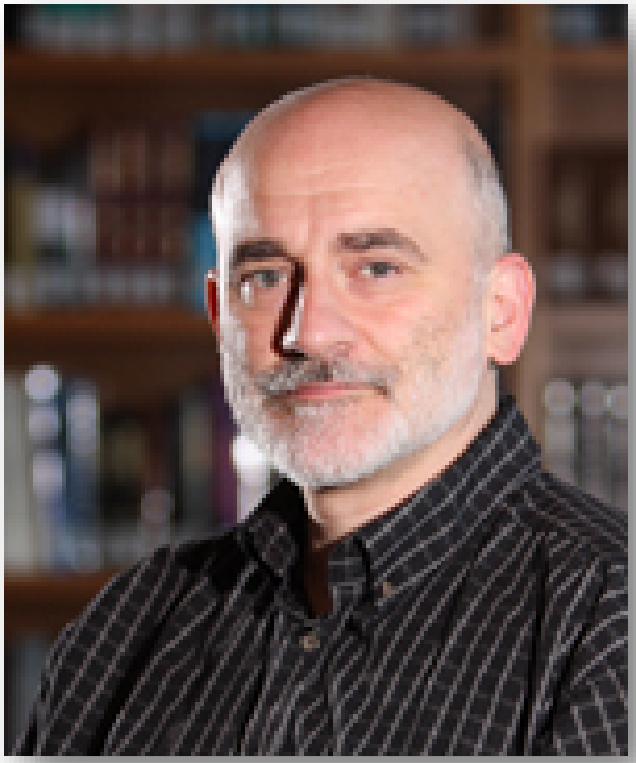
1950s 1960s 1970s 1980s 1990s 2000s 2010s

NSF's Organization

NSF Directorates and Offices
Biological Sciences (BIO)

Biological Sciences (BIO)

Arcady Mushegian
Division of Molecular and Cellular Biosciences (MCB)
amushegi@nsf.gov



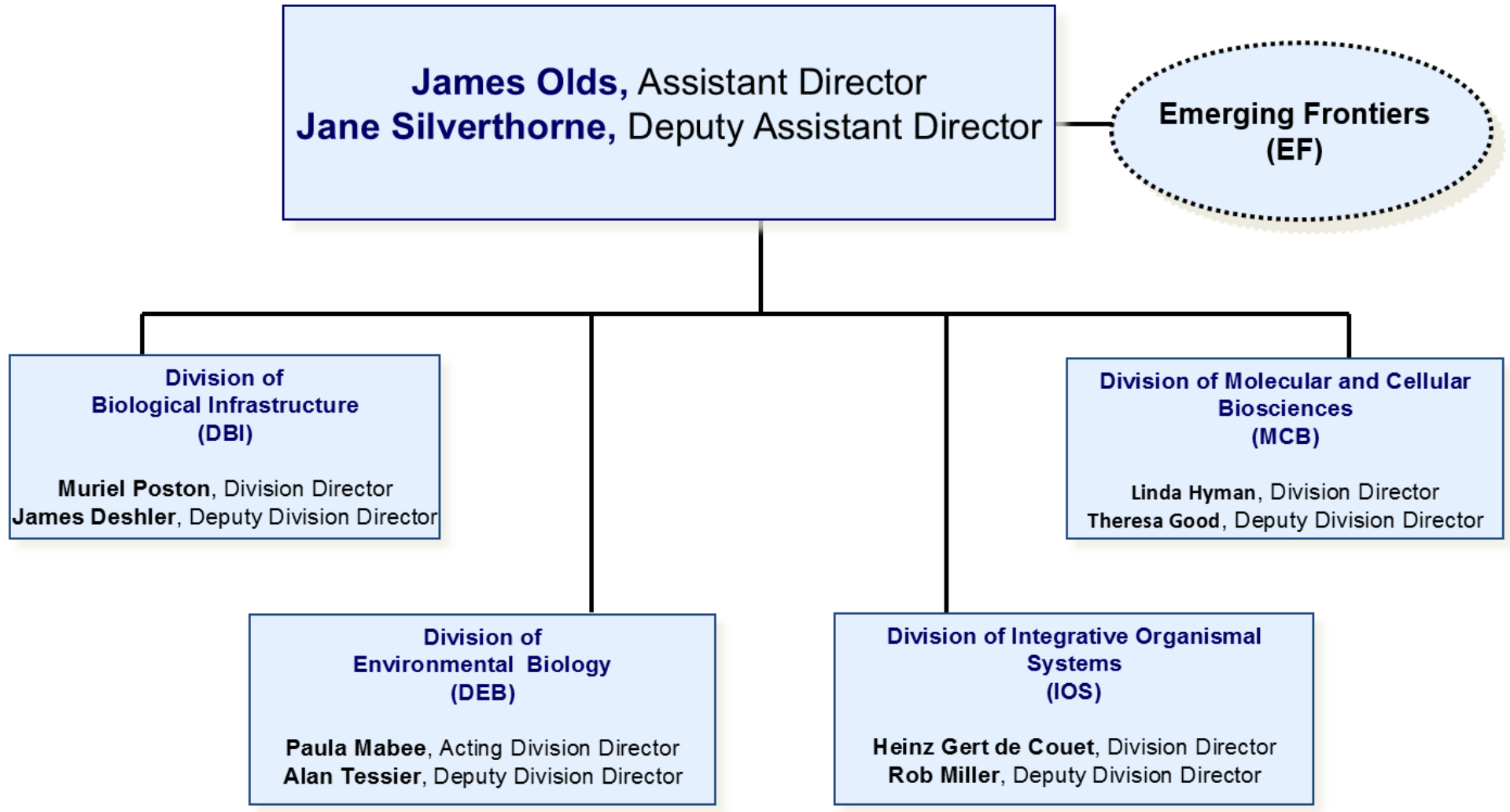
Program Officer in the Genetic Mechanisms Cluster

Managed panels for IRES, GRFP, Origin of Life Ideas Lab
and other NSF programs

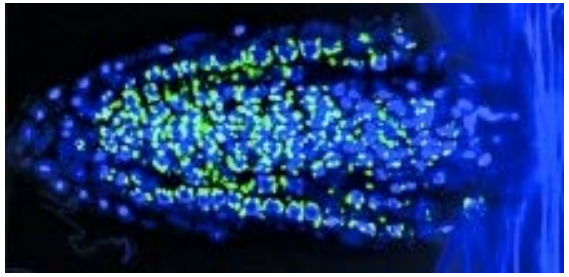
Interests: crowdfunding, DIY science

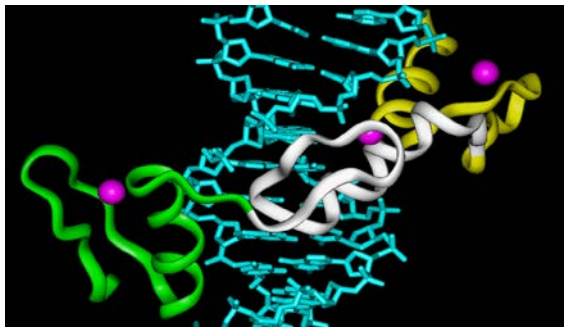
Interests: computational biology, genomics, RNA, viruses

Biological Sciences (BIO)



Biological Sciences (BIO)

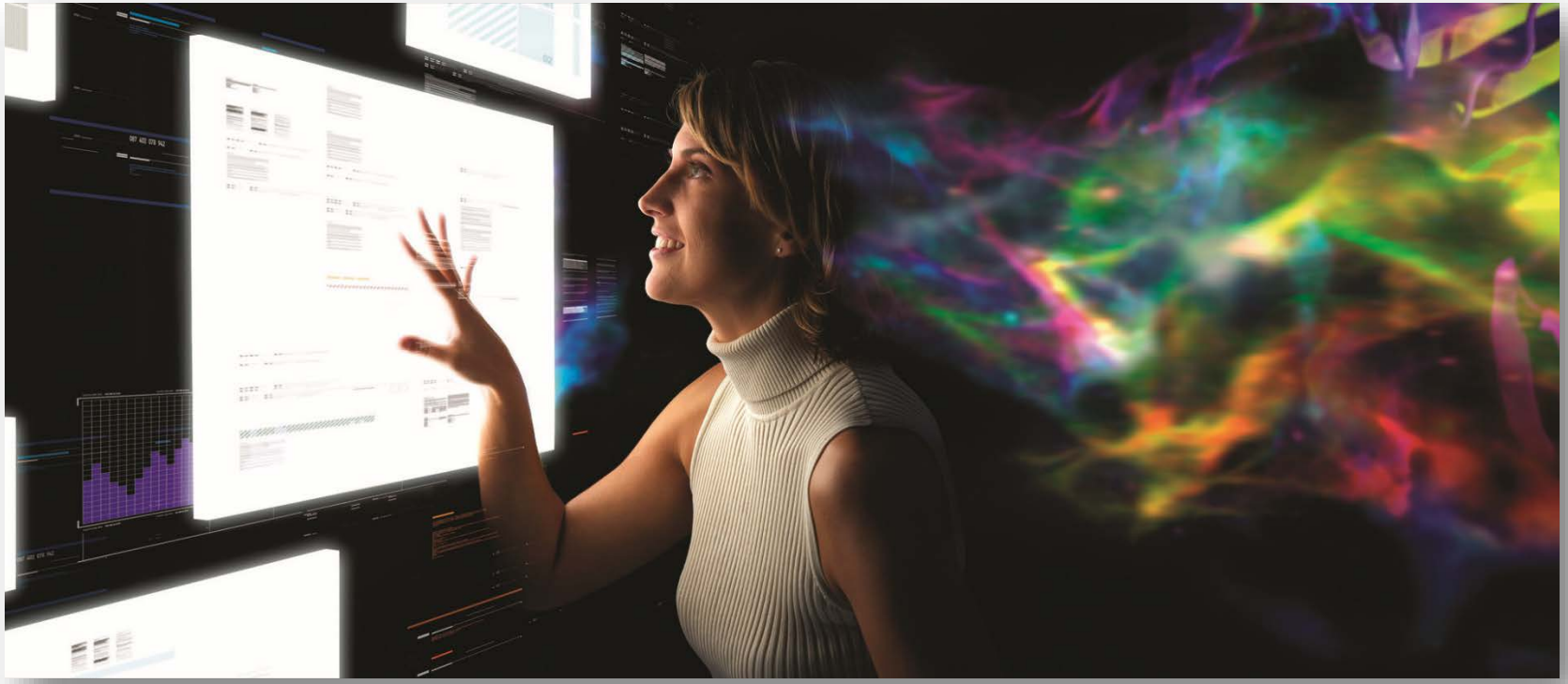




PRIORITIES

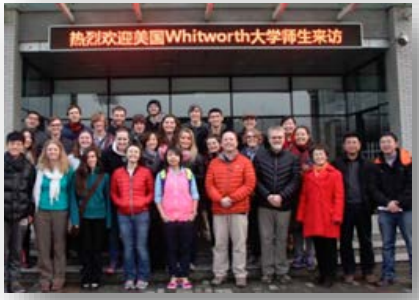
- Investigator-driven projects in all areas of biological research
- Brain Research through Advancing Innovative Neurotechnologies (BRAIN)
- National Ecological Observatory Network (NEON)
- Plant Genome Research Program (PGRP)
- Dimensions of Biodiversity
- Projects at interface of biology, mathematics, and engineering (BIOMAPS)
- New: Enabling Discovery through Genomic Tools (EDGE)
- Crosscutting: Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS)

NSF Directorates and Offices
Computer & Information Science & Engineering (CISE)



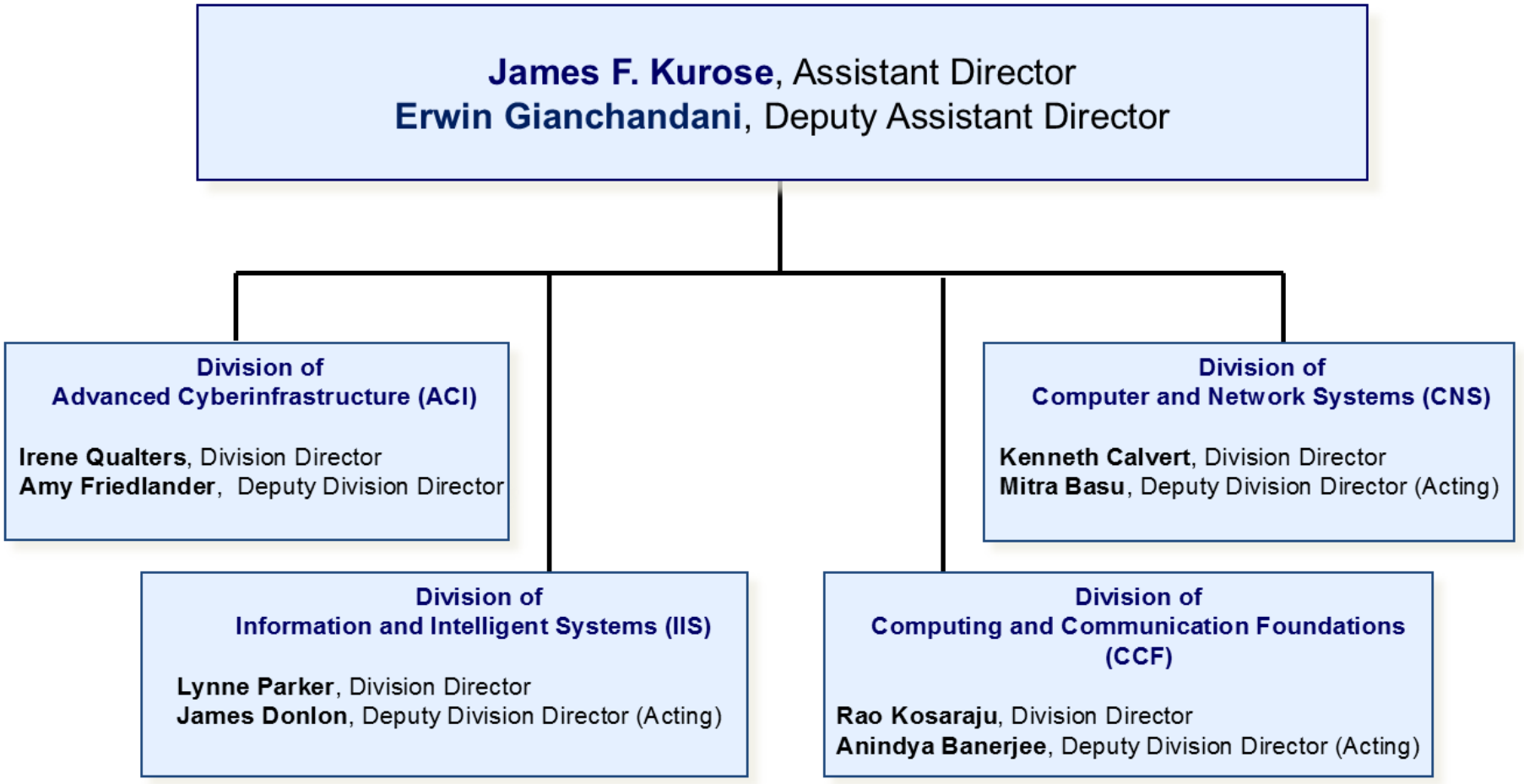
Computer & Information Science & Engineering (CISE)

Ed Walker
Advanced Cyberinfrastructure (ACI)
edwalker@nsf.gov



- Blue Waters
- Petascale Computing Resource Allocation (PRAC)
- Major Research Instrumentation (MRI)
- Campus Cyberinfrastructure (CC*)
- Co-chair for NITRD High End Computing interagency working group
- Previously… CS professor at Whitworth University, a small primarily undergraduate liberal arts college in Spokane, WA.

Computer & Information Science & Engineering (CISE)



Computer & Information Science & Engineering (CISE)

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

NSF Directorates and Offices
Education & Human Resources (EHR)

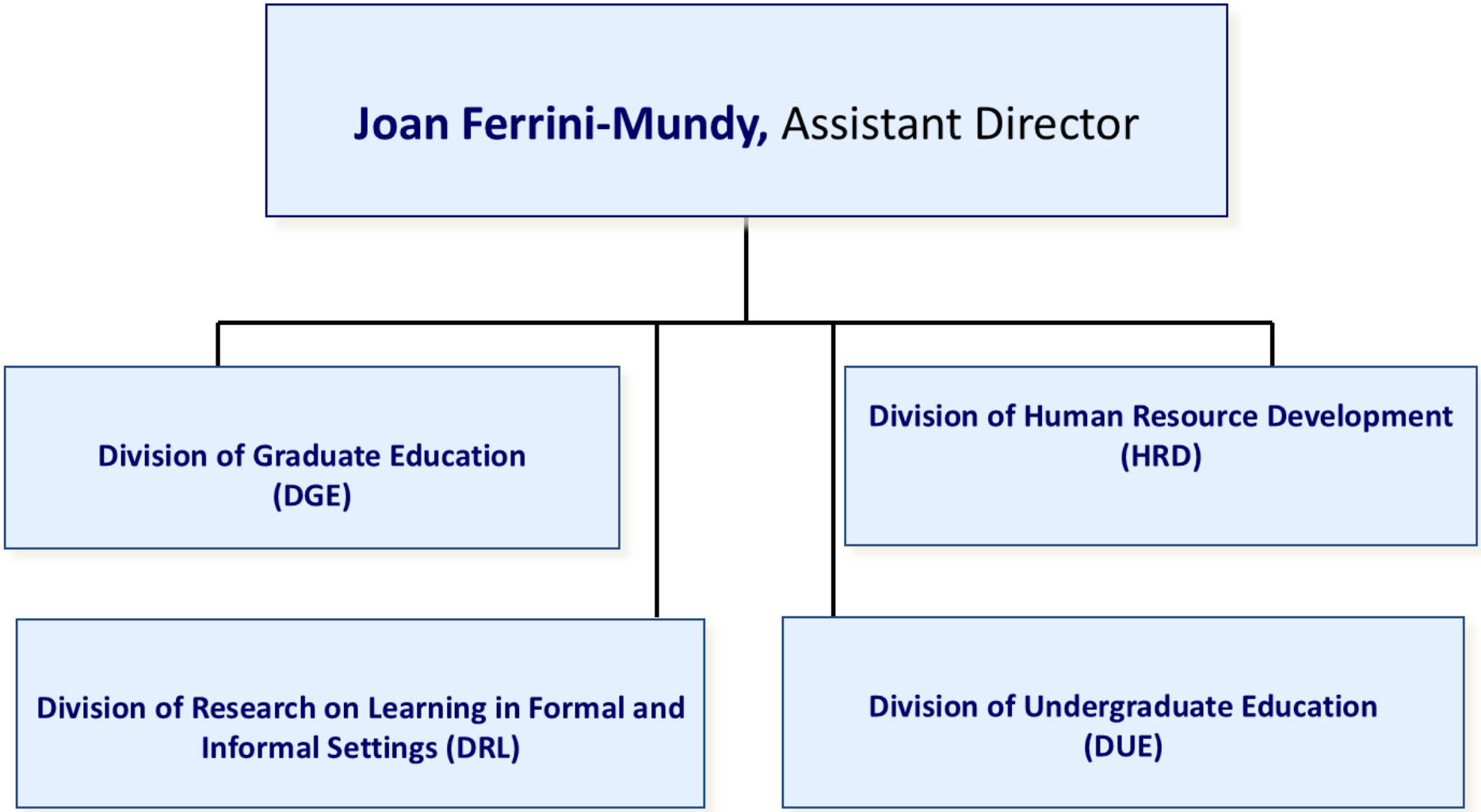
Education & Human Resources (EHR)

Jermelina Tupas
Deputy Division Director, Division of Human Resource Development (HRD)
jtupas@nsf.gov

ADVANCE (Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers
AGEP (Alliance for Graduate Education & the Professoriate)
CREST (Centers of Research Excellence in Science & Technology)
EASE (Excellence Awards in Science and Engineering)
ECR (EHR Core Research)- Broadening Participation
HBCU-UP (Historically Black Colleges & Universities-Undergraduate Program)
LSAMP (Louis Stokes Alliances for Minority Participation)
TCUP (Tribal Colleges & Universities Program)
*INCLUDES

Prior experiences: University of Hawaii at Manoa, NSF-BIO-MCB, NIH/NIGMS-MORE, USDA/NIFA-IYFC/DOCE

Education & Human Resources (EHR)



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

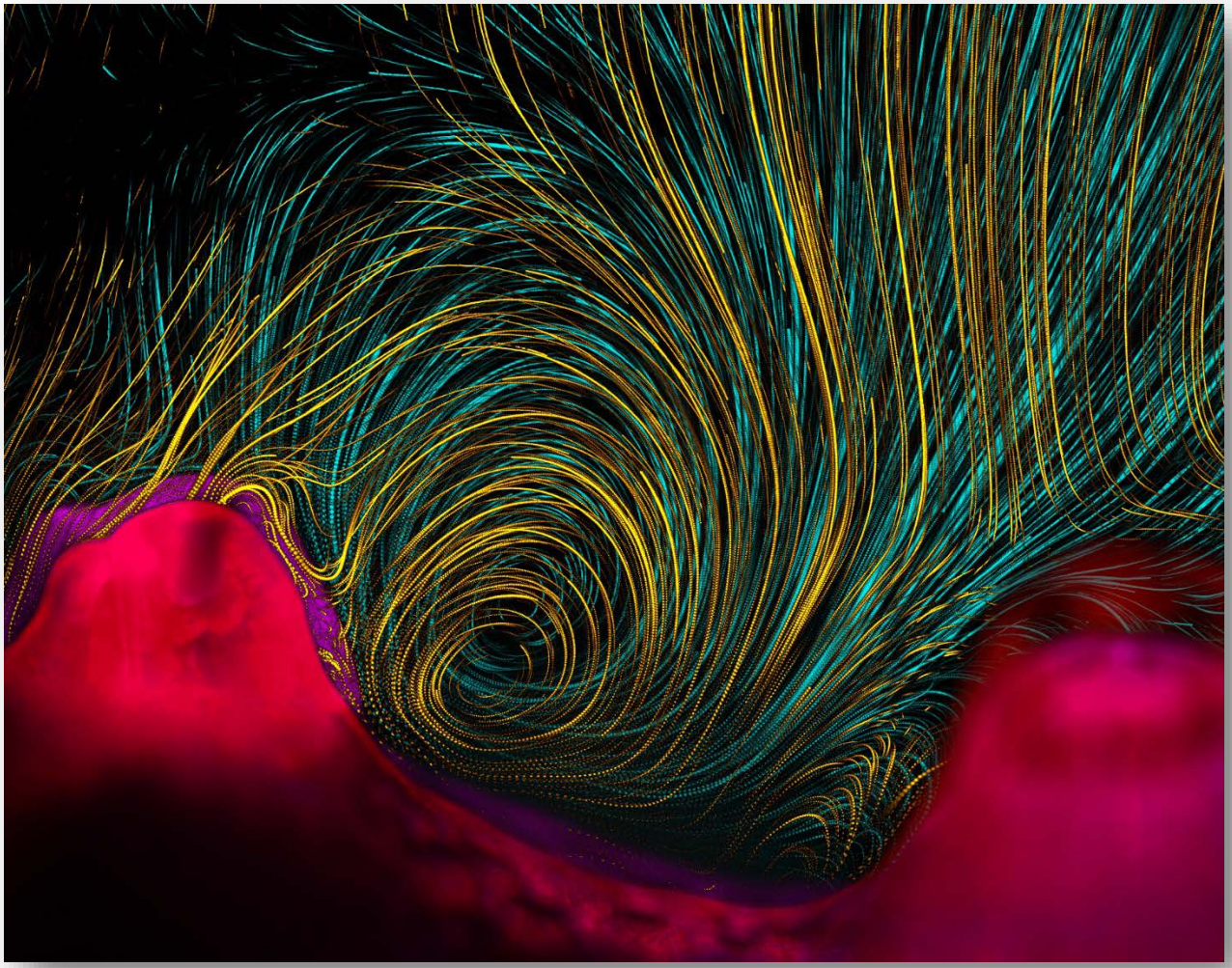
Access to and success in high-quality
STEM education for underrepresented groups

STEM Professional Workforce Development

Capitalize on scientific advances

Address not yet imagined global, social & econ challenges

Engineering (ENG)



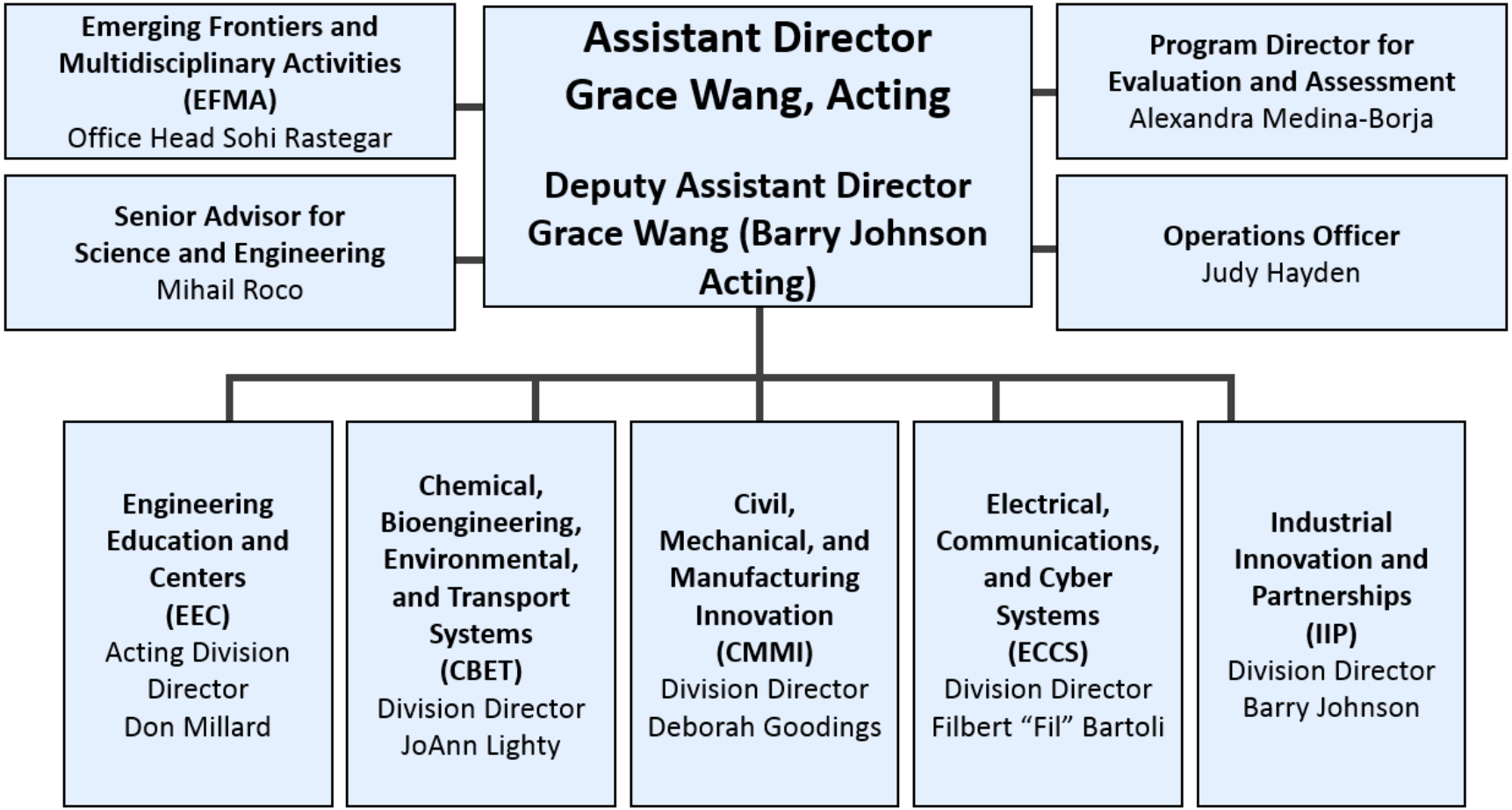
Engineering (ENG)

Prakash G. Balan
Industrial Innovation and Partnerships (IIP) Division
pbalan@nsf.gov

Program Director
Division of Industrial Innovation and Partnerships (IIP)

- Small Business Innovation Research (SBIR/STTR)
- Grants for Academic-Industry Collaborations (GOALI Program)
- Partnerships for Innovation (PFI)

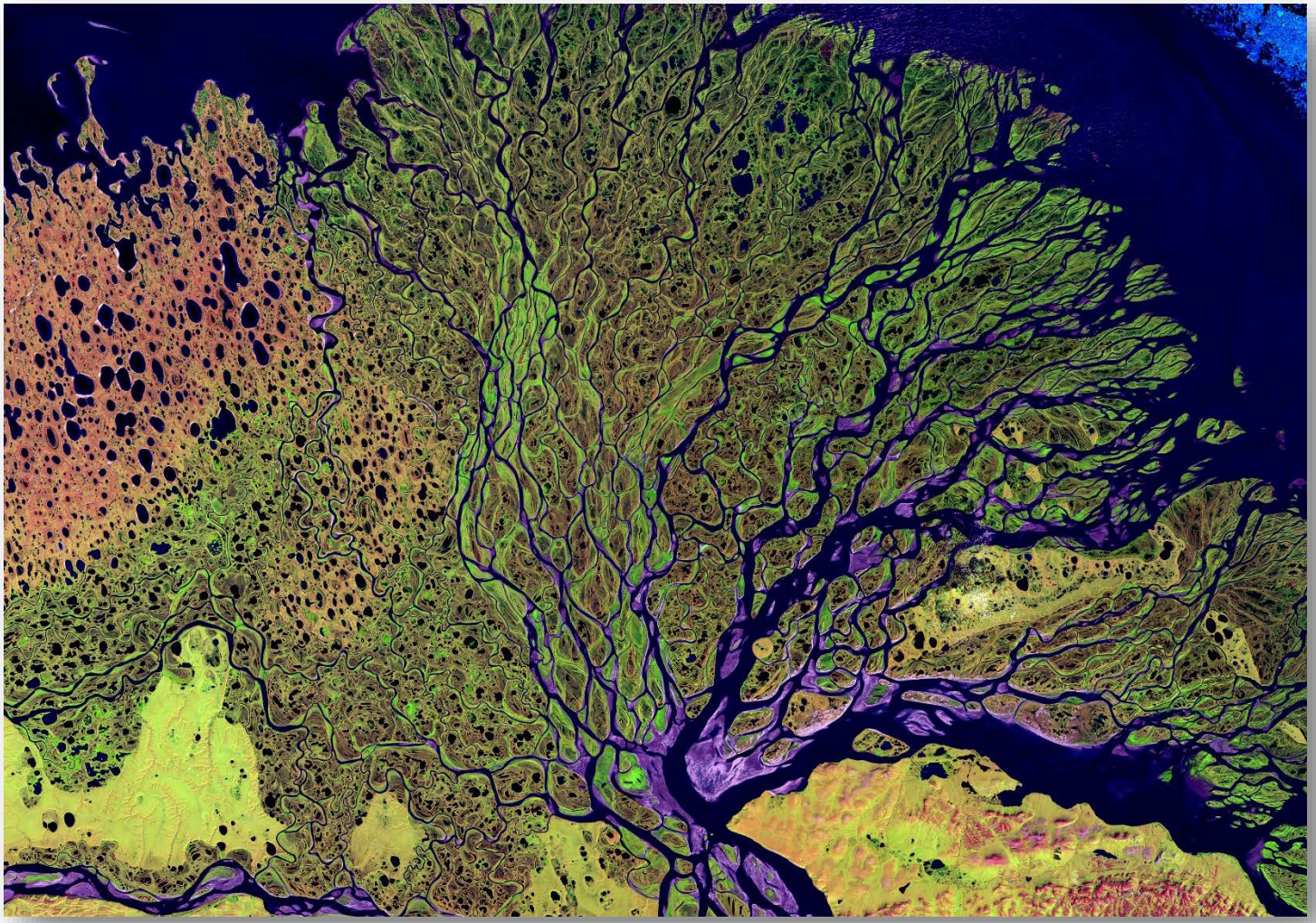
NSF Directorate for Engineering



ENG Initiatives and Priorities Address National Interests

- **INFEWS: Innovations at the Nexus of Food, Energy, and Water Systems**
- **Risk and Resilience – Resilient Infrastructure Systems**
- **Clean Energy Technology**
- **Cyber-Enabled Materials, Manufacturing, and Smart Systems**
  - Advanced Manufacturing
- **National Nanotechnology Initiative**
- **Communications & Cyberinfrastructure**
- **Understanding the Brain**
- **Education and Broadening Participation**
  - **NSF INCLUDES** – Inclusion across The Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science
  - **IUSE:RED** – Improving Undergraduate Science and Engineering: Revolutionizing Engineering Departments
- **GOALI : Grant Opportunities for Academic Liaison with Industry**
- **Engineering Research Centers**
- **IUCRC: Industry University Cooperative Research Centers**
- **PFI: Partnerships for Innovation**
- **iCorps: Innovation Corps**
- **SBIR/STTR Small Business Innovation Research**

Geosciences (GEO)



Geosciences (GEO)

Daniel Thornhill
Division of Ocean Sciences
dthornhi@nsf.gov

Program Director Biological Oceanography Program

Managed panels for GRFP, Dimensions of Biodiversity

Program lead for RAPID and EAGER program; Division lead for NSF OCE-BSF collaborative proposals

Formerly at Bowdoin College, Brunswick ME; Auburn Univesity, Auburn, AL; Defenders of Wildlife, Washington, DC

Geosciences (GEO)

Roger Wakimoto, Assistant Director
Margaret Cavanaugh, Deputy Assistant Director

Earth Sciences (EAR)
Carol Frost, Division Director
Deep Earth Processes
Surface Earth Processes

Ocean Sciences (OCE)
Rick Murray, Division Director
Marine Geosciences
Ocean
Integrated Programs

Atomspheric and Geospace Sciences (AGS)
Paul Shepson, Division Director
Atmosphere
Geospace
NCAR/Facilities

Polar Programs (PLR)
Kelly Faulkner, Division Director
Antarctic Research
Arctic Research
Antarctic Artists & Writers

Geosciences (GEO)

PRIORITIES

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

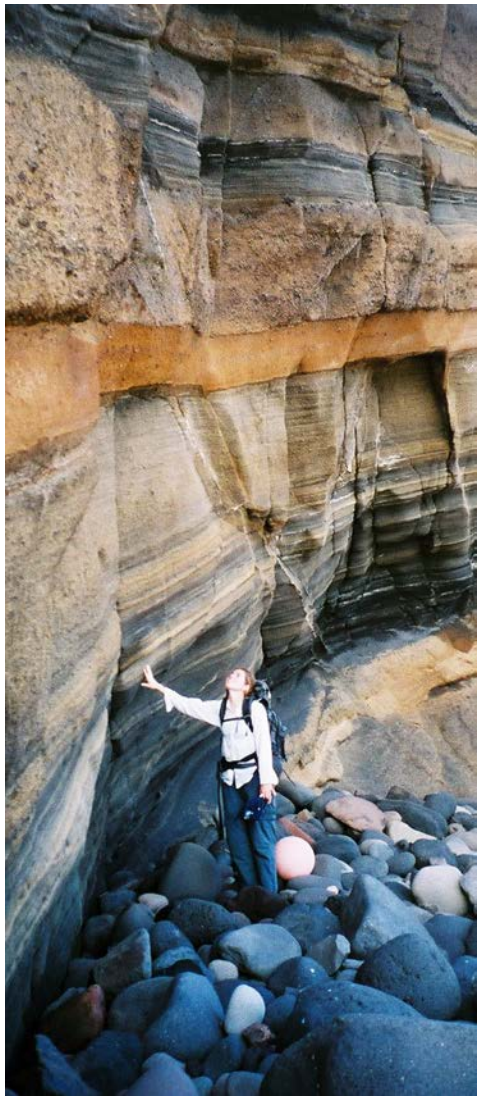
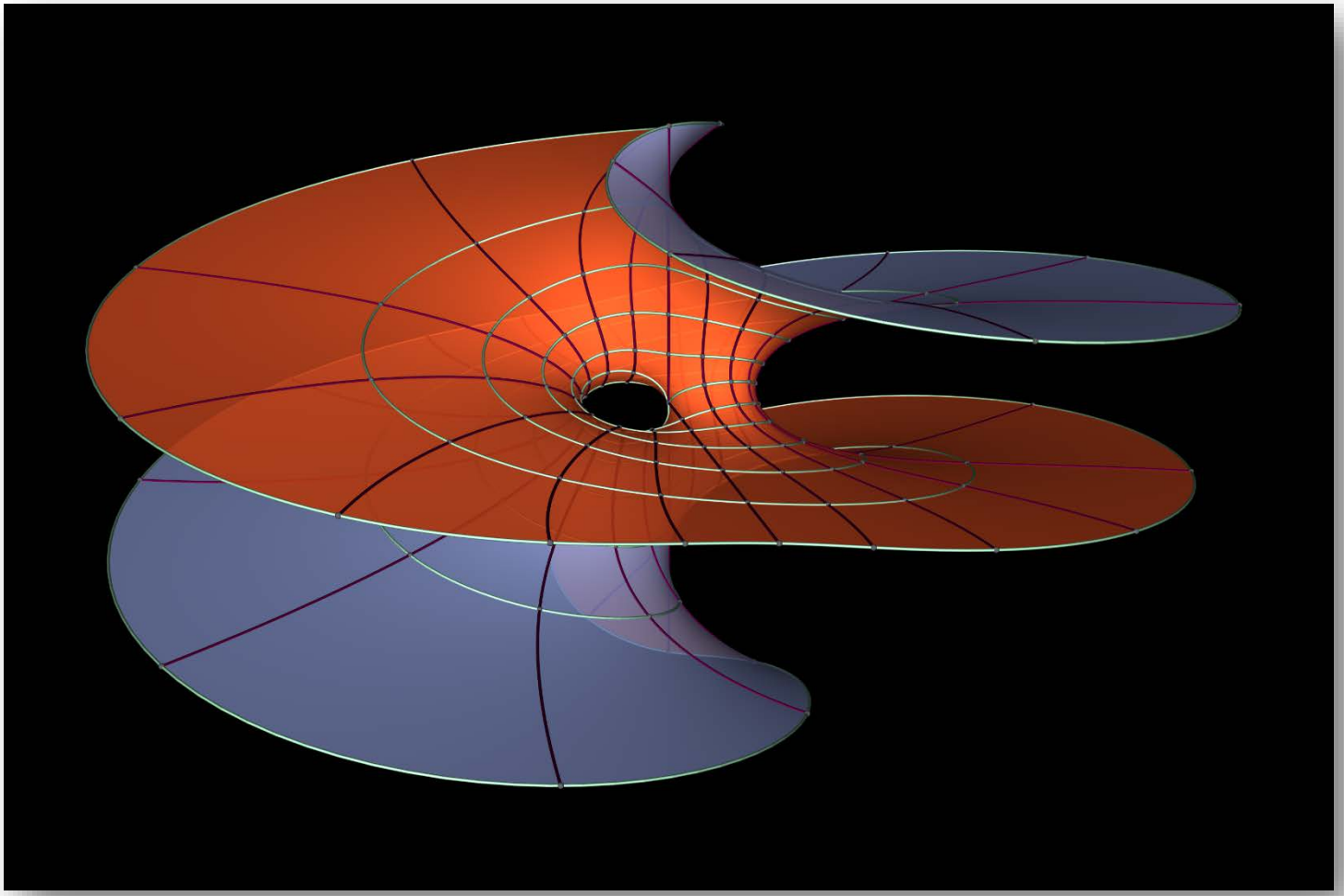


Photo credits: 1) Ben Edwards 2,4,5) Jennifer Wade 3) WiscSIMS

Mathematical & Physical Sciences (MPS)



Mathematical & Physical Sciences (MPS)

Michelle Bushey
Division of Chemistry (CHE)
mbushey@nsf.gov

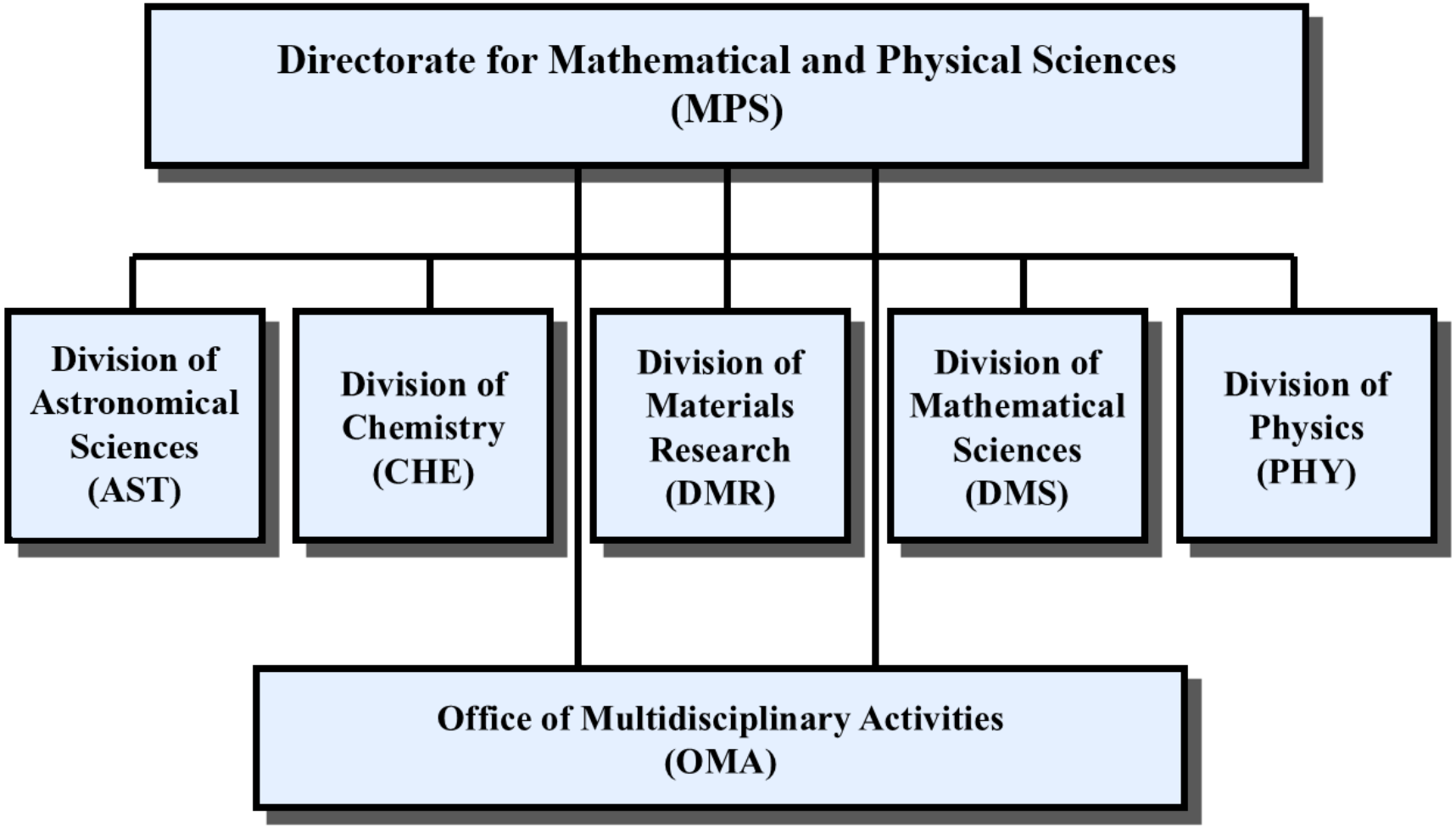
2 years at NSF

- Program Director:
  Chemical Measurement and Imaging
  Research Experiences for Undergraduates
  Special Projects

- Participated in NSF outreach activities especially those directed to PUIs. MSP RUI point of contact. Managed GRFP and PAEMST Panels

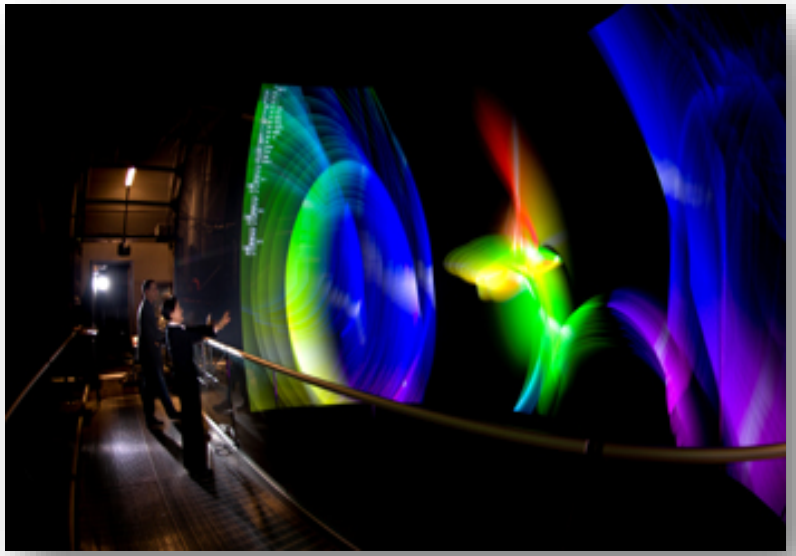
Previously, 25 years at Trinity University in San Antonio, TX. Department of Chemistry

Mathematical & Physical Sciences (MPS)



Mathematical & Physical Sciences (MPS)

EMPHASIS AREAS



- Physical sciences at the nanoscale
- World-class, shared-use Facilities
- Advances in optics and photonics
- Materials by design
- Physics of the universe
- Broadening participation
- Quantum information science
- Complex systems (multi-scale, emergent phenomena)
- Sustainable chemistry/materials (biosourced, benign, recyclable)
- Innovations at the Nexus of Food, Energy, and Water Systems
- Interfaces between the mathematical, physical, & life sciences

Social, Behavioral, & Economic Science (SBE)

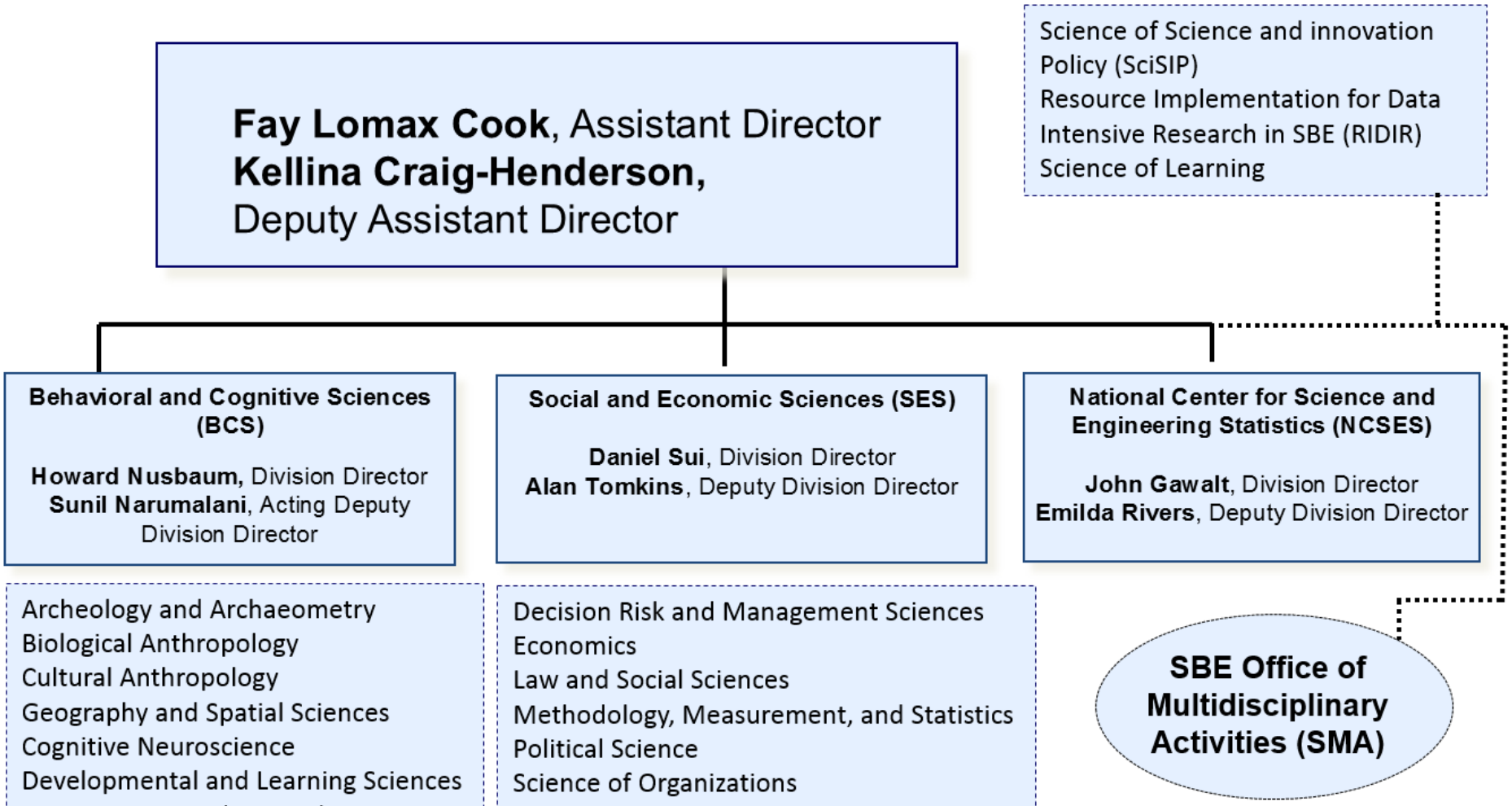
Social, Behavioral, & Economic Science (SBE)

William Badecker (Bill)
Division of Behavioral and Cognitive Sciences (BCS)
wbadecke@nsf.gov

Program Director for the Linguistics Program

Program Director for the Resource Implementations for Data Intensive Research (RIDIR) Program

Social, Behavioral, & Economic Science (SBE)



Social, Behavioral, & Economic Science (SBE)

Understanding the Brain
Nexus of Food, Energy, and Water Systems (INFEWS)
Risk and Resilience
NSF INCLUDES
Public Access Initiative
Urban Science
CIF21
Secure and Trustworthy Cyberspace (SaTC)
Science of Learning

Office of Integrative Activities (OD/OIA)

Office of Integrative Activities (OD/OIA)

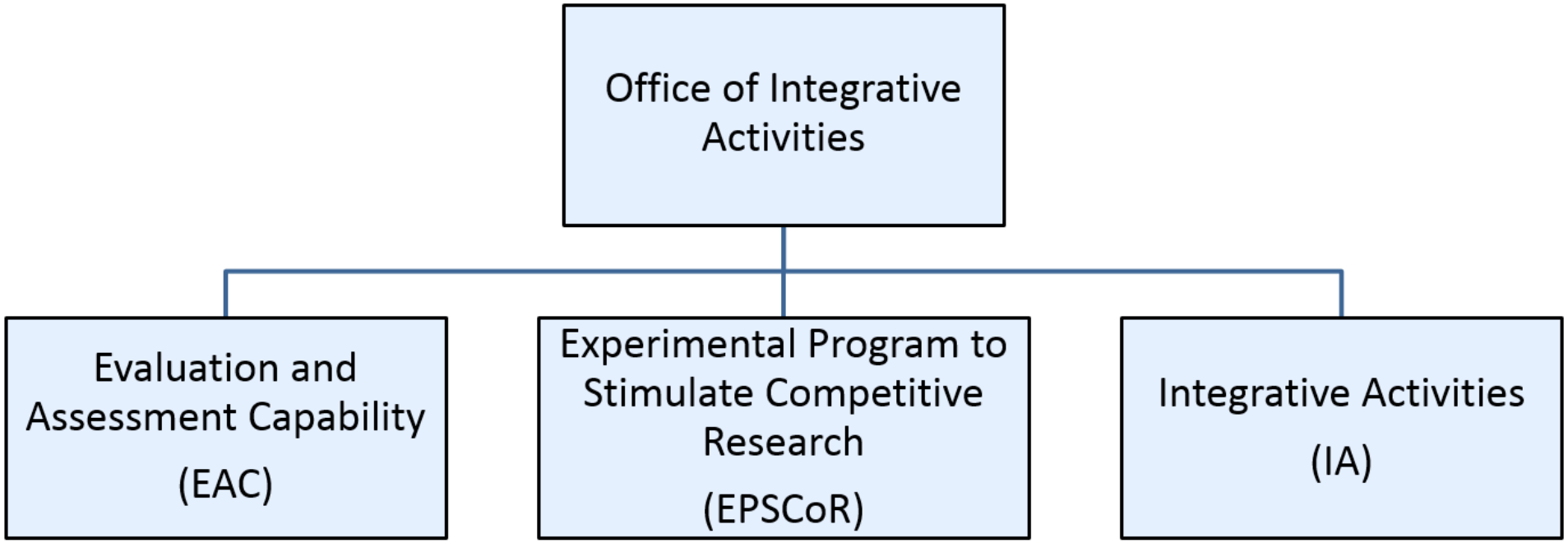
Paul Morris
Evaluation and Assessment
pmorris@nsf.gov

Data Analytics

Text Mining and Clustering

Prior to NSF –
Research Fellow, University of Oxford, England

Office of Integrative Activities (OD/OIA)



Office of Integrative Activities (OD/OIA)

- IA: Science and Technology Centers (STC)
- IA: Major Research Instrumentation (MRI)
- IA: Integrated NSF Support Promoting Inter-disciplinary Research and Education (INSPIRE)
- IA: Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) 16-544
- 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

Mangala Sharma
Office of International Science & Engineering
msharma@nsf.gov

- NSF Program Director since 2014
- Facilitates U.S. collaborations with India, and countries in southern & western Africa and Eastern Europe
- Manages funding opportunities to support international research cooperation in S & E fields

Previously:

- NSF lead for spectrum management
- U.S. Department of State – POC for space science, space weather, near-Earth asteroids, space exploration
- Coordinated NASA Astrophysics education/outreach
- Teaching faculty at Ohio University

Office of International Science & Engineering

Administrative Management

Office Head
Deputy Head

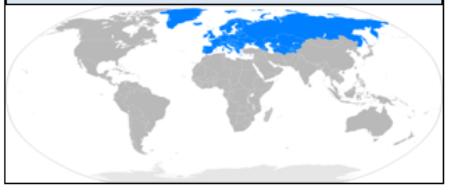
Overseas Offices
China – Office Head
Europe – Office Head
Japan – Office Head

Countries and Regions Coordinator

Programs and Analysis Coordinator

Americas

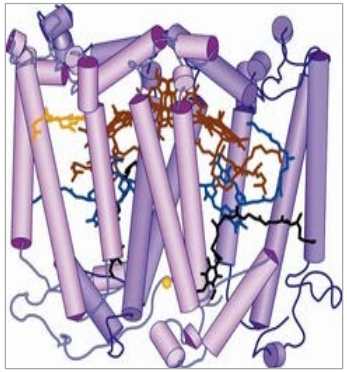
Europe and Eurasia



Africa, Near East, and South Asia

East Asia and Pacific

Office of International Science & Engineering



PRIORITIES

<u>Advance</u> the FRONTIERS of S&E via international collaboration

<u>Prepare</u> a GLOBALLY-ENGAGED U.S. S&E workforce

<u>Develop</u> GLOBAL KNOWLEDGE NETWORKS that link U.S. faculty and students to the world

<u>Leverage</u> RESOURCES, EXPERTISE, FACILITIES around the globe

Budget, Finance & Award Management (BFA)

Budget, Finance & Award Management (BFA)

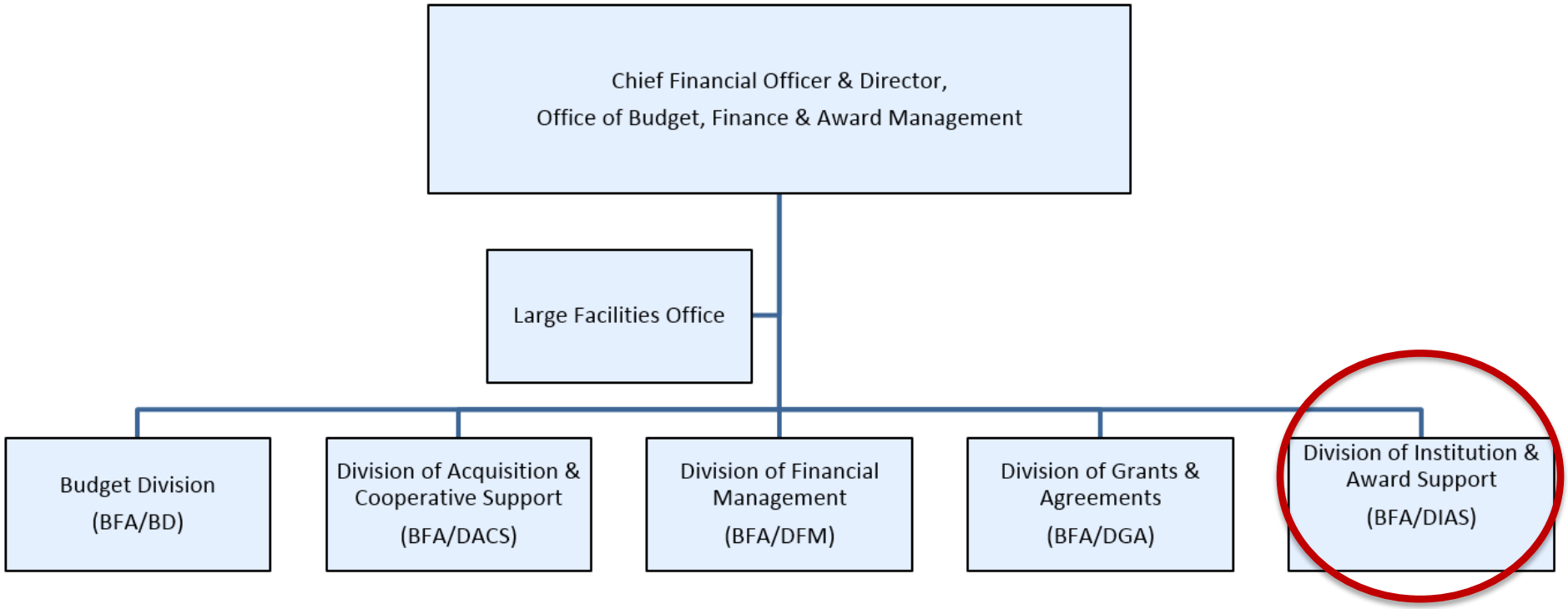
Anne Doyle
Policy Office
Division of Institution & Award Support
adoyle@nsf.gov

Senior policy specialist for proposal & award policy

Coordinates the review and approval of funding opportunity documents and other documents issued by NSF

Serves as the executive secretary of the Director's Review Board

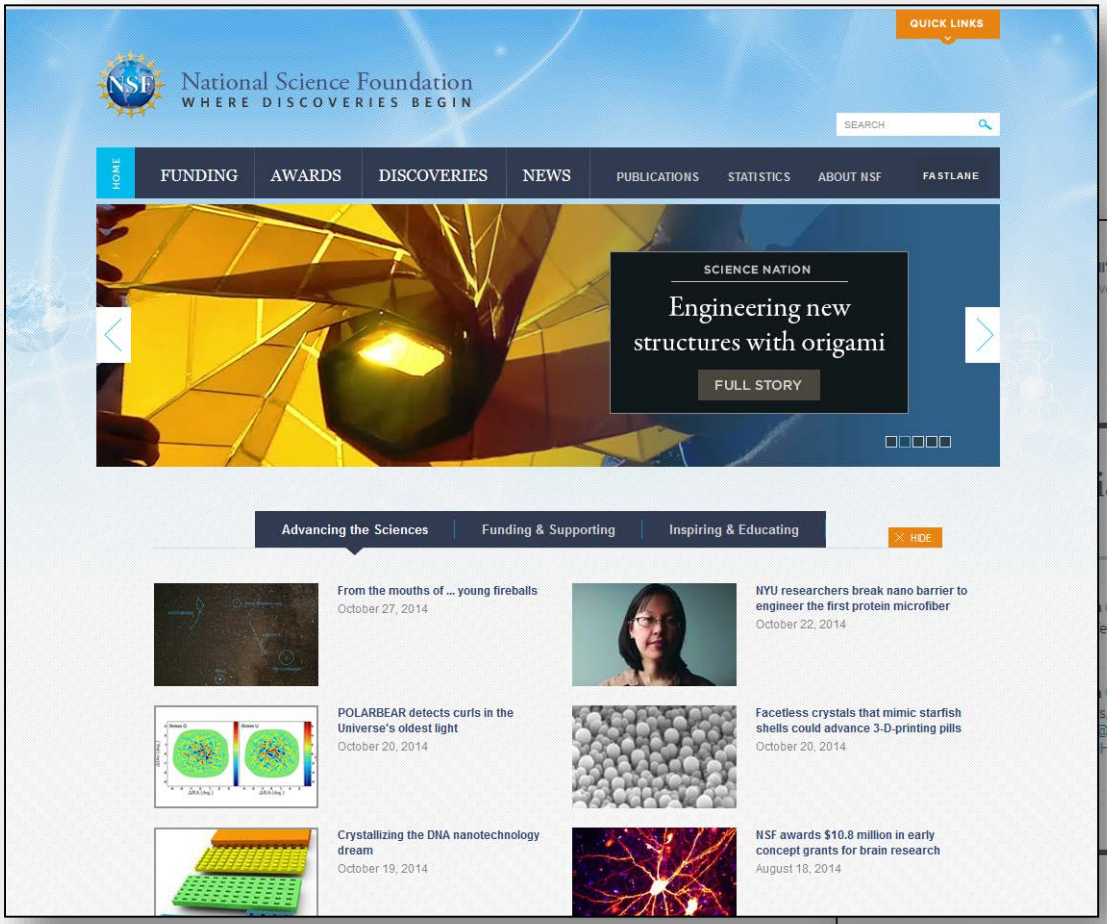
Budget, Finance & Award Management (BFA)



Getting Started

The Essentials

www.NSF.gov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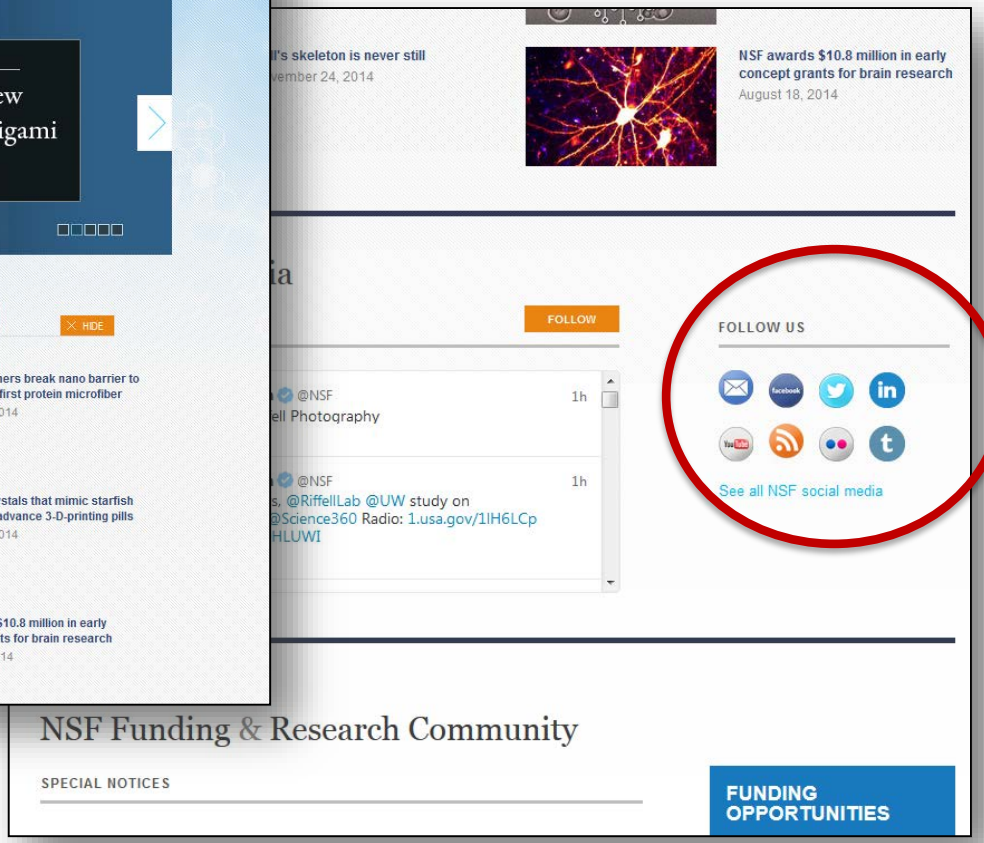
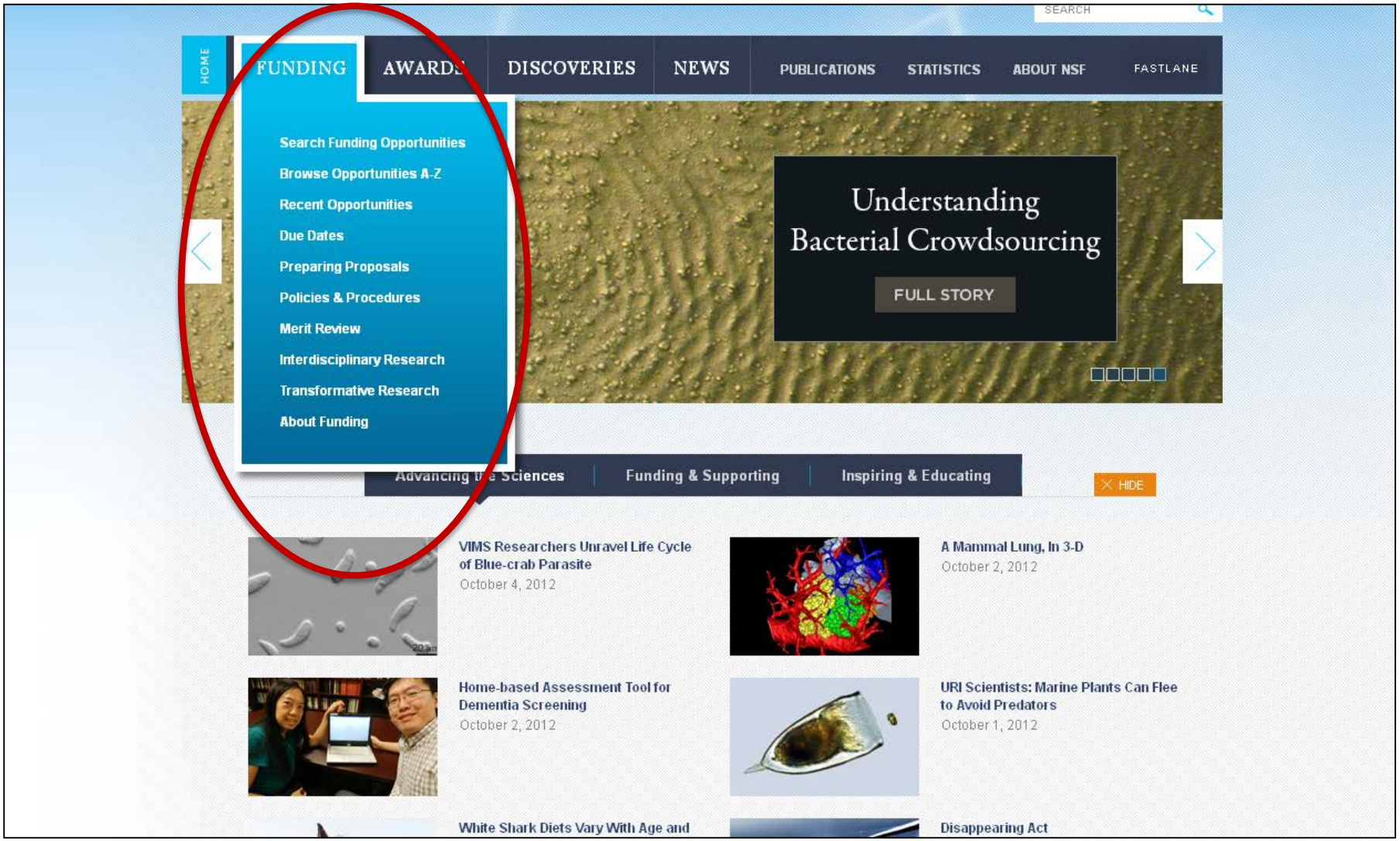
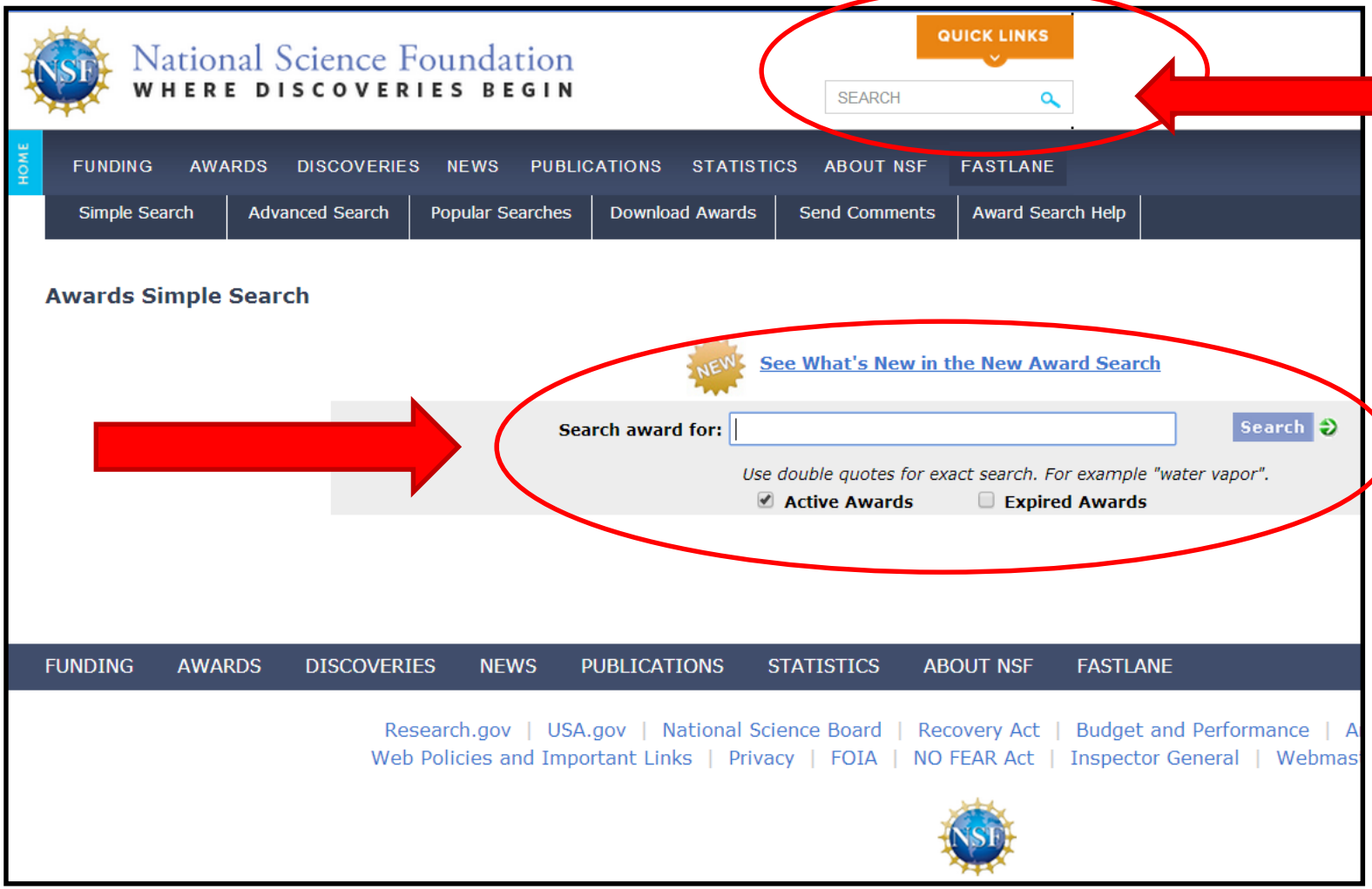
Engineering new structures with origami
FULL STORY
Advancing the Sciences
Funding & Supporting
Inspiring & Educating
HIDE
From the mouths of ... young fireballs
October 27, 2014
NYU researchers break nano barrier to engineer the first protein microfiber
October 22, 2014
POLARBEAR detects curls in the Universe's oldest light
October 20, 2014
Facetless crystals that mimic starfish shells could advance 3-D-printing pills
October 20, 2014
Crystallizing the DNA nanotechnology dream
October 19, 2014
NSF awards $10.8 million in early concept grants for brain research
August 18, 2014


NSF awards $10.8 million in early concept grants for brain research
August 18, 2014
FOLLOW
FOLLOW US
See all NSF social media
NSF Funding & Research Community
SPECIAL NOTICES
FUNDING OPPORTUNITIES

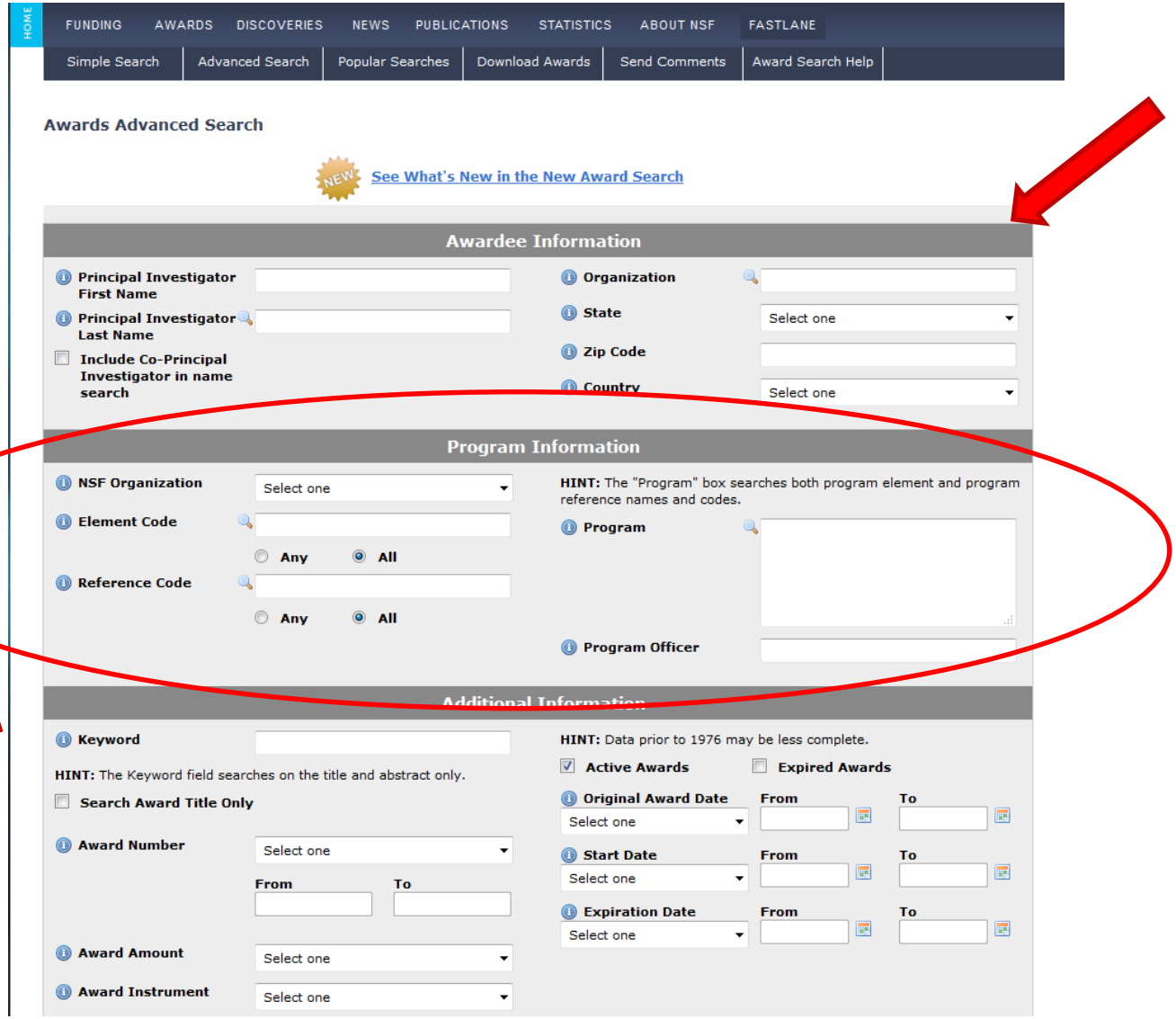
Navigating www.NSF.gov



Navigating www.NSF.gov



Navigating www.NSF.gov



Additional Information on Resources

Join Directorate Specific Listserves!

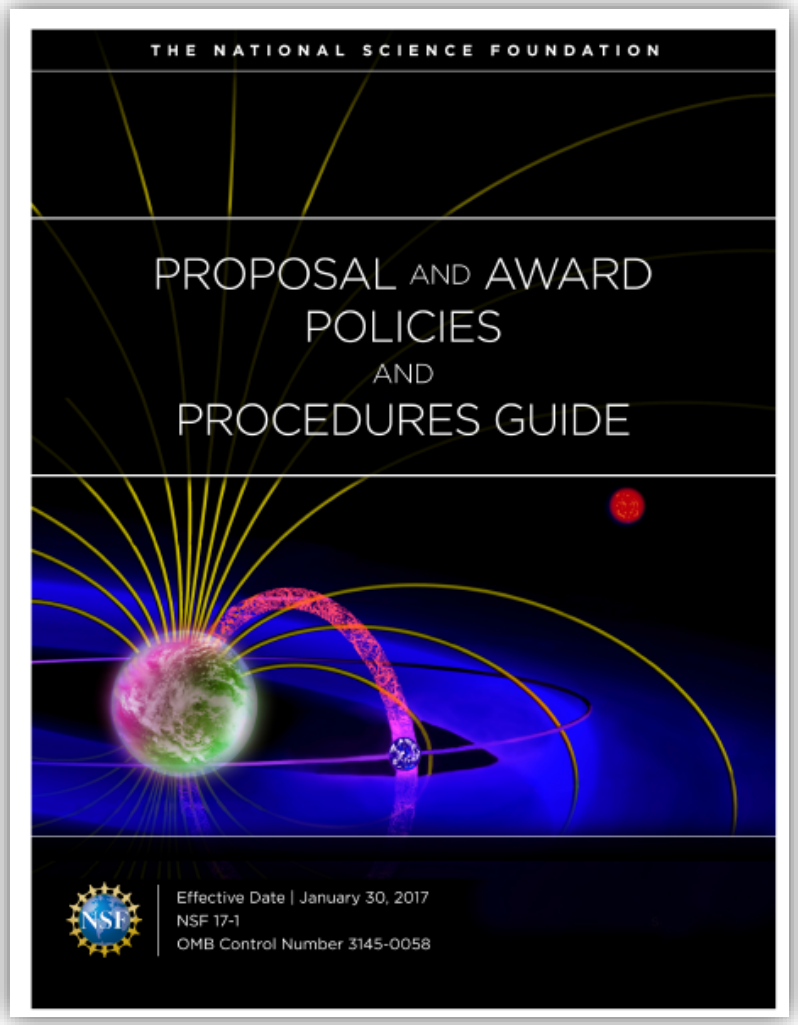
Use Grants.gov's search feature

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.

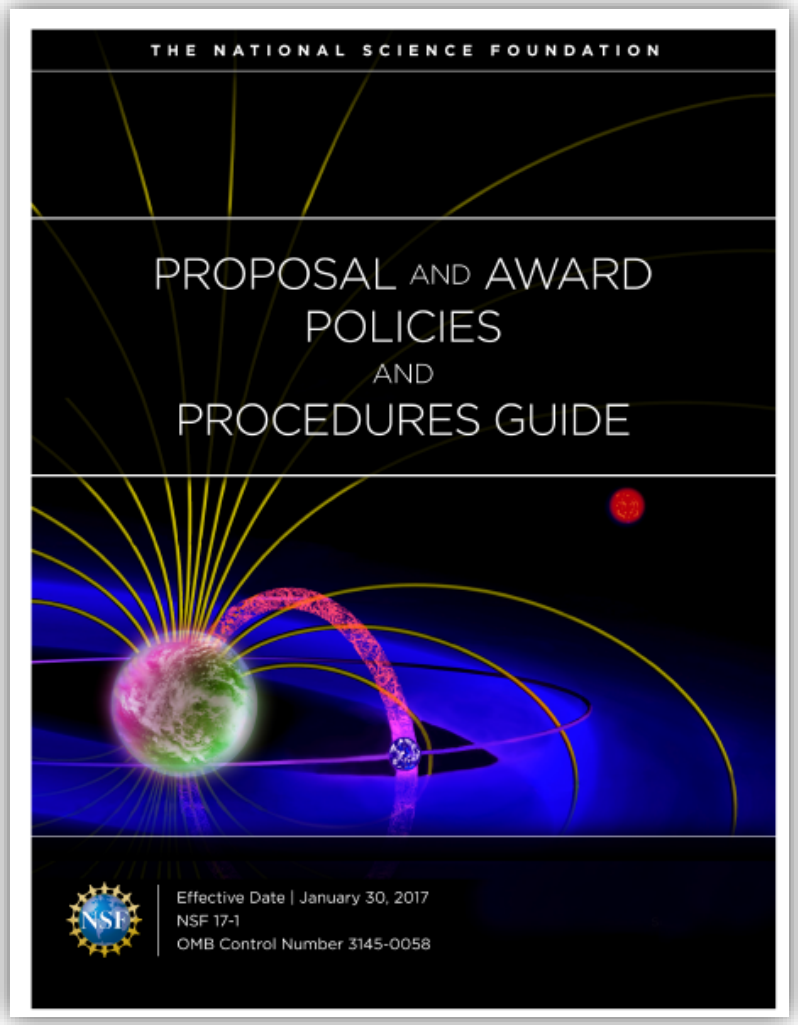
Part I is NSF's proposal preparation and submission guidelines

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



Types of Funding Opportunities

Program Descriptions	Proposals for a **Program Description** must follow the instructions in the GPG.
Program Announcements	Proposals for a **Program Announcement** must follow the instructions in the GPG.
Program Solicitations	Proposals must follow the instructions in the **Program Solicitation**; the instructions in the GPG apply unless otherwise stated in the solicitation.
Dear Colleague Letters	**Dear Colleague Letters** are notifications of opportunities or special competitions for supplements to existing NSF awards.

Types of Funding Opportunities

Program Descriptions	Program Announcements	Program Solicitations	Dear Colleague Letters
• Proposals for a **Program Description** must follow the instructions in the GPG.	• Proposals for a **Program Announcement** must follow the instructions in the GPG.	• Proposals must follow the instructions in the **Program Solicitation**; the instructions in the GPG 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 Proposals

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

Navigating a Program Description

Division of Mathematical Sciences

Algebra and Number Theory

CONTACTS

Name	Email	Phone	Room
Tie Luo	tluo@nsf.gov	(703) 292-8448	1025 N
J. Matthew Douglass	mdouglas@nsf.gov	(703) 292-2467	1025 N
Andrew Pollington	adpollin@nsf.gov	(703) 292-4878	1025 N
Victoria Powers	vpowers@nsf.gov	(703) 292-2113	1025 N

PROGRAM GUIDELINES

Apply to PD 10-1264 as follows:

For full proposals submitted via FastLane: standard *Grant Proposal Guide* proposal preparation guidelines apply.
For full proposals submitted via Grants.gov: the *NSF Grants.gov Application Guide; A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines* applies. (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

Important Information for Proposers

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 15-1), is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200). Please be advised that the guidelines contained in NSF 15-1 apply to proposals submitted in response to this funding opportunity.

DUE DATES

Full Proposal Target Date: October 9, 2015
Second Friday of October
Second Friday in October, Annually Thereafter

Research proposals (as opposed to conference proposals) are expected to be submitted by the target date. An extension may be granted under unusual extenuating circumstances, provided that approval is obtained from the cognizant Program Director prior to the target date.

SYNOPSIS

The Algebra and Number Theory program supports research in algebra, algebraic and arithmetic geometry, number theory, and representation theory.

Conferences

Principal Investigators should carefully read the program solicitation "Conferences and Workshops in the Mathematical Sciences" (link below) to obtain important information regarding the substance of proposals for conferences, workshops, summer/winter schools, and similar activities.

For conference proposals with budgets not exceeding $50,000, which in accordance with NSF policy can be reviewed internally at NSF, the following target dates are in effect: For an event that will take place at some time prior to October 1 during a given year, the proposal should be submitted in October of the previous year. For an event that will occur in the period October 1 through December 31 of a given year, the proposal should be submitted in May of that year. A conference proposal with a budget request exceeding $50,000 should be submitted roughly seven months before the event is scheduled to take place, in order to allow time for external review.

RELATED PROGRAMS

Focused Research Groups in the Mathematical Sciences
Research Training Groups in the Mathematical Sciences
Faculty Early Career Development Program
Mathematical Sciences Postdoctoral Research Fellowships
NSF Graduate Research Fellowship Program

RELATED URLS

Conferences and Workshops in the Mathematical Sciences

THIS PROGRAM IS PART OF

Disciplinary Research Programs

What Has Been Funded (Recent Awards Made Through This Program, with Abstracts)

Map of Recent Awards Made Through This Program

News

Navigating a Program Solicitation

Enhancing Access to the Radio Spectrum (EARS)

PROGRAM SOLICITATION
NSF 15-550

REPLACES DOCUMENT(S):
NSF 14-529

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Astronomical Sciences

Directorate for Engineering
Division of Electrical, Communications and Cyber Systems

Directorate for Computer & Information Science & Engineering
Division of Computer and Network Systems

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

June 02, 2015

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 15-1), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Enhancing Access to the Radio Spectrum (EARS)
Opportunities for interdisciplinary research that increases the efficiency of the radio spectrum, expanding the access to wireless-enabled services for all Americans.

Synopsis of Program:

The National Science Foundation's Directorates for Mathematical and Physical Sciences (MPS), Engineering (ENG), and Computer and Information Science and Engineering (CISE) are coordinating efforts to identify bold new concepts with the potential to

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 20 to 25

Each proposal may request up to $750,000 in total funding over a period of up to three years.

Anticipated Funding Amount: $15,000,000

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI:

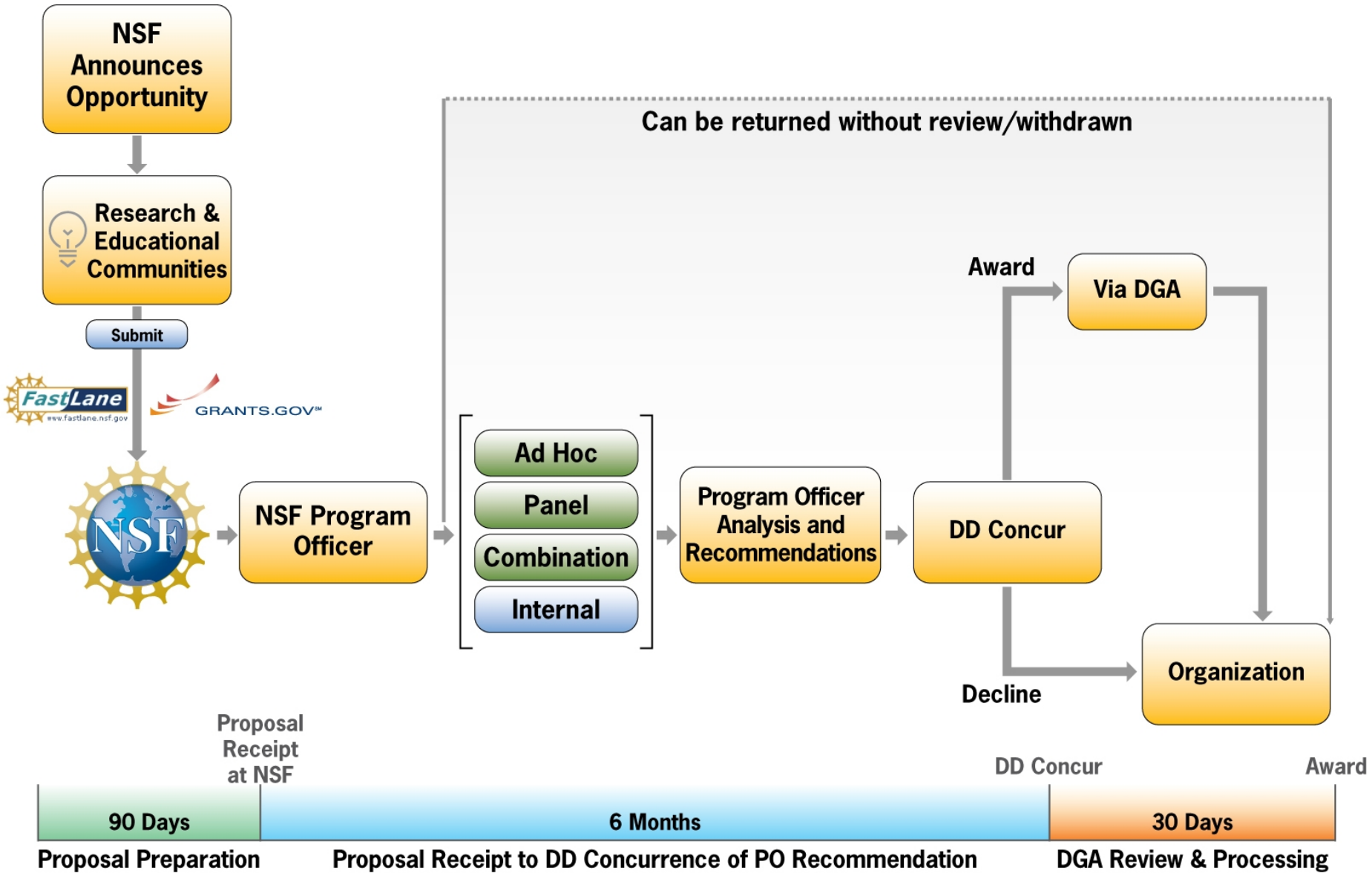
A proposer may be a Principal Investigator (PI) or co-PI on up to two proposals.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete

NSF Proposal & Award Process Timeline



Types of Proposal Submissions

No Deadlines – Proposals may be submitted at any time

F. When to Submit Proposals

Proposers should allow adequate time for NSF review and processing of proposals (see GPG Chapter I.H for further information). Many NSF programs accept proposals at any time. Other programs, however, establish due dates for submission of proposals. The following types of due dates are utilized by NSF:

1. **Target dates:** dates after which proposals will still be accepted, although they may miss a particular panel or committee meeting.
2. **Deadline dates:** dates after which proposals be returned without review by NSF. The deadline date will be waived only in extenuating circumstances. Such a deviation only may be authorized in accordance with GPG Chapter II.A.

Types of Proposal Submissions

Target Dates –
Talk to the Program Office if you think you might miss the date

F. When to Submit Proposals

Proposers should allow adequate time for NSF review and processing of proposals (see GPG Chapter I.H for further information). Many NSF programs accept proposals at any time. Other programs, however, establish due dates for submission of proposals. The following types of due dates are utilized by NSF:

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Types of Proposal Submissions

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

F. When to Submit Proposals

Proposers should allow adequate time for NSF review and processing of proposals (see GPG Chapter I.H for further information). Many NSF programs accept proposals at any time. Other programs, however, establish due dates for submission of proposals. The following types of due dates are utilized by NSF:

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Types of Proposal Submissions

Submission Windows – Closing date converts to a deadline date

3. **Submission windows:** designated periods of time during which proposals will be accepted for review by NSF. It is NSF's policy that the end date of a submission window converts to, and is subject to, the same policies as a deadline date.

Types of Proposal Submissions

Letters of Intent –
Enables better management of reviewers and panelists

1. Letter of Intent

Some NSF program solicitations require or request submission of a letter of intent (LOI) in advance of submission of a full proposal. A LOI is not binding. The predominant reason for its use is to help NSF program staff to gauge the size and range of the competition, enabling earlier selection and better management of reviewers and panelists. In addition, the information contained in a LOI is used to help avoid potential conflicts of interest in the review process.

A LOI normally contains the PI's and co-PI's names, a proposed title, a list of possible participating organizations (if applicable), and a synopsis that describes the work in sufficient detail to permit an appropriate selection of reviewers. A LOI is not externally evaluated or used to decide on funding. The requirement to submit a LOI will be identified in the program solicitation, and such letters are submitted electronically via the NSF FastLane System.

Types of Proposal Submissions

Preliminary Proposals – Sometimes required, sometimes optional

2. Preliminary Proposal

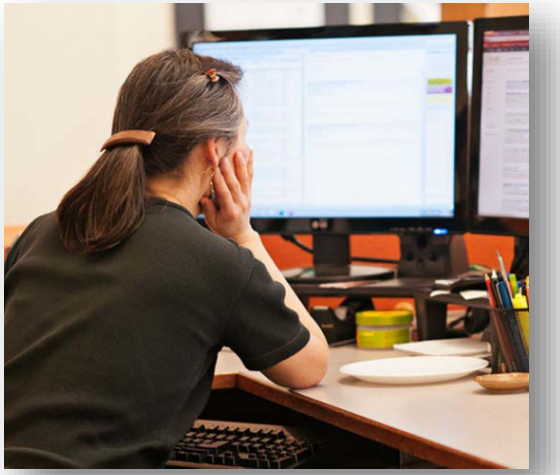
Some NSF program solicitations require or request submission of a preliminary proposal in advance of submission of a full proposal. The two predominant reasons for requiring submission of a preliminary proposal are to:

- reduce the proposers' unnecessary effort in proposal preparation when the chance of success is very small. This is particularly true of exploratory initiatives where the community senses that a major new direction is being identified, or competitions that will result in a small number of actual awards; and
- increase the overall quality of the full submission.

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 Applying…

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?
- What do you intend to do?
- Why is the work important?
- How is the work unique or cutting edge?
- How are you going to do the work?
- Do you have the right team?

Proposal Development Strategies:

What Do You Need Besides $???

- Prepare to do the project
  - Realistically assess needs
  - Determine available resources
  - Develop preliminary data
  - 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 GPG)
- 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

So You Want to Write a Proposal…

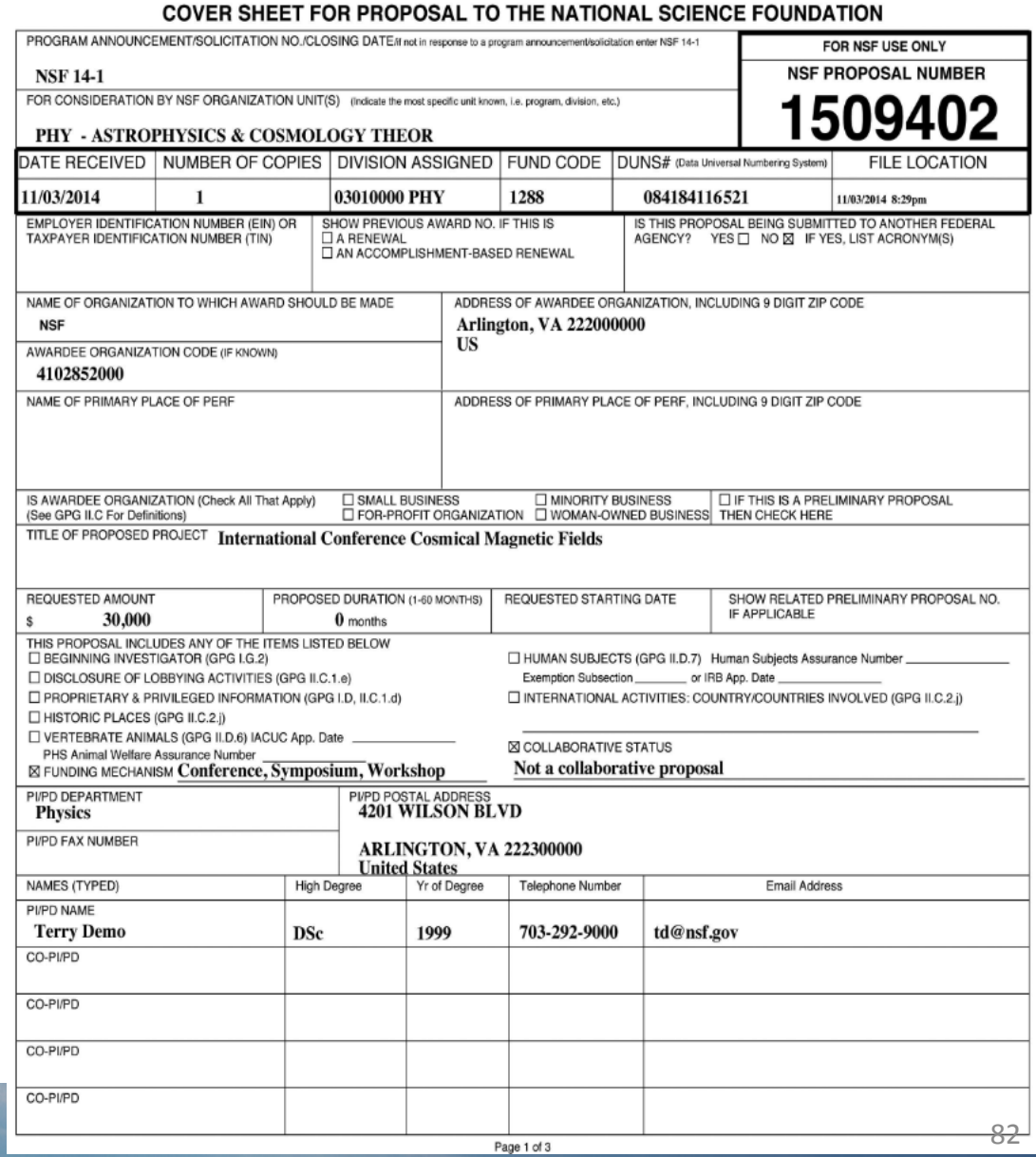
NSF PROPOSAL INGREDIENTS

- ❑ 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

Cover Sheet

Many of the boxes on the cover sheet are electronically prefilled as part of the FastLane login process.



COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE (If not in response to a program announcement/solicitation enter NSF 14-1)

NSF 14-1

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

1509402

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

PHY - ASTROPHYSICS & COSMOLOGY THEOR

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
11/03/2014	1	03010000 PHY	1288	084184116521	11/03/2014 8:29pm

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES ☐ NO ☒ IF YES, LIST ACRONYM(S)

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

NSF

AWARDEE ORGANIZATION CODE (IF KNOWN)

4102852000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Arlington, VA 222000000
US

NAME OF PRIMARY PLACE OF PERF

ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS
☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT International Conference Cosmical Magnetic Fields

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ 30,000	0 months		

THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW

☐ BEGINNING INVESTIGATOR (GPG I.G.2)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C.1.e)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.D, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
☐ VERTEBRATE ANIMALS (GPG II.D.6) IACUC App. Date _____
PHS Animal Welfare Assurance Number _____
☒ FUNDING MECHANISM Conference, Symposium, Workshop

☐ HUMAN SUBJECTS (GPG II.D.7) Human Subjects Assurance Number _____
Exemption Subsection _____ or IRB App. Date _____
☐ INTERNATIONAL ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)
☒ COLLABORATIVE STATUS
Not a collaborative proposal

PI/PD DEPARTMENT
Physics

PI/PD FAX NUMBER

PI/PD POSTAL ADDRESS
4201 WILSON BLVD

ARLINGTON, VA 222300000
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address
PI/PD NAME Terry Demo	DSc	1999	703-292-9000	td@nsf.gov
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Page 1 of 3

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

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)**

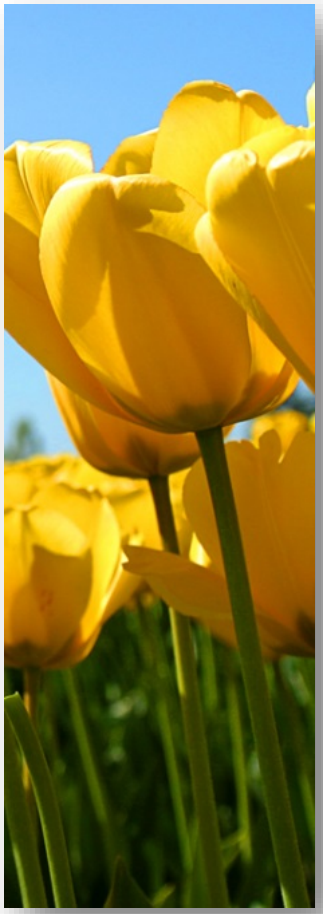
Eligible costs consist of:

- **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

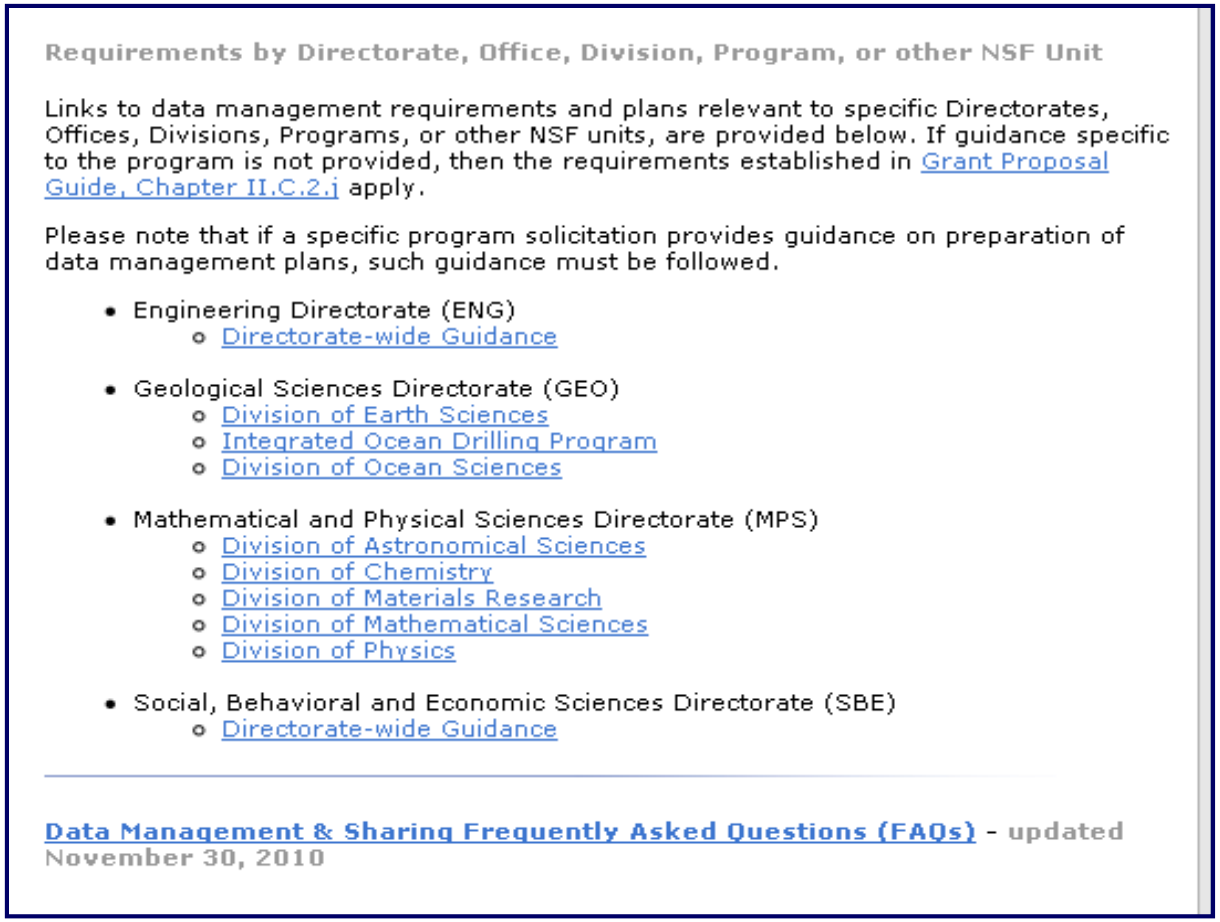
You should alert NSF officials to unusual circumstances that require special handling (i.e. proprietary information)

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 by Directorate, Office, Division, Program, or other NSF Unit

Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units, are provided below. If guidance specific to the program is not provided, then the requirements established in Grant Proposal Guide, Chapter II.C.2.j apply.

Please note that if a specific program solicitation provides guidance on preparation of data management plans, such guidance must be followed.

- Engineering Directorate (ENG)
  - Directorate-wide Guidance
- Geological Sciences Directorate (GEO)
  - Division of Earth Sciences
  - Integrated Ocean Drilling Program
  - Division of Ocean Sciences
- Mathematical and Physical Sciences Directorate (MPS)
  - Division of Astronomical Sciences
  - Division of Chemistry
  - Division of Materials Research
  - Division of Mathematical Sciences
  - Division of Physics
- Social, Behavioral and Economic Sciences Directorate (SBE)
  - Directorate-wide Guidance

Data Management & Sharing Frequently Asked Questions (FAQs) - updated November 30, 2010

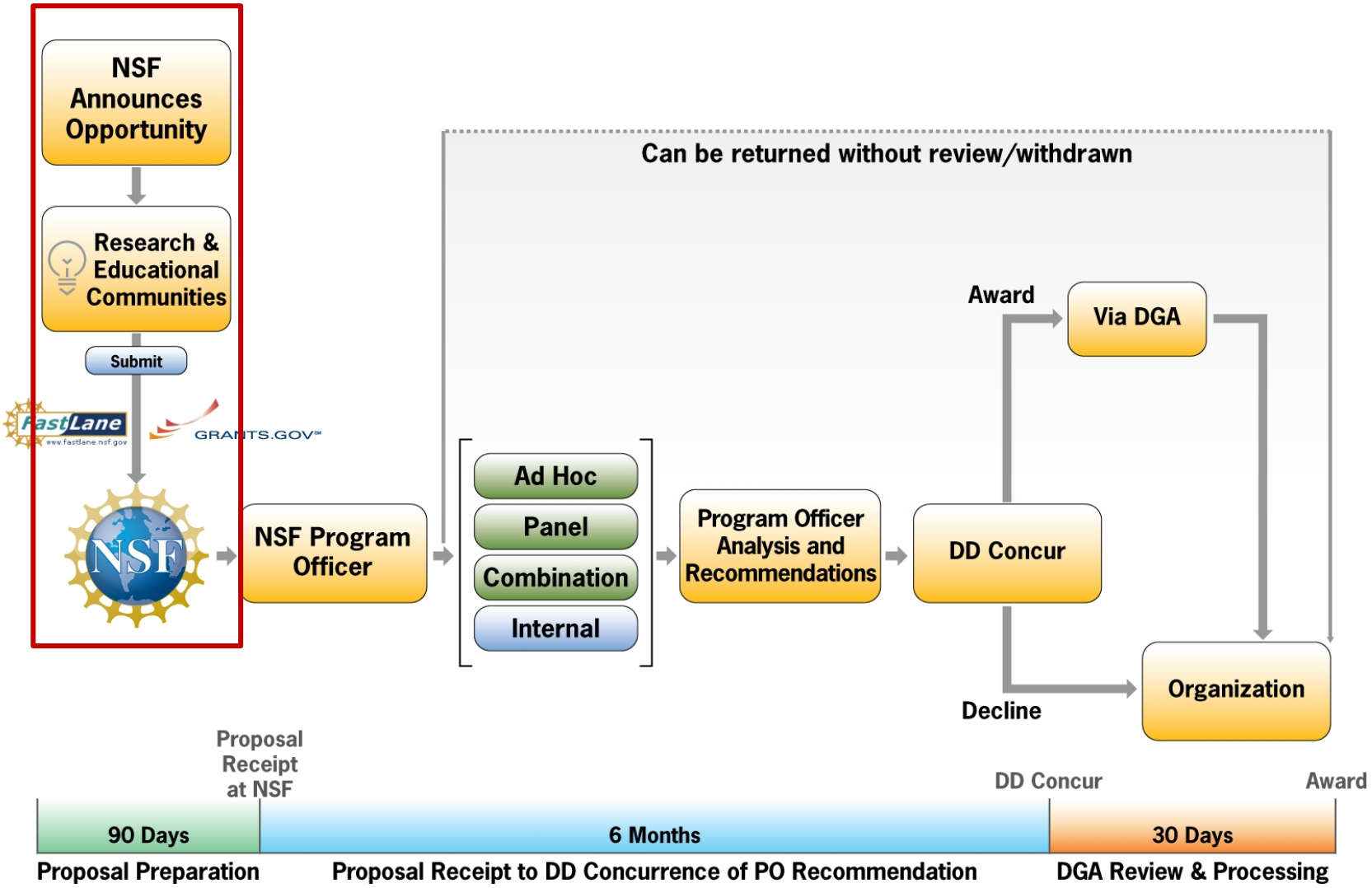
Requirements may vary by Directorate or Office

nsf.gov/bfa/dias/policy/dmp.jsp

Questions?

The Merit Review Process

NSF's Proposal & Award Process Timeline



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

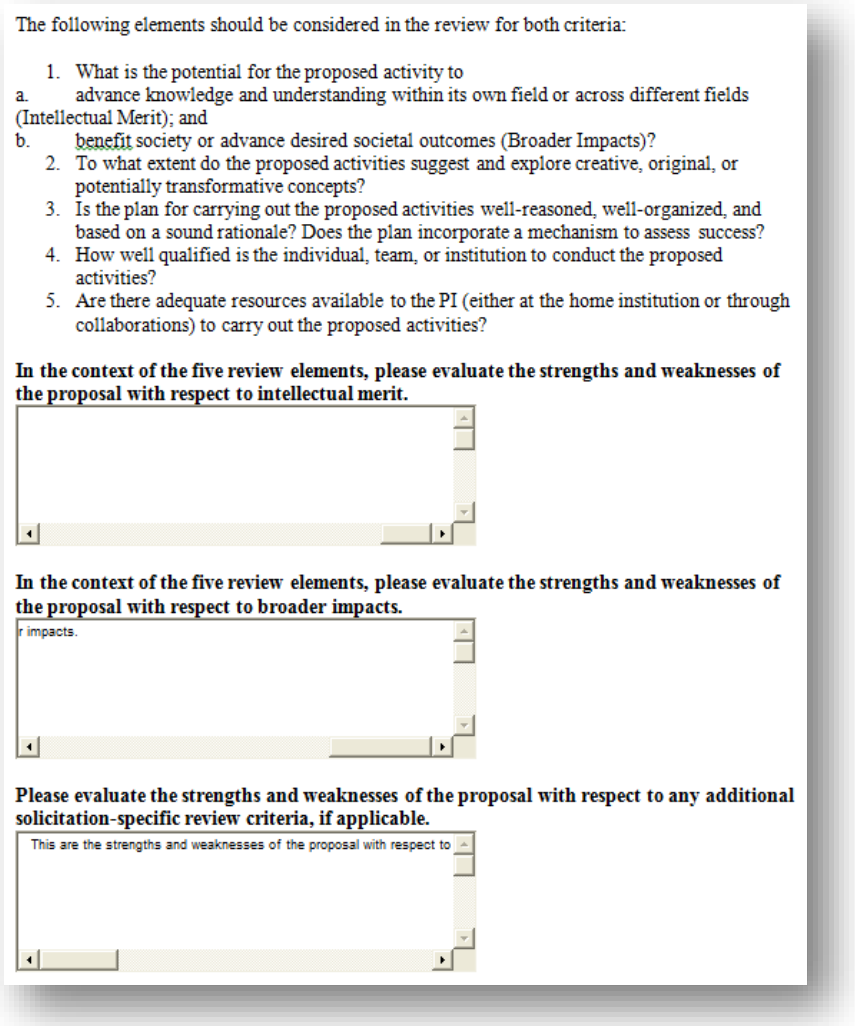
- Read the funding opportunity; ask a Program Officer for clarifications if needed
- Address all the proposal review criteria
- Understand the NSF merit review process
- Avoid omissions and mistakes
- Check your proposal to verify that it is complete!
- Double Check that the proposal NSF receives is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


The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
a. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
b. benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or institution to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

r impacts.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable.

This are the strengths and weaknesses of the proposal with respect to

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?

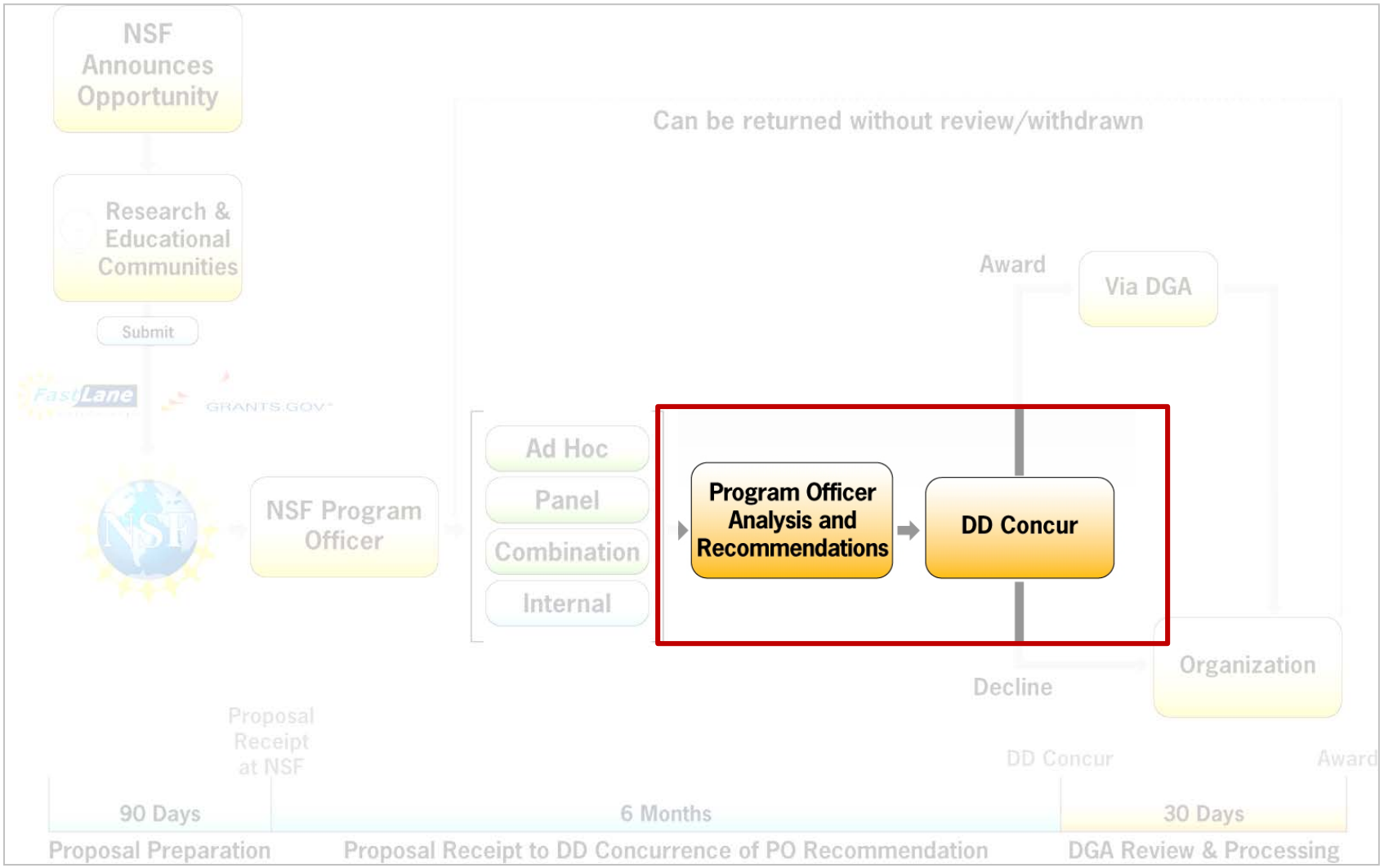
How we address conflict of interest

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 the 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?

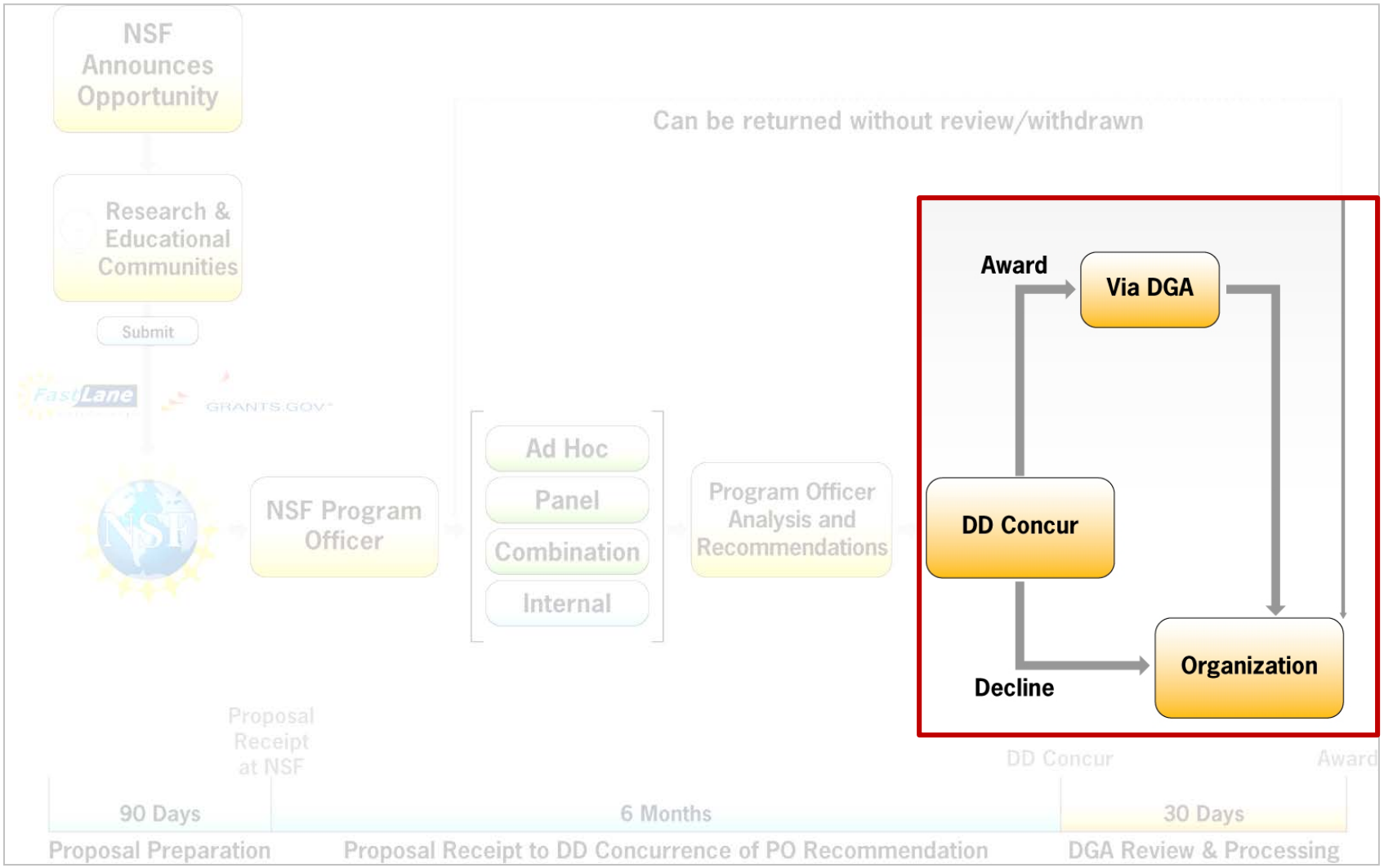
Questions?

Contact your cognizant Program Officer!

Possible Considerations for Funding a Competitive Proposal

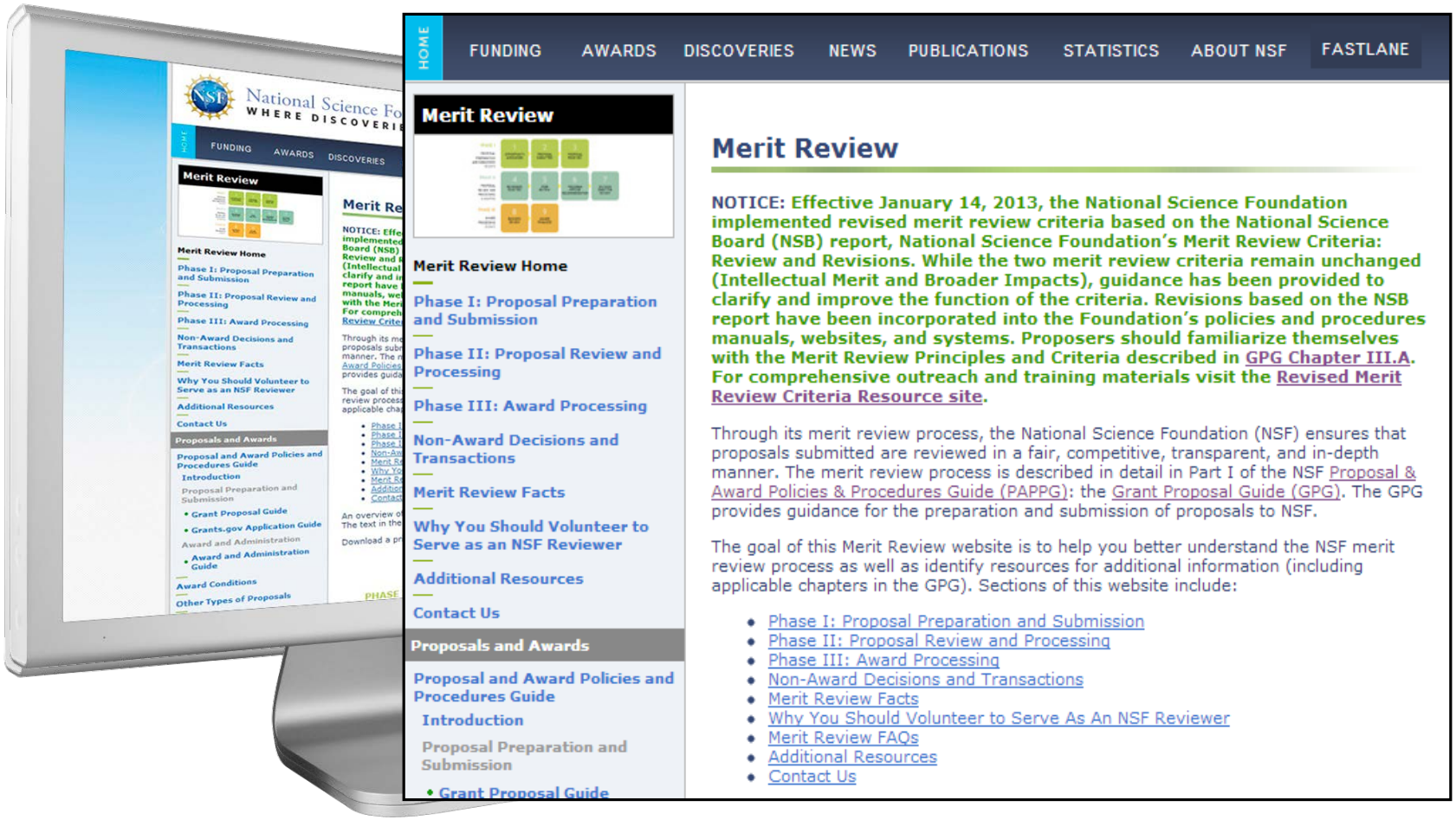
- Addresses all review criteria
- Likely high impact
- Broadening participation
- Educational impact
- Impact on institution/state
- Special programmatic considerations (e.g. CAREER/RUI/EPSCoR)
- Other support for PI
- “Launching” versus “Maintaining”
- Portfolio balance

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 in preparation—expected by year's end

Due Dates: Third week of July, 2017

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

www.nsf.gov/career

CAREER Awards

Stable support for 5 years

NSF wide: 500+/year

> $400K

www.nsf.gov/career

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 the program of interest

* see 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

YES	NO
Consultants, subawards, unpaid collaborators	Co-PI
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

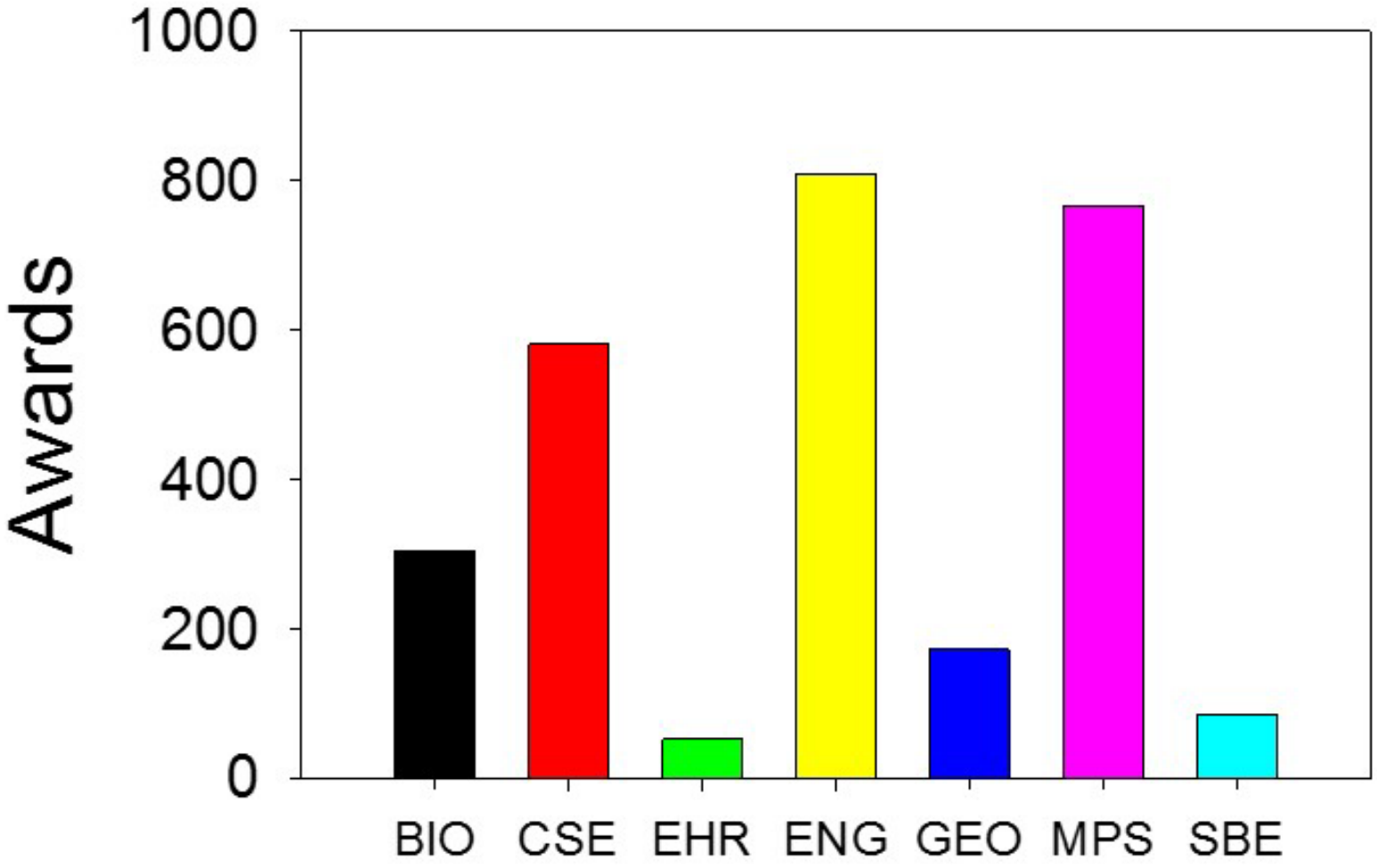
Strikes a balance between doable research activities and more risky pursuits

PECASE:

Presidential Early Career Awards for Science and Engineering

April 18, 2014

CAREER AWARDS BY DIRECTORATE
2011 to 2016



CAREER Awards Resources
www.nsf.gov/CAREER

Program Solicitation - Dec. 2016
Frequently Asked Questions - Dec. 2016
CAREER Directorate/Division Contacts
Links to recent CAREER and PECASE awards

Questions?

Lunch Program

LESSONS LEARNED FROM SUCCESSFUL PRINCIPAL INVESTIGATORS

Habib Joseph Daghler, Exec Dir, Advanced Structures and Composites Center

David Hart, Professor, Director/Professor, Mitchell Center for Sustainability Solutions

Paul Andrew Mayewski, Director/Professor, Climate Change Institute

Lisa-Joy Zgorski, Office of Legislative and Public Affairs, NSF (moderator)

Crosscutting & NSF-wide Opportunities

www.nsf.gov/career

What Is meant by crosscutting?

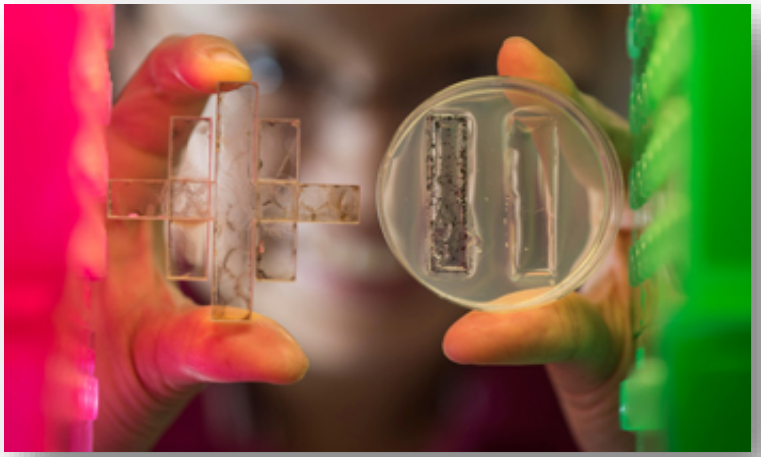
Sponsored by >1 NSF unit….

Cuts across NSF in different ways...

Collaborative with other
U.S. government agencies…

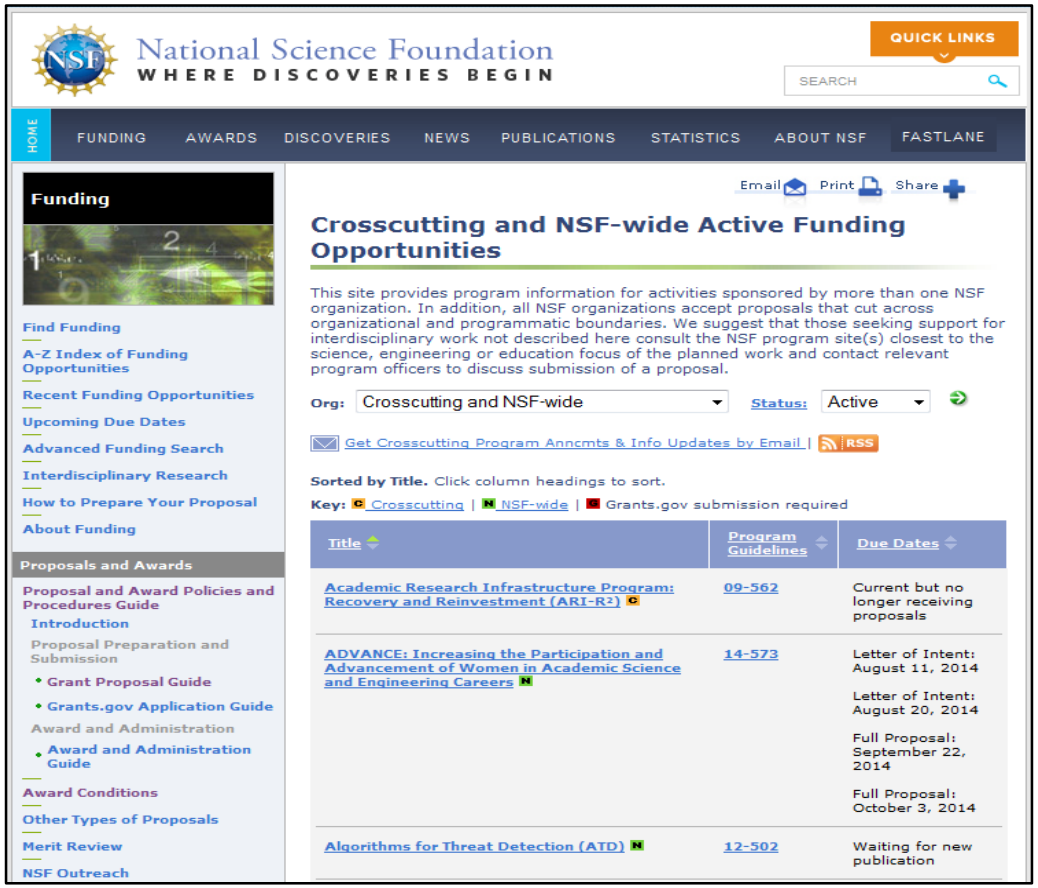
Types of Crosscutting Activities

- 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: www.nsf.gov/funding/pgm.list.jsp?type=xcut



RAPID/ EAGER

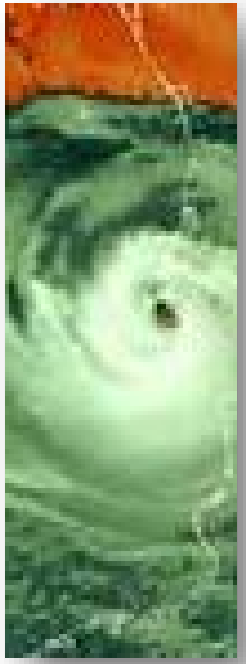
Grants for Rapid Response Research (RAPID)

Severe Urgency

Up to $200K/one year

Brief project description

Internal review



EArly-concept Grants for Exploratory Research (EAGER)

Potentially transformative

Up to $300K/one year

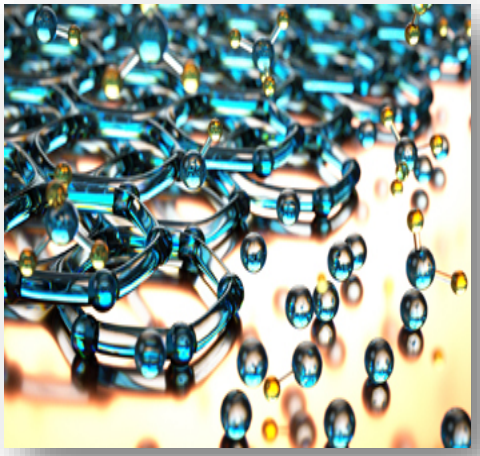
“High risk-high payoff"

Internal review

Rare but occasional external review

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.

http://www.nsf.gov/pubs/2012/nsf12513/nsf12513.htm

ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers – NSF-15-594

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

PARTNERSHIPS

Letter of Intent – Dec. 14, 2016

Full proposal – Jan. 11, 2017

ADAPTION

Letter of Intent – Aug. 9, 2017

Full proposal – Sept. 13, 2017

RESOURCE and COORDINATION NETWORK

Target date – March 15, 2017

INSTITUTIONAL TRANSFORMATION

Prelim Proposals – April 12, 2017

Full Proposals – Jan. 17, 2018

INCLUDES

(Inclusion across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science)

NSF 16-544

Foundational pillar to:

- Foster community & stakeholder engagement
- Spur a national conversation to identify “bold visions” for broadening participation

Design and Development Launch Pilots:

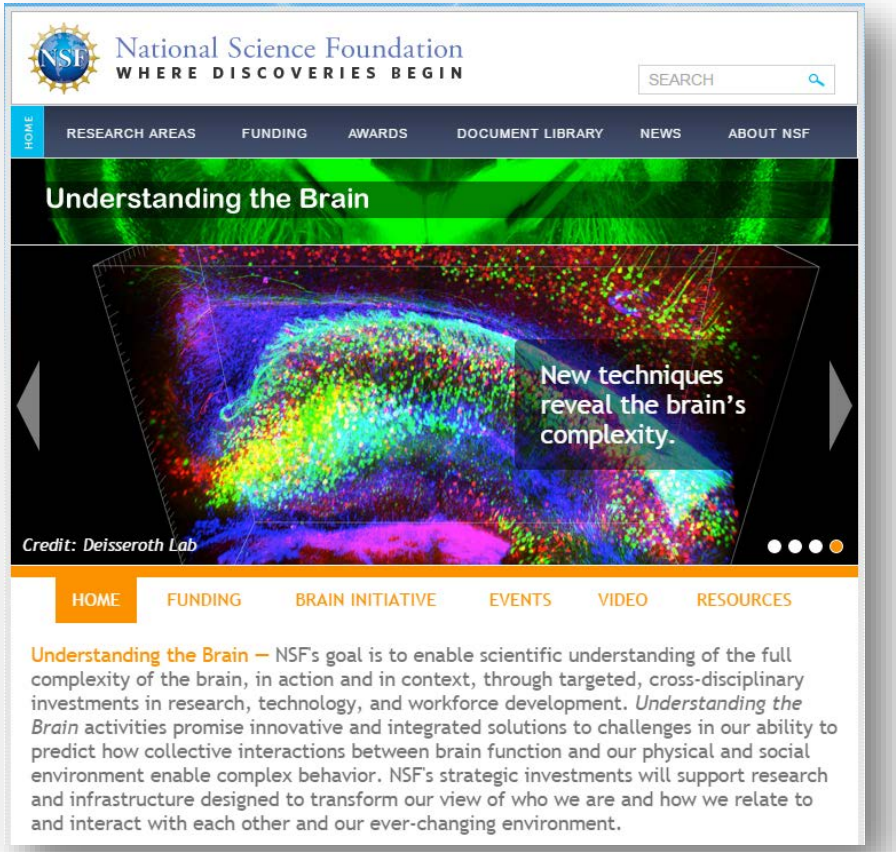
Preliminary proposals – April 15, 2016

Full proposals – June 24, 2016

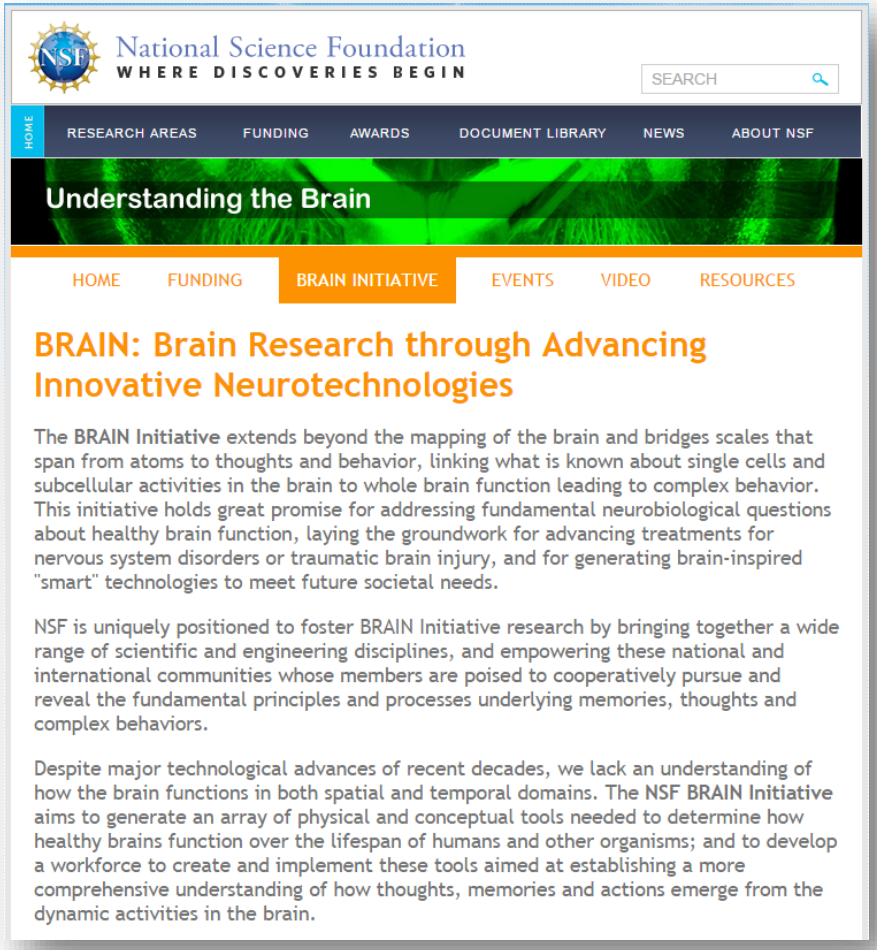
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505289

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

Quantitive theory and modeling of brain function

Brain-Inspired concepts and designs

BRAIN Workforce Development

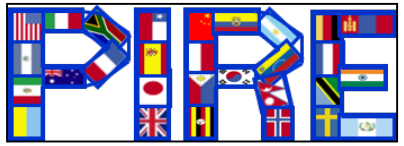
International - A Crosscutting Portfolio

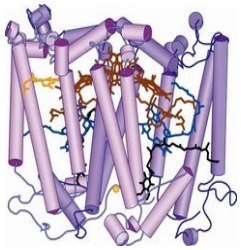
International activities at NSF

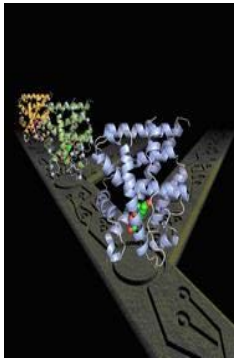
- Span all NSF Directorates and Offices
- Globalize NSF research and education
- Strengthen partnerships with international funding agencies
- Cooperate with other U.S. government agencies, private foundations

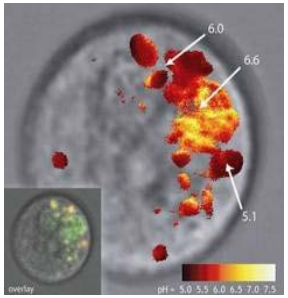
Examples of Support for International Activities

- Partnerships for International Research and Education (PIRE)
- Partnerships for Enhanced Engagement in Research (PEER) – with USAID
- International Research Experiences for Students (IRES)
- East Asia Pacific Summer Institutes for Graduate Students (EAPSI)
- (International) Postdoctoral Research Fellowship Program
- Science Across Virtual Institutes (SAVI)
- Graduate Research Opportunities Worldwide (GROW)

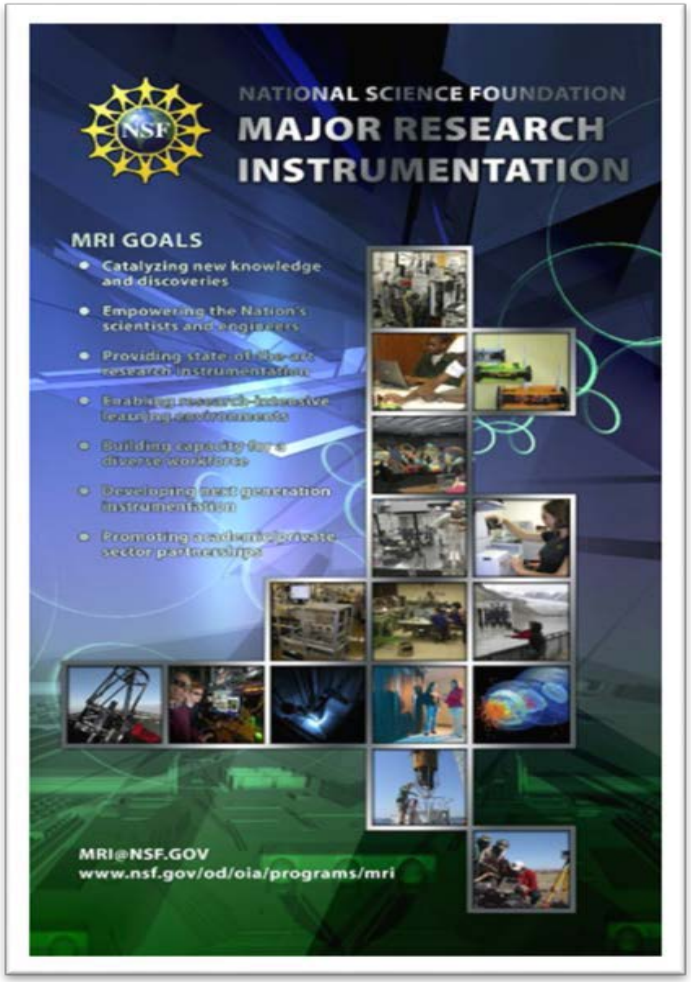








Major Research Instrumentation (MRI)

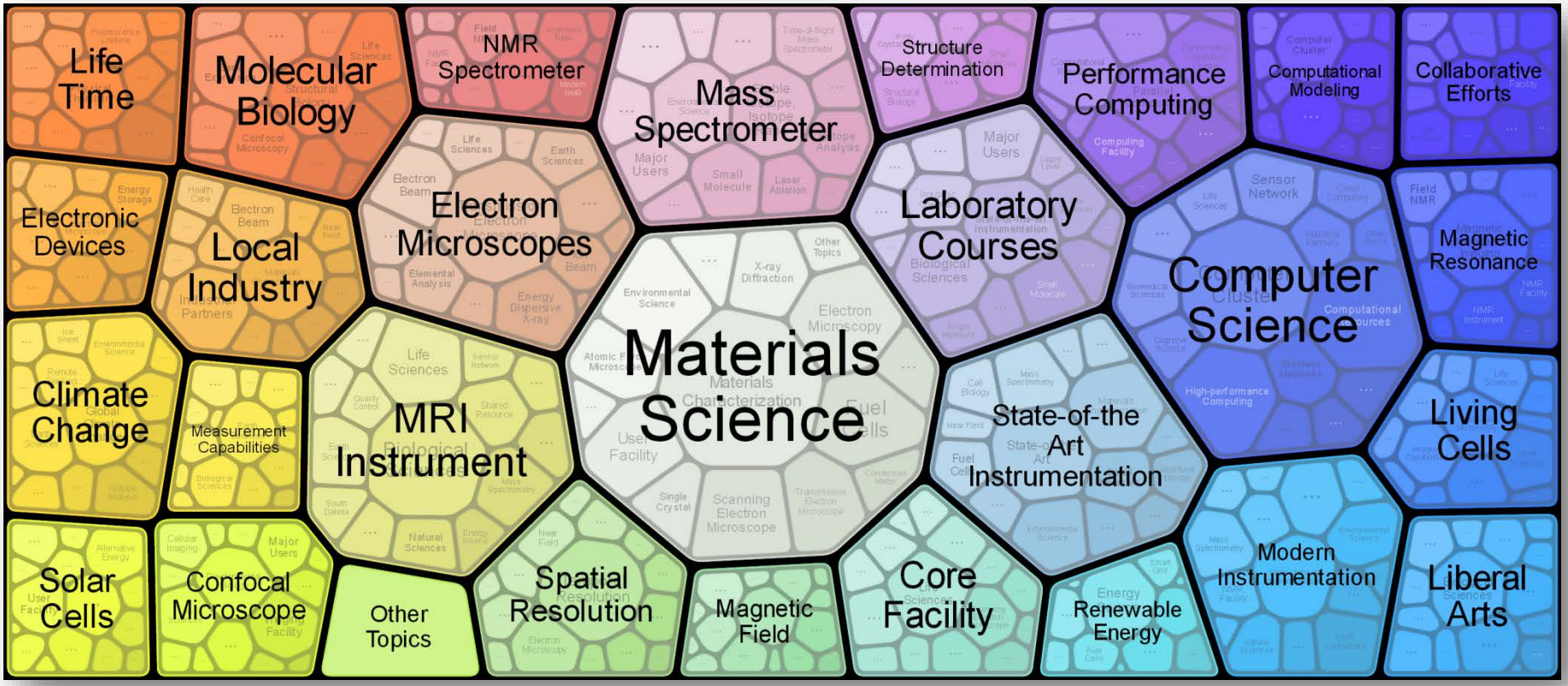


Goals:

- 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

Major Research Instrumentation (MRI)

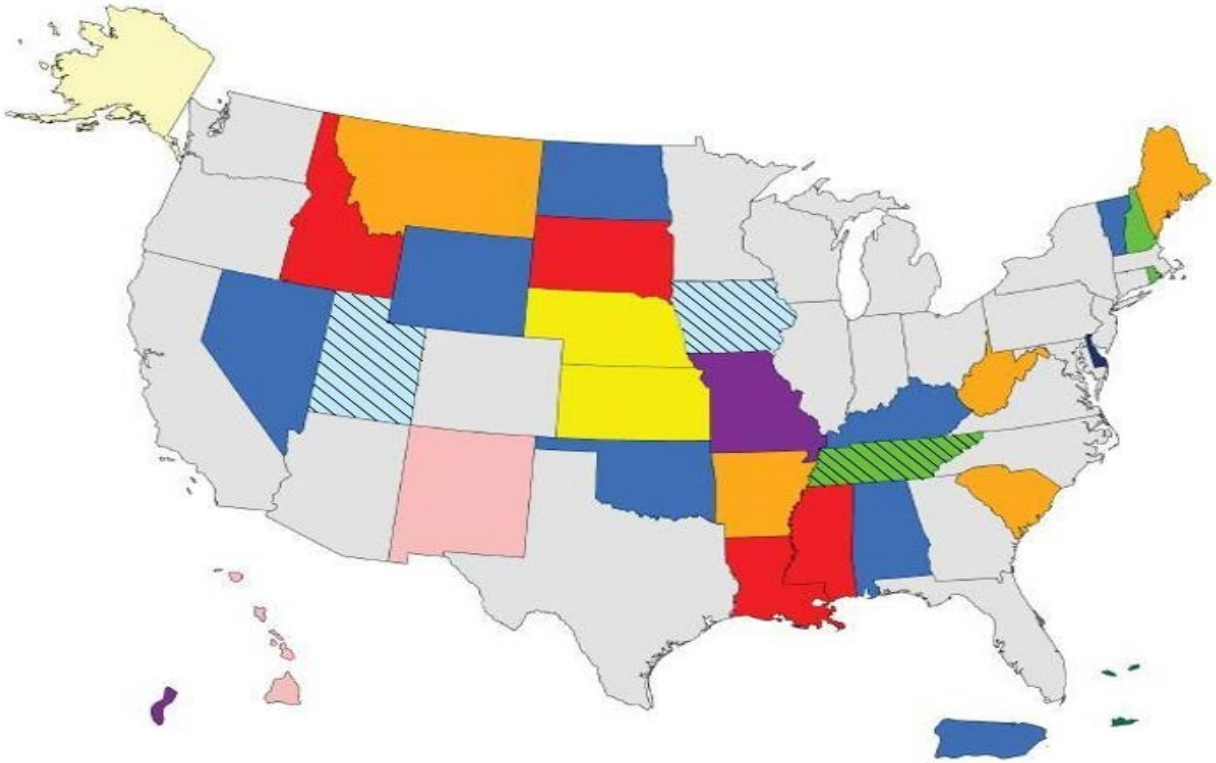
Thematic Areas:



OIA manages the program in coordination with other NSF directorates and offices

Program Contact: Randy Phelps, rphelps@nsf.gov; 703-292-8040

NSF EPSCoR Jurisdictions



1980
Arkansas
Maine
Montana
South Carolina
West Virginia

1985
Alabama
Kentucky
Nevada
North Dakota
Oklahoma
Puerto Rico
Vermont
Wyoming

1987
Idaho
Louisiana
Mississippi
South Dakota

1992
Kansas
Nebraska

2000
Alaska

2001
Hawaii
New Mexico

2002
U.S. Virgin Islands

2003
Delaware

2004
New Hampshire
Rhode Island
Tennessee

2009
Iowa
Utah

2012
Guam
Missouri

Note: IA, TN, and UT (shown shaded in the map) are no longer EPSCoR- eligible

EPSCoR Investment Strategies

- **Research Infrastructure Improvement (RII)** (79% of EPSCoR budget)

  Support physical, human, and cyber infrastructure within academic institutions across the state

  - ***RII Track-1:*** *State-based capacity building, multi- discip & inst*
  - RII Track-2: Focused EPSCoR Collaborations, more than 1 state
  - RII Track-3: Building Diverse Communities *i.e.*, Broadening Participation in STEM fields
- **Co-Funding with NSF Directorates and Offices** (20%)
- **Outreach and Workshops** (1% of EPSCoR budget)

EPSCoR funding, ~ $160 Million total, represents ~2.7% of NSF's overall research support

Graduate Research Fellowship Program

Goals:

- Select, recognize, and financially support early in their careers individuals with the demonstrated potential to be high achieving scientists and engineers

- Broaden participation in science and engineering of underrepresented groups, including women, minorities, persons with disabilities, and veterans

5 Year Award = $138,000

$34,000/year for 3 years +

+

$12,000 Educational allowance to institution

Professional Development Opportunities:
GROW: International Research
GRIP: Internships

Supercomputer access: XSEDE

Career Life Balance (family leave)

RESOURCES:

Solicitation and links
www.nsf.gov/grfp

NSF GRFP FastLane Website
www.fastlane.nsf.gov/grfp

Application, guides, announcements
GRFP Website, www.nsfgrfp.org

Current & former Fellows
866-NSF-GRFP, info@nsfgrfp.org

NSF Research Traineeship (NRT) Program

Encouraging the development and implementation of bold, new, and potentially transformative models for STEM graduate training

Traineeship Track

$3,000,000 for up to 5 years

(New priority areas for 2017: INFEWS, UtB, Other)

Innovations in Graduate Education (IGE) Track

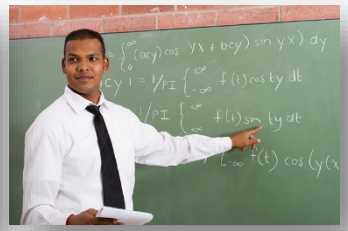
$300,000 - $500,000 for 2-3 years

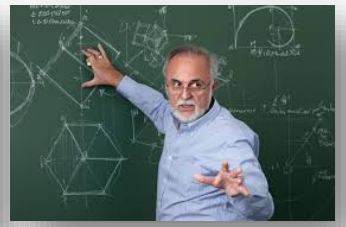
NRT Program

APPLICATION DUE DATES:

Required Letter of Intent Deadline:
December 9, 2016 For both tracks

Full Proposal Deadline Date:
February 7, 2017 For both tracks

Graduate Research Internship Program

GRIP
NSF Graduate Research Internship Program

Expands opportunities for NSF Graduate Fellows

Open only to NSF GRFP recipients

Internship allowance of up to $5,000 for travel and research costs.

Partner agencies include: Census, DHS, EPA, FBI, NOAA, ONR, SI, and USGS. Other being added.

Details in Dear Colleague Letter 16-015 and via agencies.

See: http://www.nsf.gov/grip – Supplement deadline: Dec 4, 2017

Graduate Research Opportunities Worldwide

Provides international research experiences to NSF GRFP recipients through partnerships with counterpart agencies around the world.

Open only to NSF GRFP recipients

$5,000 NSF travel allowance plus in-country support provided by partner

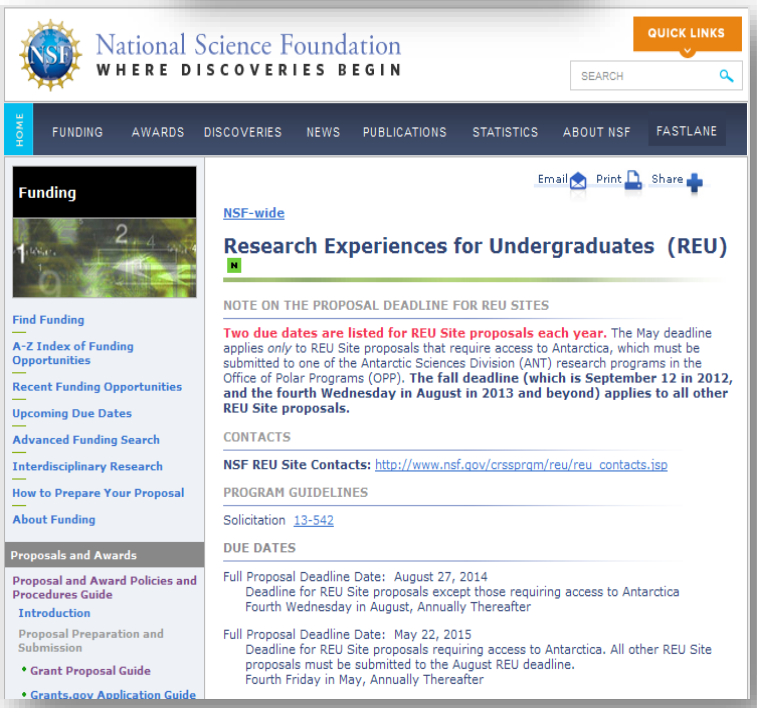
Source: www.maps.google.com

Country partners: Australia, Austria, Brazil, Chile, Denmark, Finland, France, India, Ireland, Japan, Korea, Mexico, Netherlands, Norway, Singapore, Sweden, and Switzerland. Others being added.

Please see application details in the Dear Colleague Letter 16-012.

See http://www.nsf.gov/grow – Submission window: Sept. 11 – Dec. 4

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

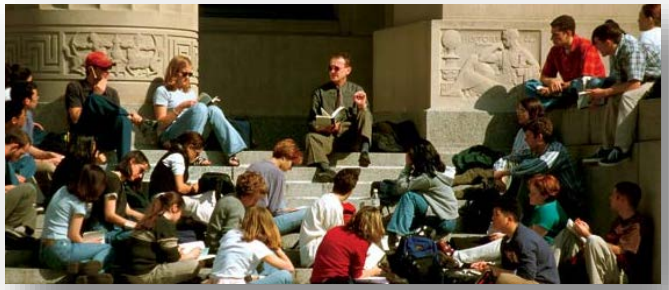
Support for Undergraduates RUI, ROA for PUIs

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.

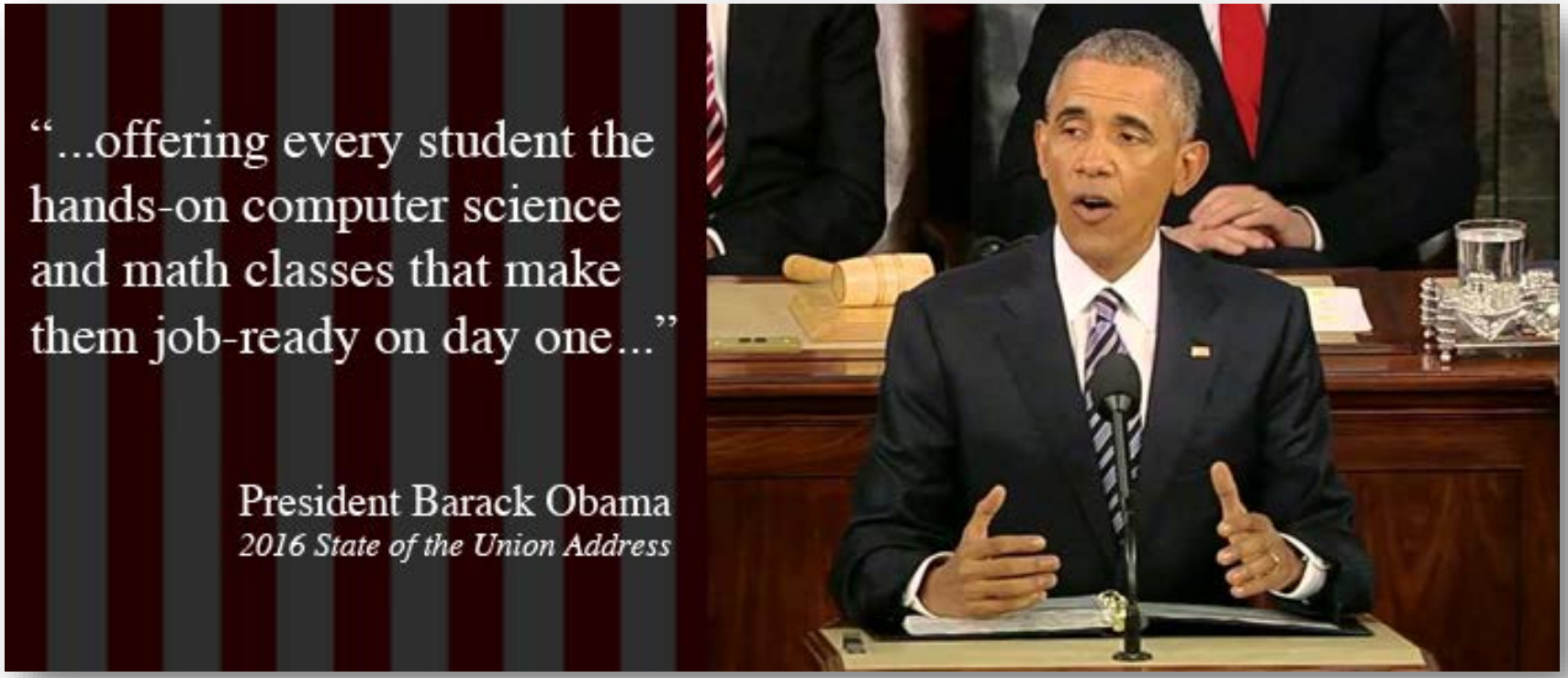
ALL NSF directorates evaluate and fund RUIs and ROAs

They are funded within R & E program allocations



Directorate contacts found at : http://www.nsf.gov/crsspgrm/rui_roa/contacts.jsp

Computer Science FOR ALL



CS-FOR ALL

- [x] Focus = ensuring **ALL** students have access to learning Computer Science

- [x] **Significant proposed funding** =
$4b to empower states
$100m for school districts
to train teachers, expand access, build partnerships

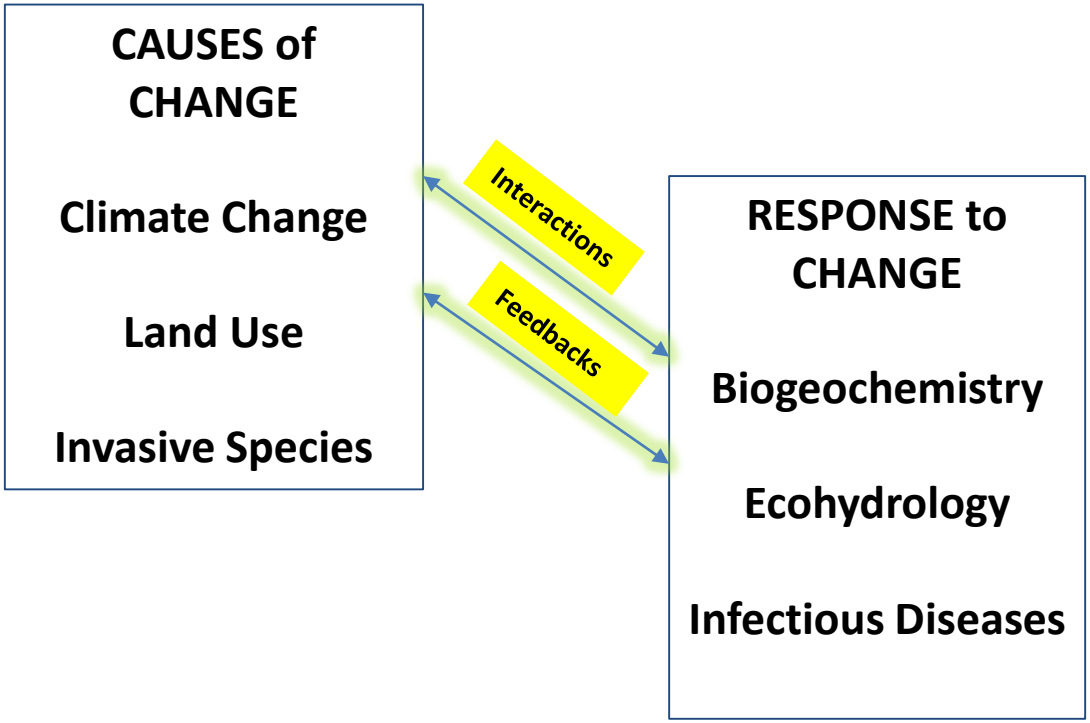
- [x] **Multiple Partners**: governors, mayors, education leaders, CEOs, philanthropists, creative media, technology e.g. Governors for CS, Code.org, NMSI (National Math and Science Initiative) Cartoon Network, Google, Teach for America, Microsoft, the Infosys Foundation USA, Computer Science Education Coalition.

CS-FOR ALL

$135 m available over 5 years to **build on NSF's research** developing instructional materials, assessments, in-service and pre-service models of teacher professional development, and approaches to ongoing support of classroom teachers.

- 2 new high school courses, currently taught in over 2,000 schools:
  Exploring Computer Science AP CS Principles
- Professional development to support high school teachers in CS instruction
- Research to integrate CS and computational thinking in K-8 STEM curriculum and instruction

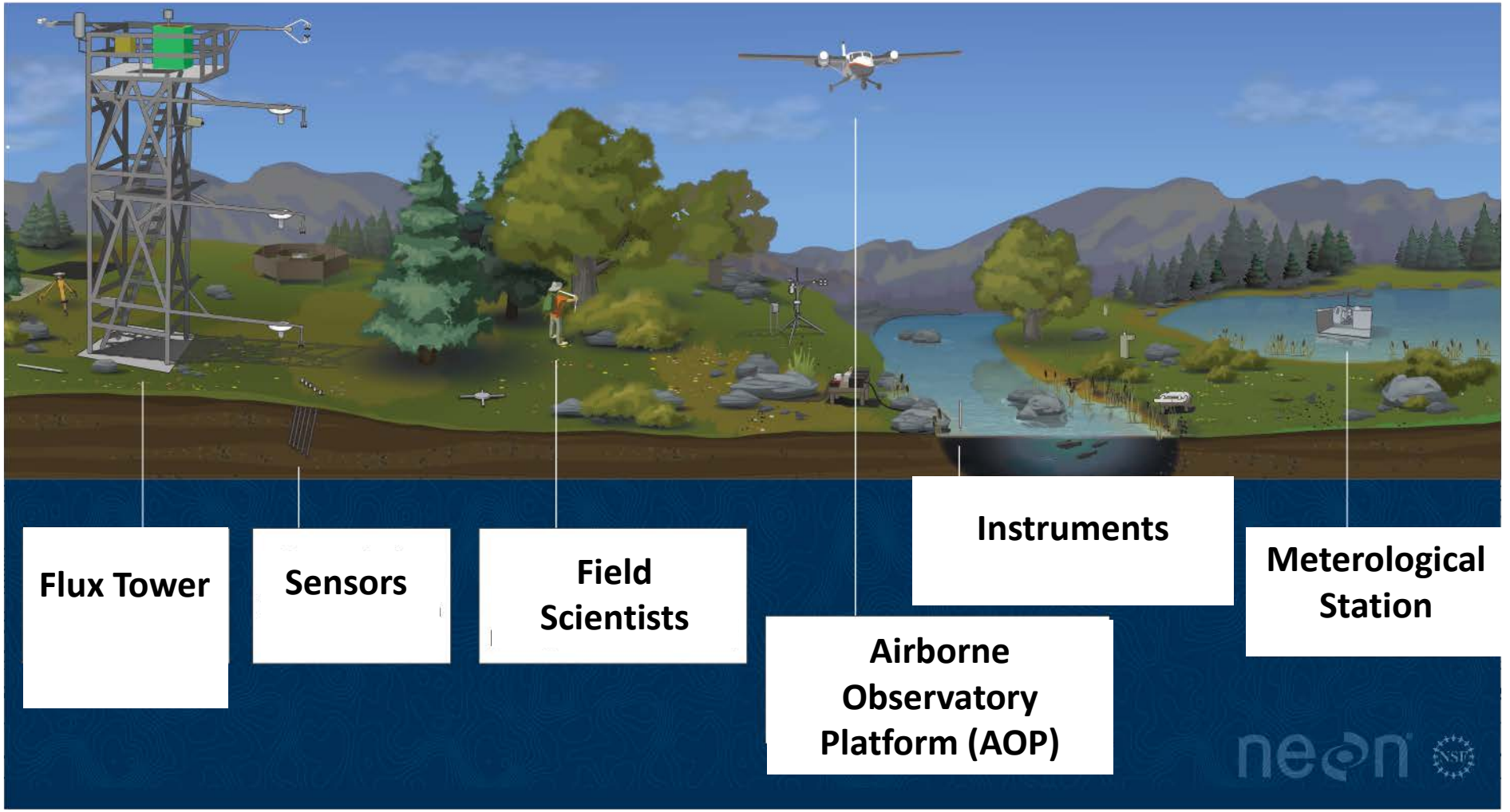
National Ecological Observatory Network



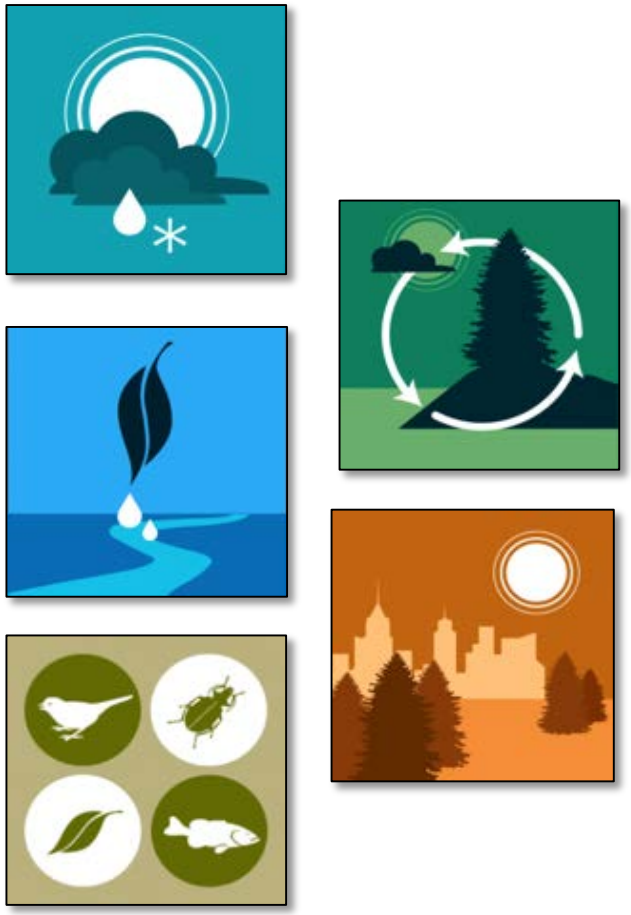
NEON is charged to *enable understanding* and *forecasting* of the *impacts* of ***climate change, land use change*** and ***invasive species*** on *continental-scale* ***ecology***

.

Collection methods at NEON field sites



National Ecological Observatory Network (NEON)



Data Themes

ATMOSPHERE

BIOGEOCHEMISTRY

ECOHYDROLOGY

LAND COVER and PROCESSES

ORGANISMS, POPULATIONS, and COMMUNITIES

http://www.neonscience.org/

http://data.neonscience.org/home

Discovering the Rules of Life: A Big Idea
NSF Ideas for Future Investment

NSF's Office of the Director, Dr. France Córdova

RESEARCH IDEAS

- Harnessing Data for 21st Century Science and Engineering
- Shaping the New Human – Technology Frontier
- Understanding the Rules of Life: Predicting Phenotype
- The Quantum Leap: Leading the Next Quantum Revolution
- Navigating the New Arctic
- Windows on the Universe: The Era of Multi-messenger Astrophysics

PROCESS IDEAS

- Growing Convergent Research at NSF
- Mid-scale Research Infrastructure
- NSF 2050

A Vision for BIO: Understanding the Rules of Life

Complexity from basic rules

“endless forms most beautiful”

www.mylespaul.com

"Barnsley fern plotted with VisSim" by DSP-user - Own work, using model written by Mike BorrelloThis chart was created with VisSim. Licensed under CC BY-SA 3.0 via Commons - https://commons.wikimedia.org/wiki/File:Barnsley_fern_plotted_with_VisSim.PNG#/media/File:Barnsley_fern_plotted_with_VisSim.PNG

Discovering the Rules of Life

The Landscape

A Universal Approach

Observation

Experimentation

Modeling & Theory

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

- 3% of US electricity is used to pump, treat, & transport water
- 90% of the energy bill on some farms
- 40-50% of water withdrawals in the US are for thermoelectric power plant cooling
- 30-40% of water withdrawals in the US are for irrigating crops
- 10% of the US energy budget is associated with food production, processing, distribution, etc.

INFEWS

Significantly advance understanding via:

- Quantitative and computational modeling
- Cyberinfrastructure
- Real-time, cyber-enabled interfaces for increased decision support capability

INFEWS

Solicitation, DCL and companion calls establish CONTEXT:

- INFEWS context for research across NSF
- Focus for interaction with sister agencies [USDA, NIFA, NOAA]

Central solicitation will provide a FOCUS for new research:

- creative interdisciplinary research
- *fuzzy* track boundaries focus research on major challenges, but also represent opportunities
- strong connection with core programs

Future… CONTINUITY . . . interdisciplinary thinking
build new breed of scientists and interact with core programs

Improving Undergraduate STEM Education "IUSE"

NSF 15-585

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

Deadlines (Both tracks):
Exploration/Design: **November 2, 2016**
Development/Implementation: **January 11, 2017**

Two Program Tracks

Engaged Student Learning

Two Approaches

Exploration & Design (smaller scale)
Up to $300K
Up to 3 yrs

Development & Implementation (larger scale)
Level I:
Up to $600K Up to 3 yrs
Level II:
$601K to $2M Up to 5 yrs

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

Institutional and Community Transformation

Two Approaches

Exploration & Design (smaller scale)
Up to $300K
Up to 3 yrs

Development & Implementation (larger scale)
Up to $3M
Up to 5 yrs

Focus on approaches to increase the propagation of highly effective* methods *of STEM teaching and learning

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*

Building a National Innovation Network

I-Corps Model

- Eligible NSF PIs with ideas !
- I-Corps Team: A student entrepreneurial lead and a business mentor
- I-Corps Curriculum: Online instruction and on-site activities at an I-Corps node
- I-Corps Regional Nodes: Groups of institutions dedicated to advance entrepreneurial research and training

I-Corps Stats

- 700+ completed I-Corps Projects in 4 years
- More than 50% created start-up companies
- I-Corps trained teams are more successful

I-Corps Resources

I-Corps Solicitations

I-Corps Nodes: NSF 16-539

http://www.nsf.gov/pubs/2016/nsf16539/nsf16539.htm

Sites: NSF 16-547

http://www.nsf.gov/pubs/2016/nsf16547/nsf16547.htm

Teams: NSF 12-602

http://www.nsf.gov/pubs/2012/nsf12602/nsf12602.htm

NSF I-Corps Home Page

http://www.nsf.gov/news/special_reports/i-corps/index.jsp

About I-Corps

http://www.nsf.gov/news/special_reports/i-corps/about.jsp

The I-Corps Components

http://www.nsf.gov/news/special_reports/i-corps/components.jsp

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

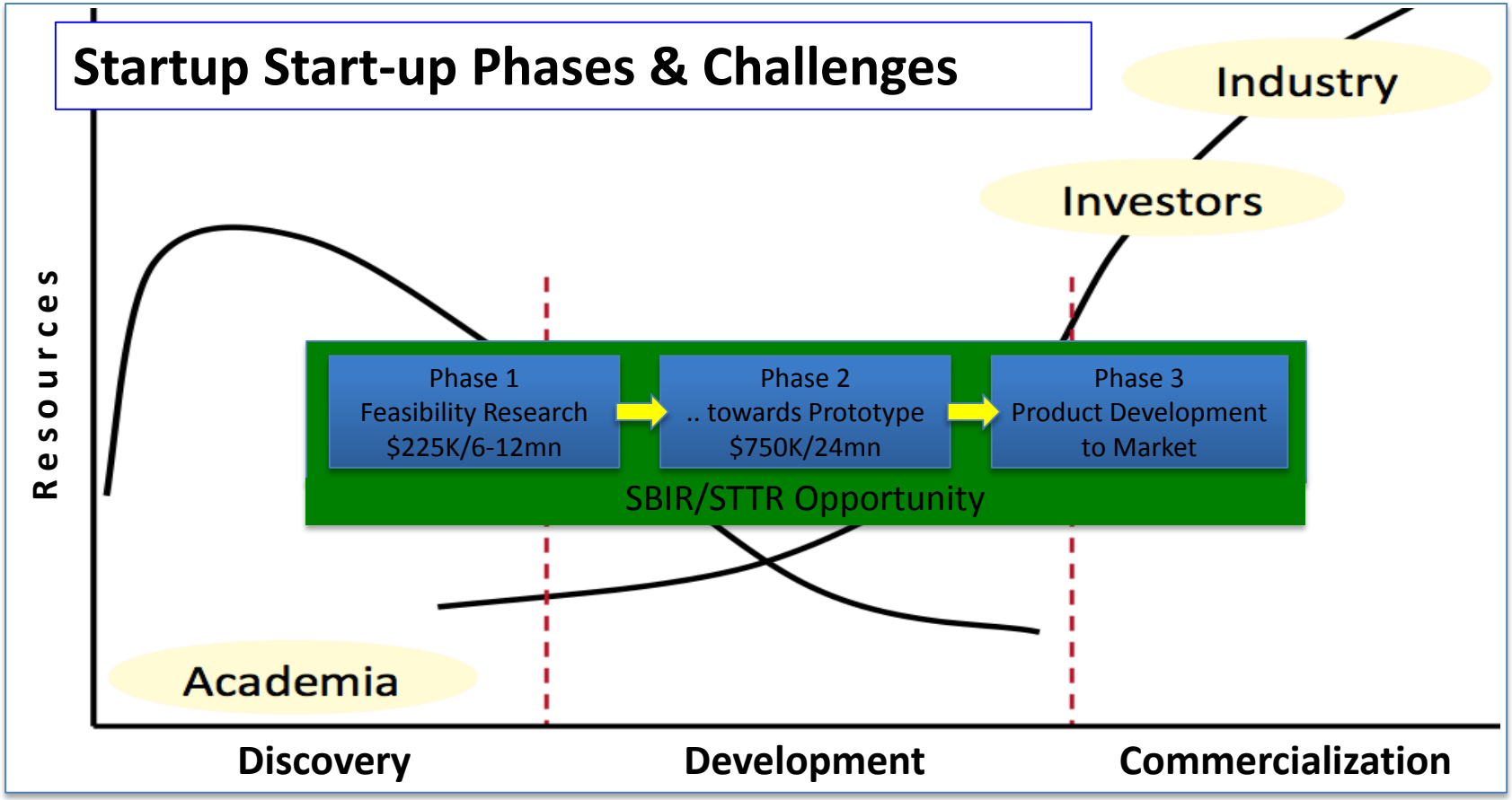
Facilitate cooperative R&D via STTR

- Grants, not contracts – *equity-free investment*
- Seed funding for start-up and early stage technology ventures
- NSF funding *reduces risks* for other investors

New SBIR and STTR solicitations opened in March 2016, www.nsf.gov/eng/iip/sbir/

SBIR • STTR
America's Seed Fund

NSF SBIR/STTR Program



NSF SBIR/STTR Program

What NSF Will and Will Not Fund in the 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
  - 80% of the companies no prior

Phase II award

WHAT IS NOT FUNDED

- X Basic research
- X Incremental/evolutionary improvements
- X Little chance of commercial success
- X Sales and marketing, customer/market discovery

Questions?

Directorate Breakout Sessions

www.nsf.gov/career