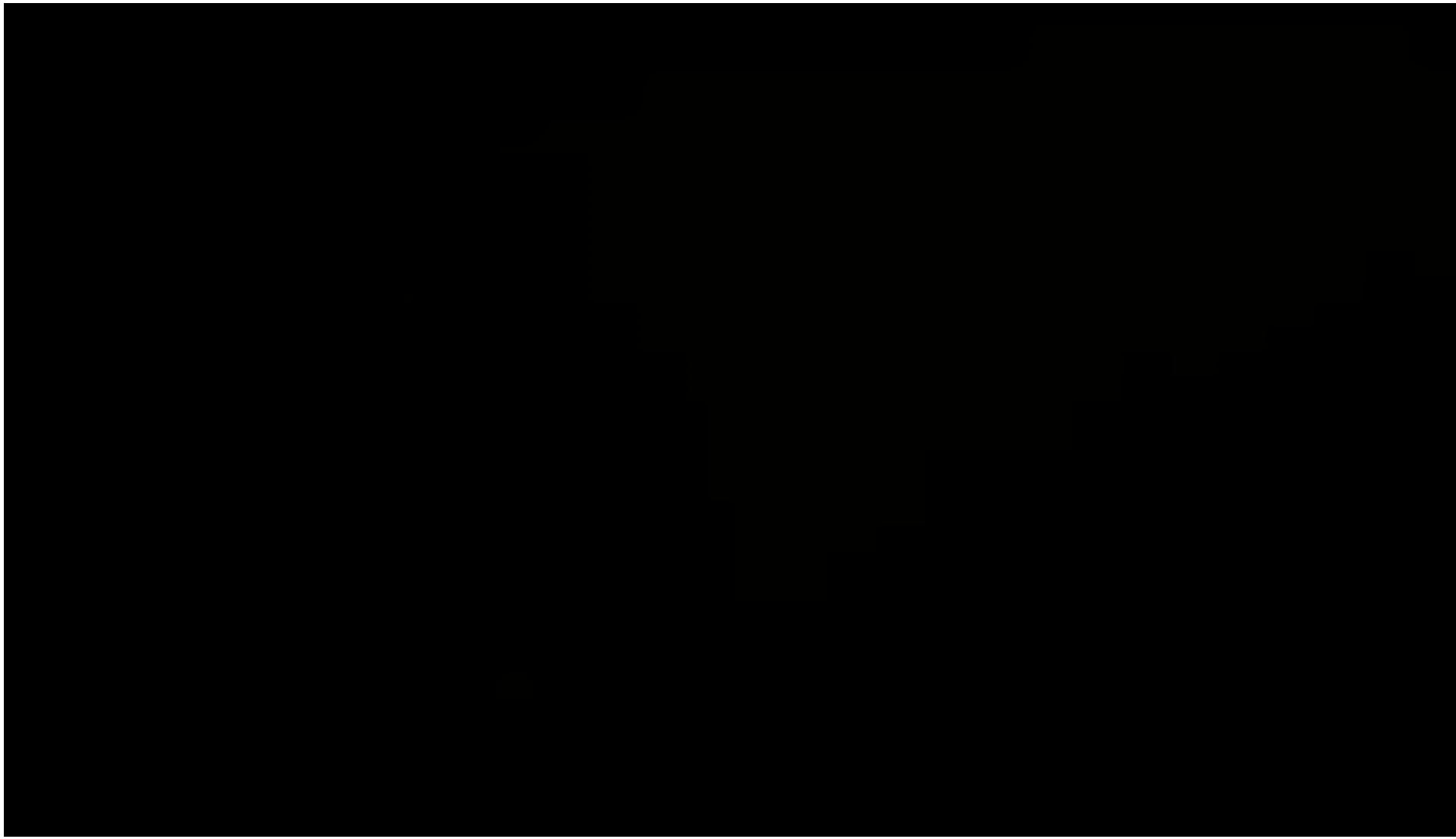
JOURNEY OF DISCOVERY



Welcome to NSF Day!

Wednesday, August 29, 2018

THE UNIVERSITY OF NEW MEXICO

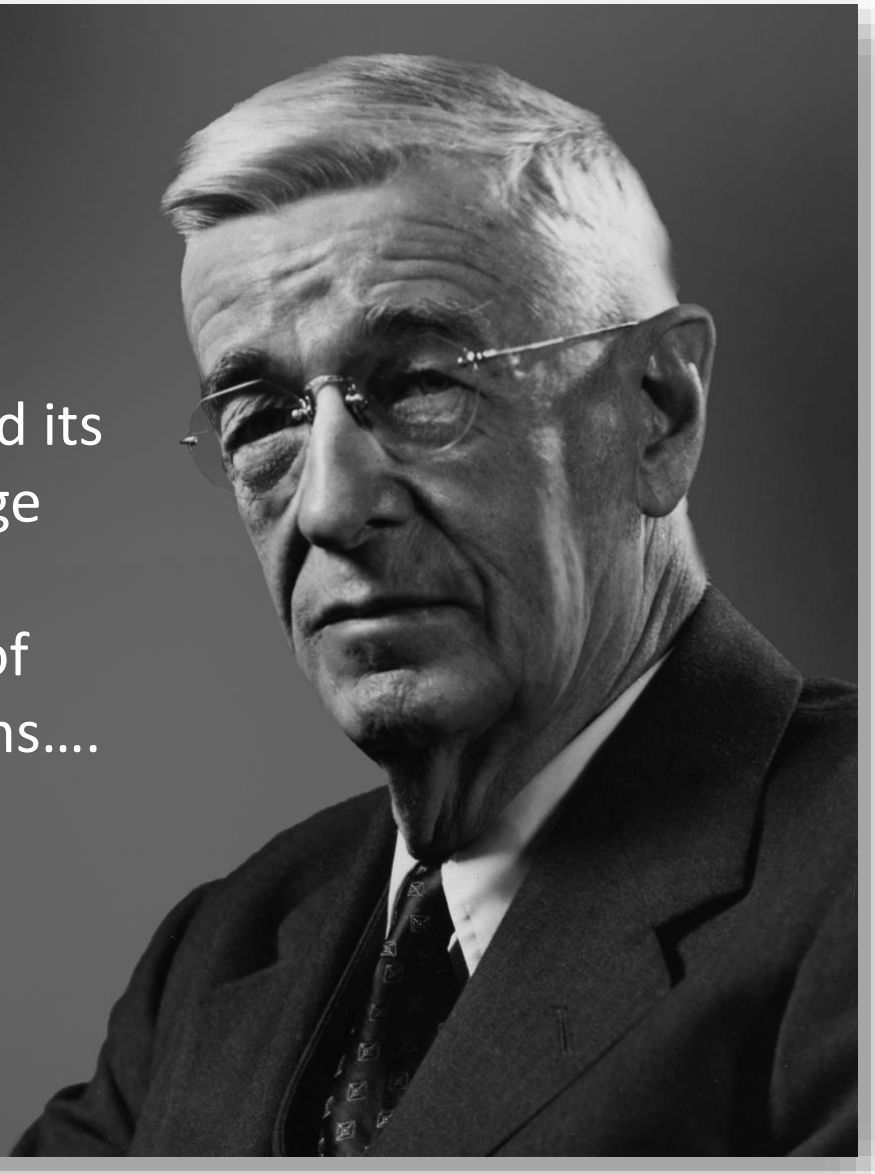
New Mexico EPSCoR

NSF Mission

Photo Credit: Maria Barnes, NSF

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



What Makes NSF Unique

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

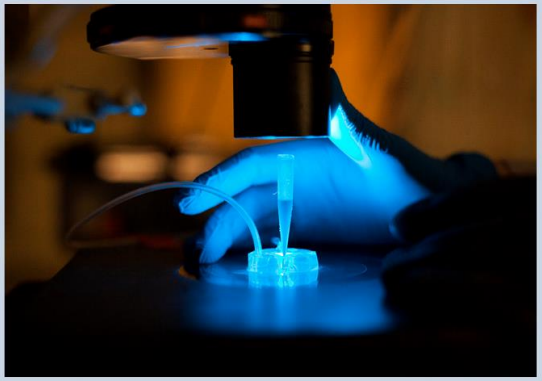
Drives U.S. economy

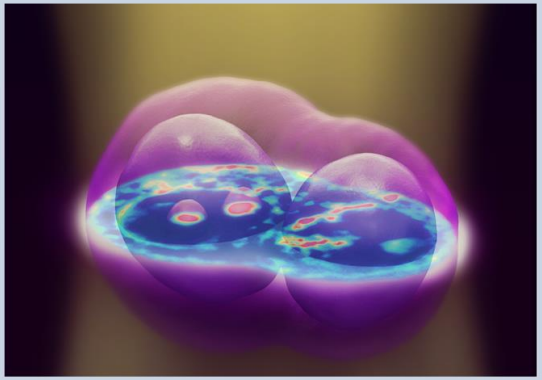
Enhances American security

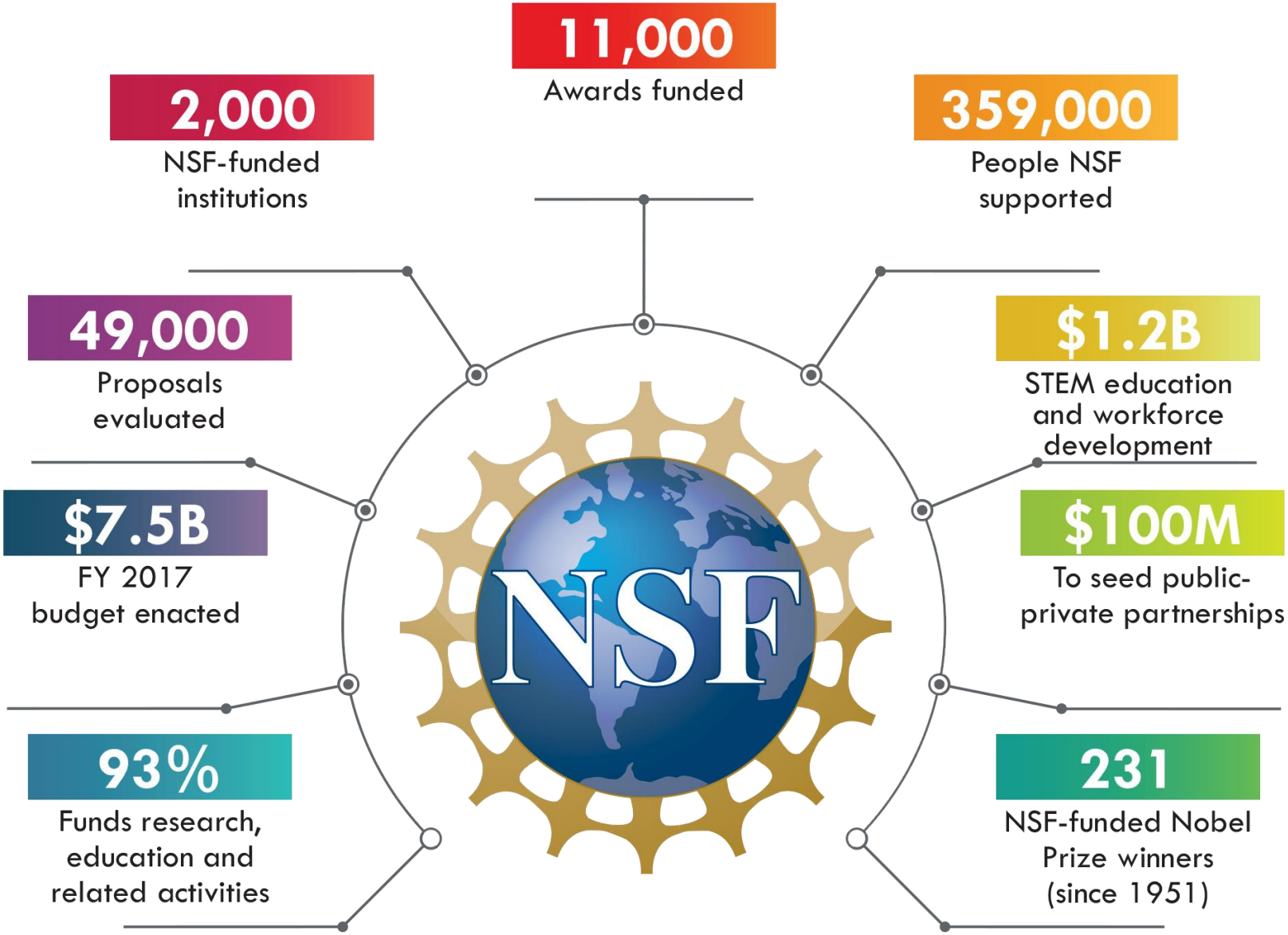
Advances knowledge

to sustain U.S. global leadership.

Distributes 93% of its budget through the merit review process







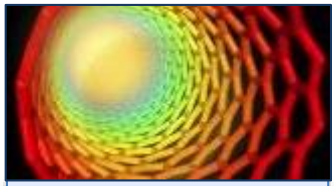
Numbers shown are based on fiscal year 2017 activities.

NSF Funds All Fields of S&E

Biological Sciences

Computer & Information Science & Engineering

Education & Human Resources



Engineering

Geosciences (including Polar Programs)

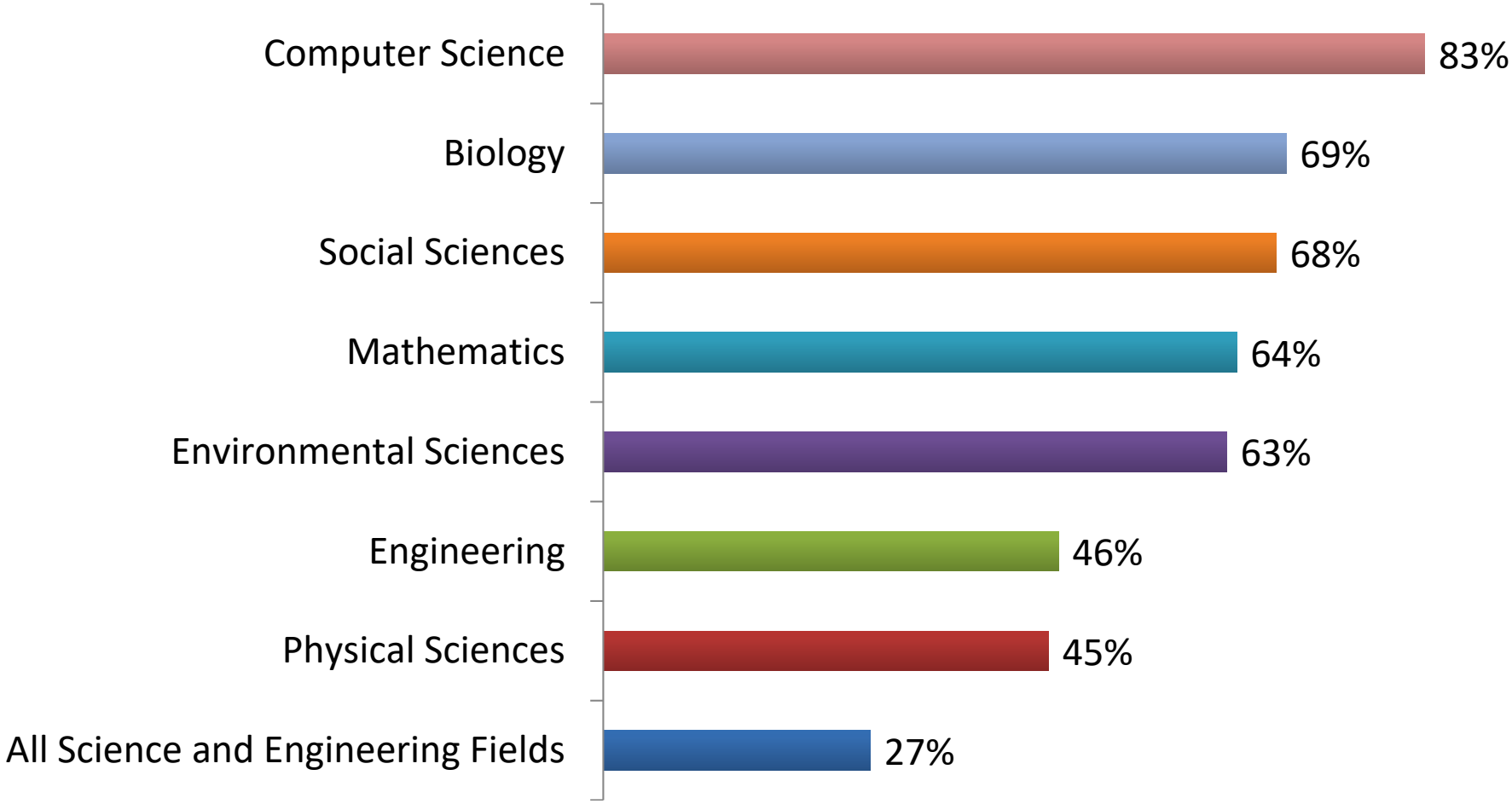
Integrative Activities

International Science and Engineering

Social, Behavioral & Economic Sciences

Mathematical & Physical Sciences

NSF Support of Academic Basic Research in Selected Fields (as a percentage of total federal support)



Continued Investment in NSF Research Infrastructure


Daniel K. Inouye Solar Telescope


LSST

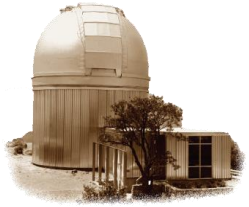

RCRV


LIGO


CYBERINFRASTRUCTURE


VLA

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

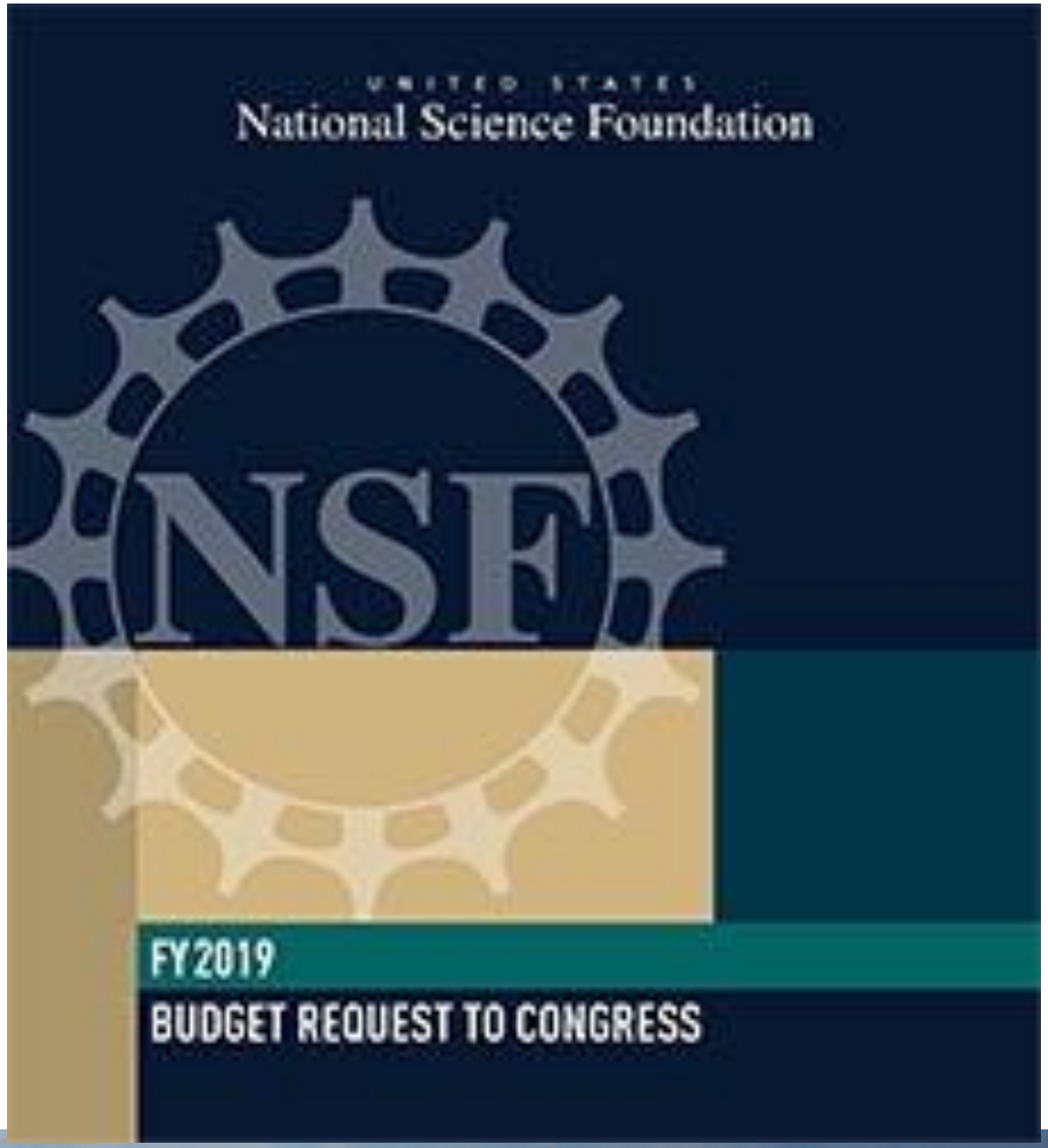
NSF Budget FY 2017 and FY 2018

(Dollars in Millions)

NSF by Account	FY 2017 Actual	FY 2018 Enacted
Research & Related Activities	$6,006.51	$6,334.48
Education & Human Resources	$873.37	$902.00
Major Research Equipment & Facilities Construction	$222.78	$182.80
Agency Operations & Award Management	$382.06	$328.51
National Science Board	$4.27	$4.37
Office of Inspector General	$15.10	$15.20
Total, NSF	**$7,504.10**	**$7,767.36**

Totals may not add due to rounding.

Came out before FY 2018 budget deal was worked out, which contains $300 million more this year. We'll see what happens for FY 2019.



FY2018 Enacted NSF Budget and FY 2019 Request

NSF by Account	FY 2018 Enacted	FY 2019 Request	FY 2019 Request change over FY 2018 Enacted Amount	Percent
Research & Related Activities	$6,334.48	$6,150.68	-$183.80	-2.9%
Education & Human Resources	$902.00	$873.37	-$28.63	-3.2%
Major Research Equipment & Facilities Construction	$182.80	$94.65	-$88.15	-48.2%
Agency Operations & Award Management	$328.51	$333.63	$5.12	1.6%
National Science Board	$4.37	$4.32	-$0.05	-1.1%
Office of Inspector General	$15.20	$15.35	$0.15	1.0%
Total, NSF	**$7,767.36**	**$7,472.00**	**-$295.36**	**-3.8%**

Totals may not add due to rounding.

Partnerships are Critical

Industry

States

International

Scientific Societies

Interagency

Foundations

National Labs

Academia

What Will Branding Do for NSF?

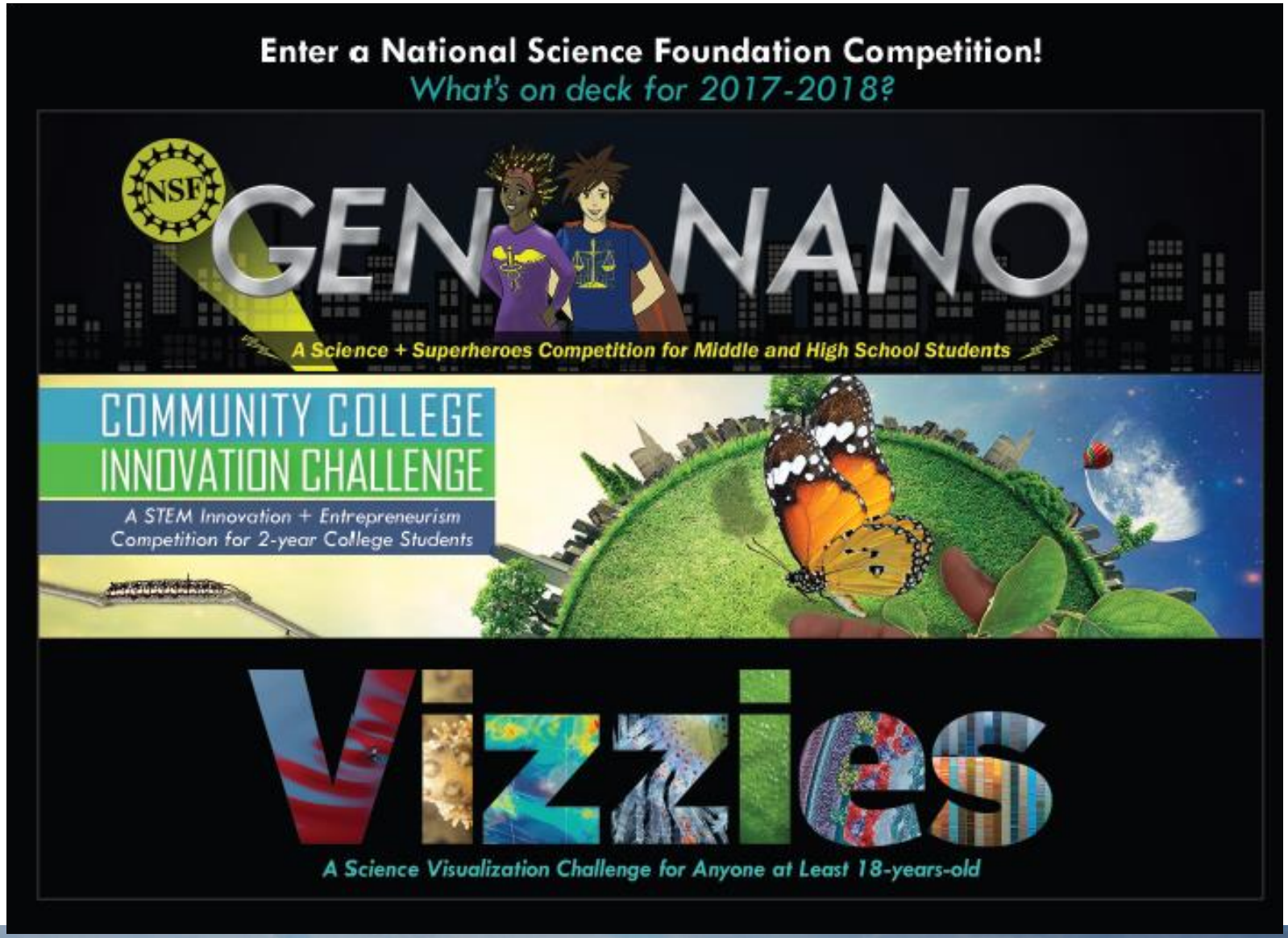
Look kids… NSF-funded science detects gravitational waves!

Outreach to the General Public

Monthly photo galleries show off NSF-funded science

High Profile Events

NSF's Challenges and Competitions



Robust Social Media

Facebook

+431K followers

Twitter

+1.08M followers

Instagram

+6,630 followers

YouTube

+8.5M views

Pinterest

+31K views

LinkedIn

+53K followers

Flickr

+607K views

Tumblr

+25K followers

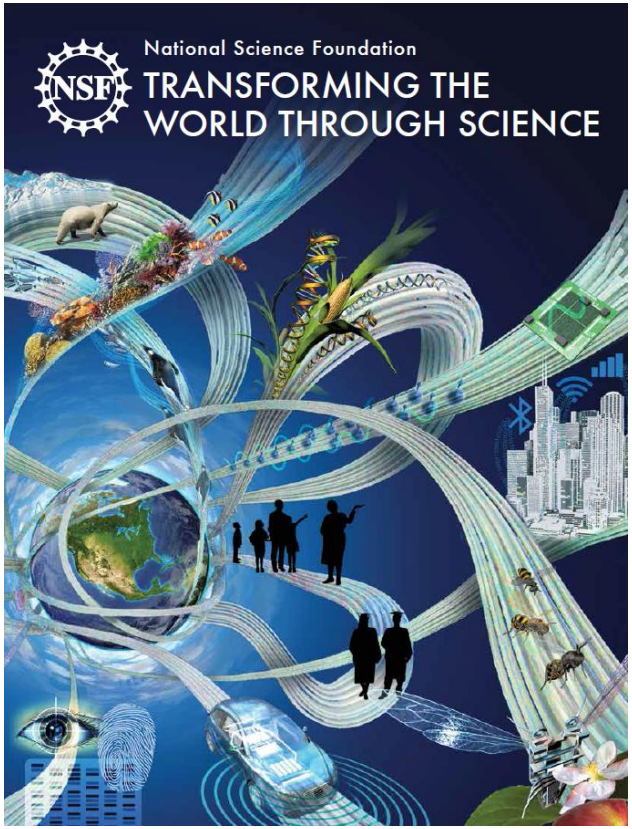
Medium

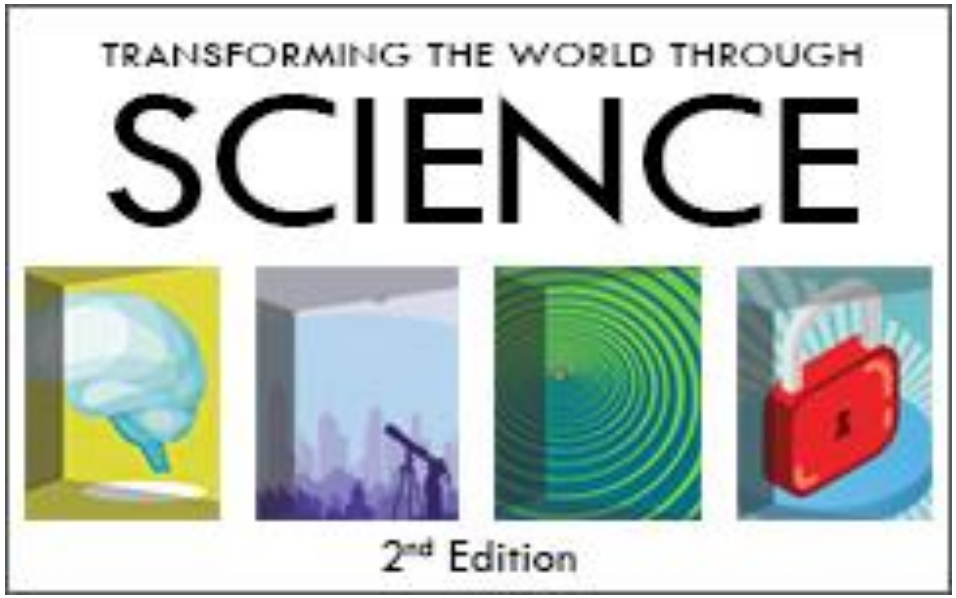
+29K views
+42K followers

Usage metrics since inception, current as of December 2017

www.nsf.gov/social

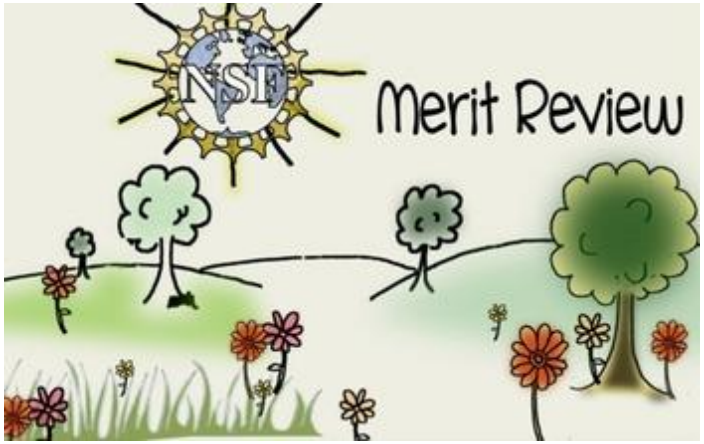
NSF Toolkit





https://nsf.gov/about/congress/toolkit.jsp

NSF Toolkit



https://nsf.gov/about/congress/toolkit.jsp

NSF's Organization

NSF Directorates and Offices
Biological Sciences (BIO)

Biological Sciences (BIO)

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

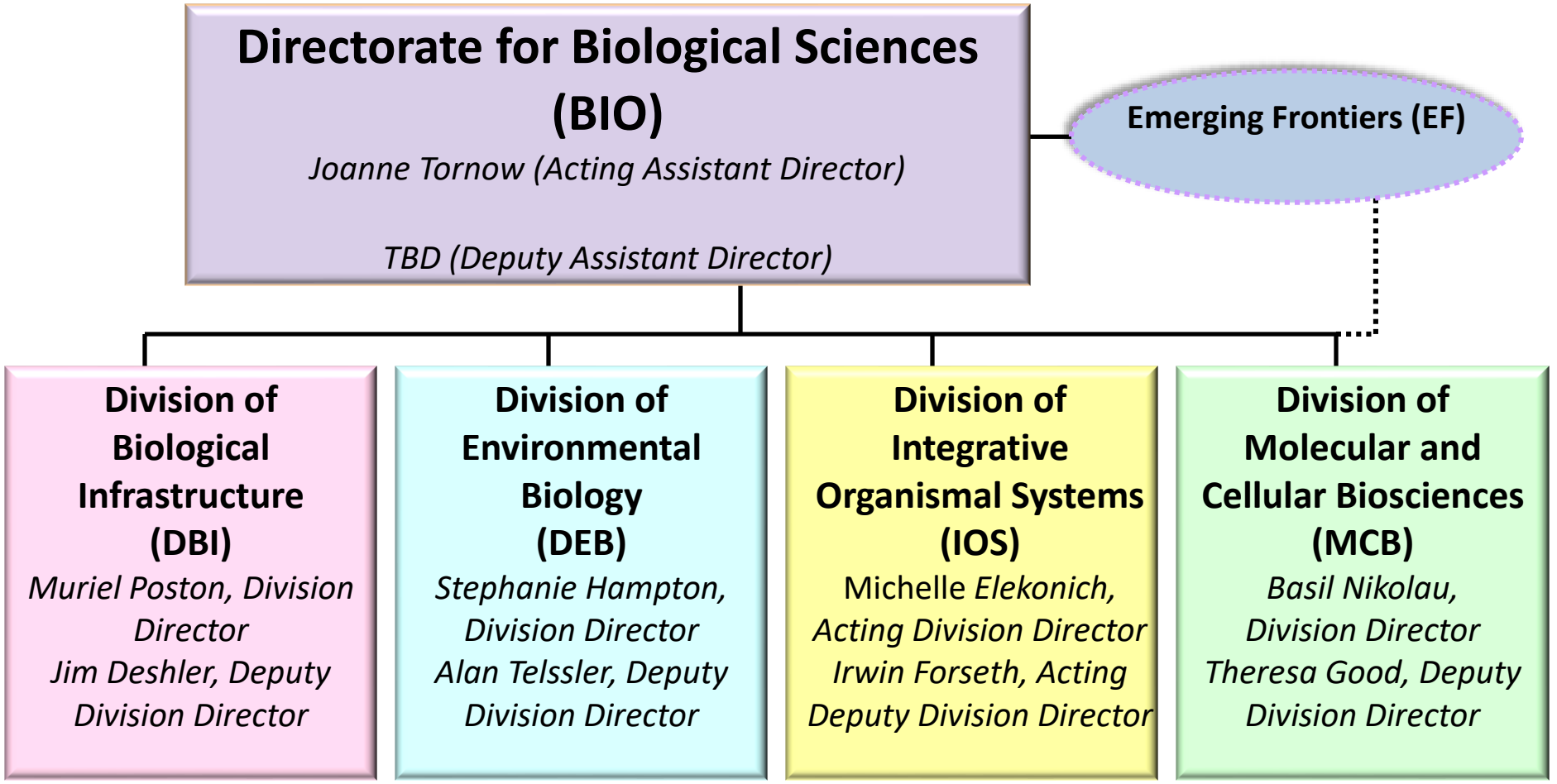
Program director for the Behavioral Systems Cluster

BIO representative for both the Graduate Research Fellowship Program and HBCU – Undergraduate Program - Excellence in Research

Behavioral endocrinologist and affiliate research faculty at New Mexico State University

Reads about Tudor Era England (specifically the reign of Queen Elizabeth I) obsessively

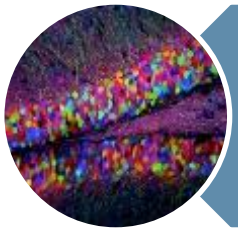
Biological Sciences (BIO)



Biological Sciences (BIO)

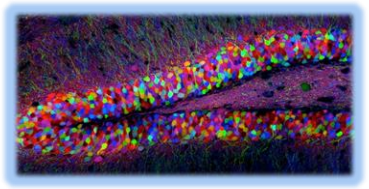
Understanding the Rules of Life

NEON / NEON Science

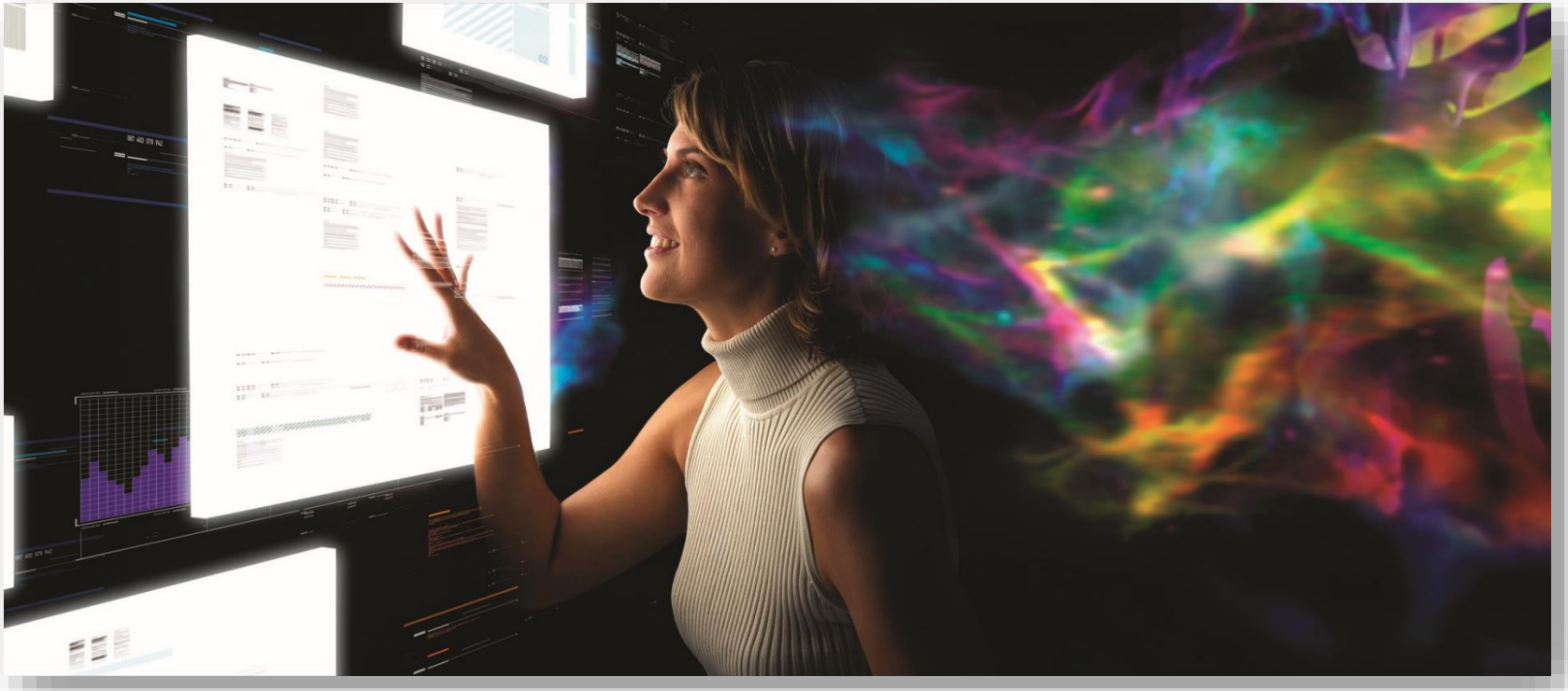


Understanding the Brain

Fundamental Research and Workforce Development



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



Computer & Information Science & Engineering (CISE)

Jeremy Epstein
Computer and Network Systems (CNS)
jepstein@nsf.gov

CNS Deputy Division Director

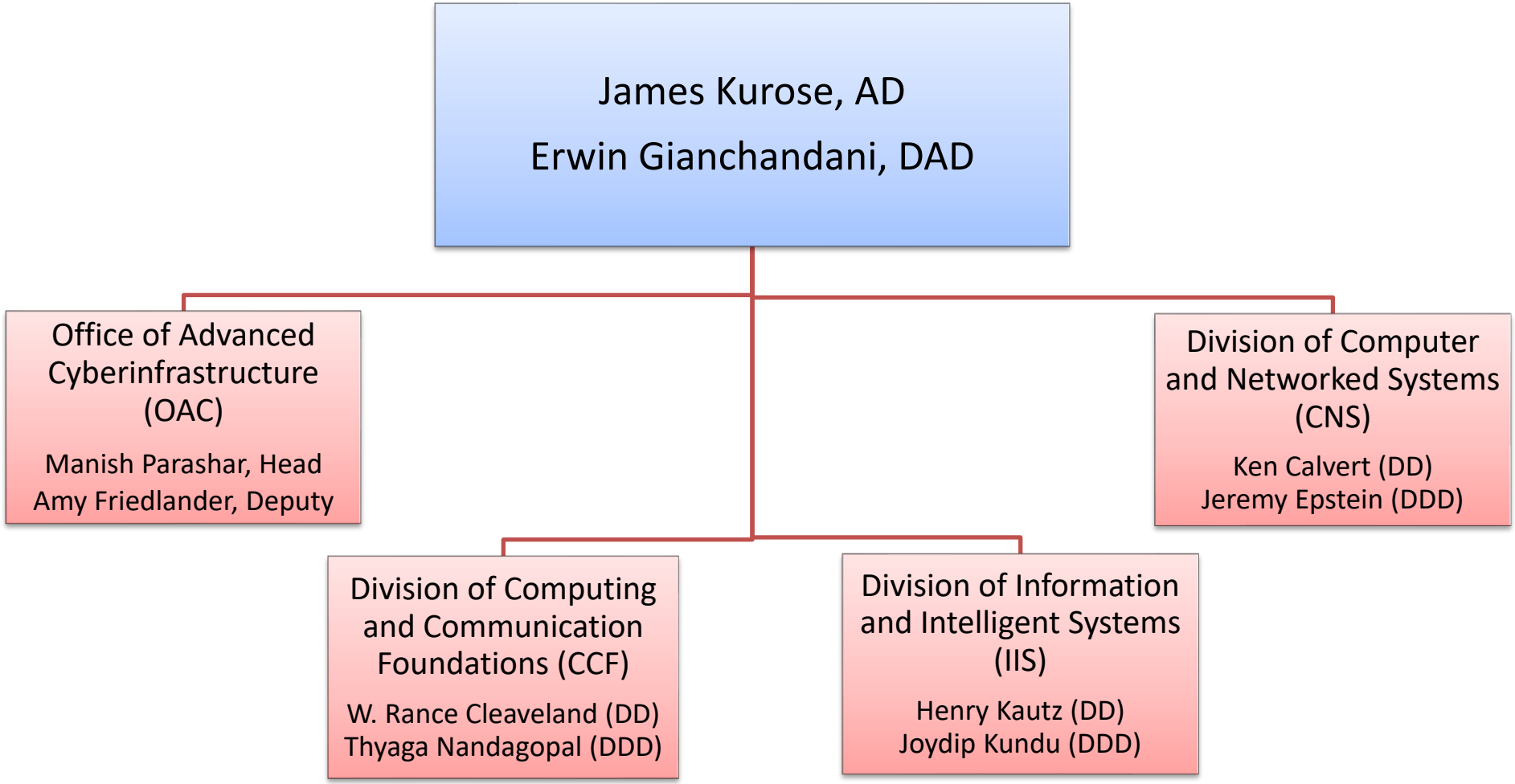
Research interests in security & privacy broadly, and in voting/elections in particular

Former lead program officer for Secure and Trustworthy Cyberspace

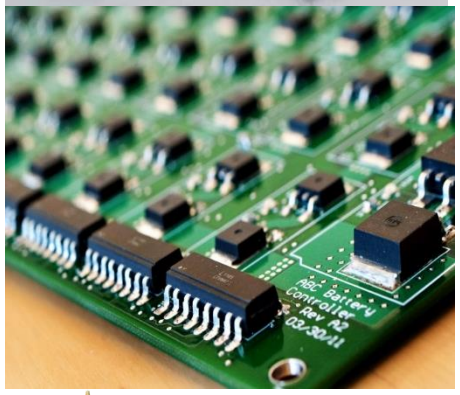
Fun fact:
One of the few NSF scientists without a PhD

Love bicycling and chocolate

Computer & Information Science & Engineering (CISE)



Computer & Information Science & Engineering (CISE)



PRIORITIES

- **Core** research programs across all of computer science
- **Cross-cutting** programs that cross NSF directorates and programs:

  BIG DATA, Collaborative Research in Computational Neuroscience, Cyber-Physical Systems, Enabling Quantum Leap, Future of Work at the Human-Technology Frontier, National Robotics Initiative, Secure and Trustworthy Cyberspace, Software Infrastructure for Sustained Innovation, Smart & Connected Health/ Communities

- **Education & Diversity**: CSforAll, Broadening Participation in Computing
- **Early Career Support**: CISE Research Initiation Initiative
- Other: **Research infrastructure**, **Technology transition** & **industry collaboration** (e.g., I-Corps, I/UCRC)

NSF Directorates and Offices
Education & Human Resources (EHR)

Education & Human Resources (EHR)

Robert L. Russell
Division of Research on Learning (DRL)
rrussel@nsf.edu

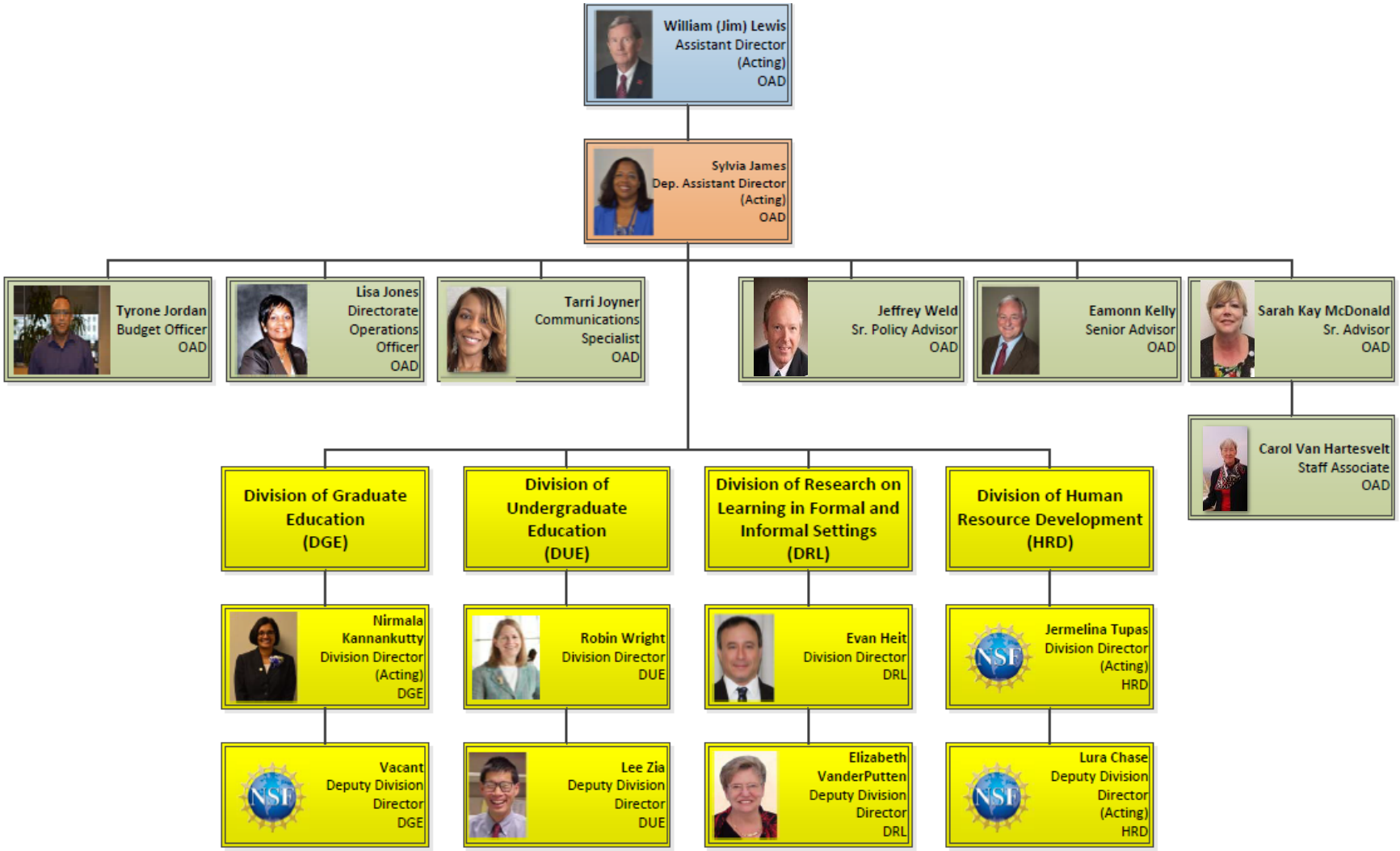
Over 30 years of experience in STEM education spanning childrens' museums, science centers, community organizations, and media.

Joined NSF in 2012

Manages proposals concerned with informal, classroom and cyberlearning STEM education

Expertise designing and evaluating projects targeting underserved minorities, including Hispanics and African-Americans

Directorate for Education and Human Resources (EHR)



07/19/2018

EHR Investment Priorities






STEM Learning and Learning Environments

- Build on cognitive and "non-cognitive" foundations in STEM
- Support research and the development of innovative tools, approaches and practices in formal and informal STEM learning contexts

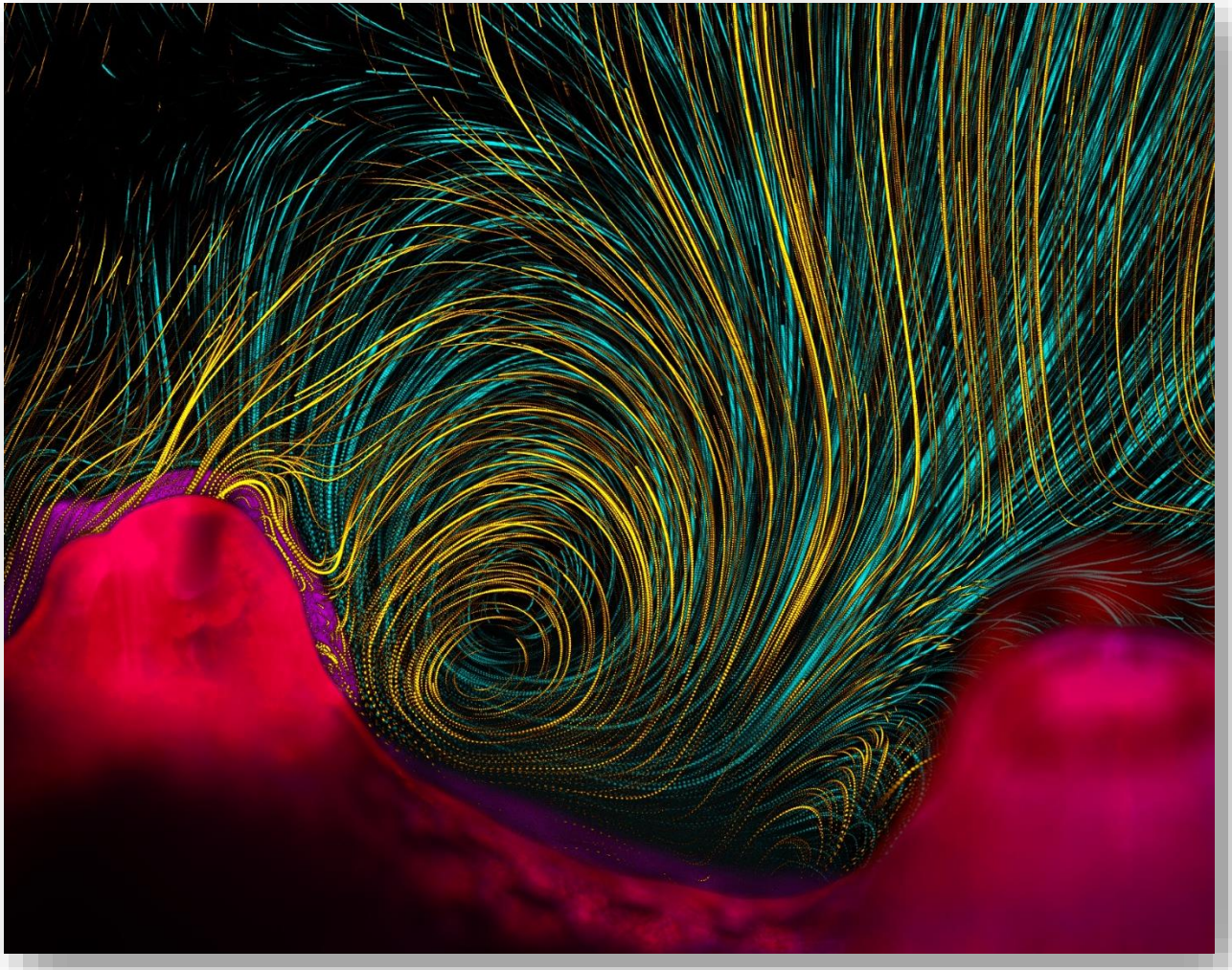
Broadening Participation and Institutional Capacity in STEM

- Promote accessibility, supports and success for underrepresented groups through high-quality STEM education

STEM Workforce

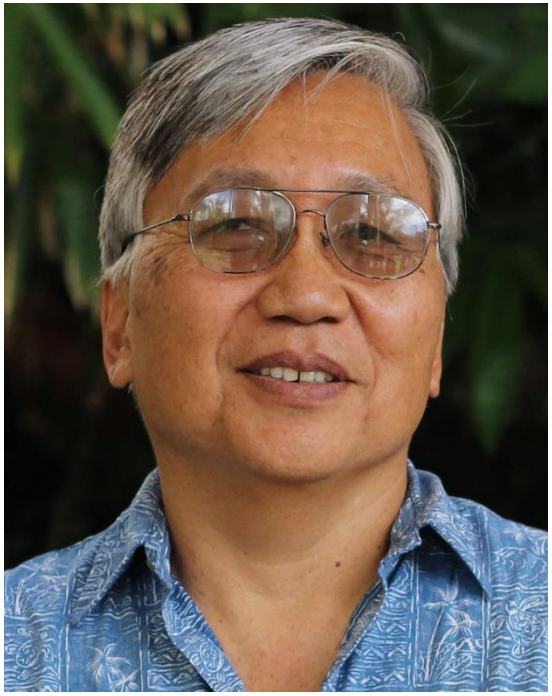
- Build capacity and prepare a diverse STEM workforce
- Capitalize on novel advances in science and technology
- Address emerging global, social, and economic challenges and opportunities

NSF Directorates and Offices
Engineering (ENG)



Engineering (ENG)

Anthony Kuh
Electrical, Communications and Cyber Systems (ECCS)
akuh@nsf.gov



Started as a program director in January 2017

Held workshop on Real-Time Learning and Decision Making in Dynamical Systems which lead to a DCL on Engineered Systems.

Work on core EPCN / ECCS program + CPS, Smart and Connected Communities, INFEWS and Big Data

Member of two working groups of the 10 NSF Big Ideas:

Harnessing the Data Revolution (HDR)
Human Technology Frontier (HTF)

Engineering (ENG)

Nora Savage
Chemical, Bioengineering, Environmental and Transport Systems (CBET)
nsavage@nsf.gov

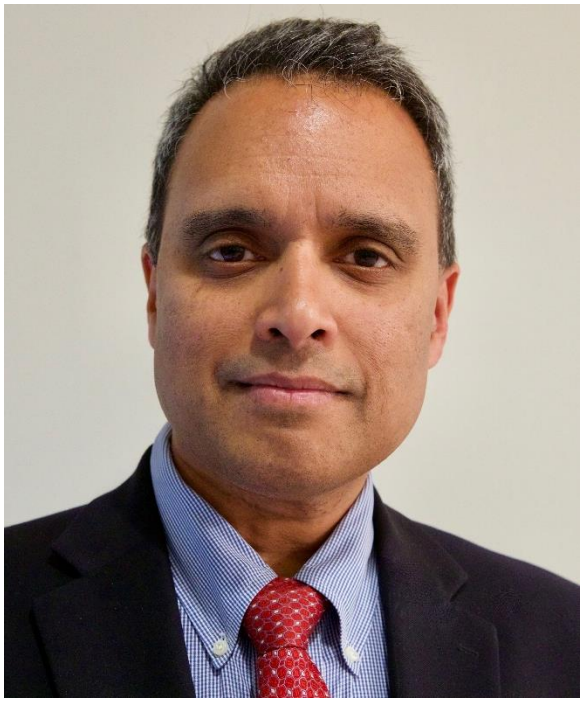
Served the environmental research community for over 20 years – federal and state

Served the environmental nano research community for 20 years

Published numerous articles, edited several books, and contributed chapters to several books

Engineering (ENG)

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



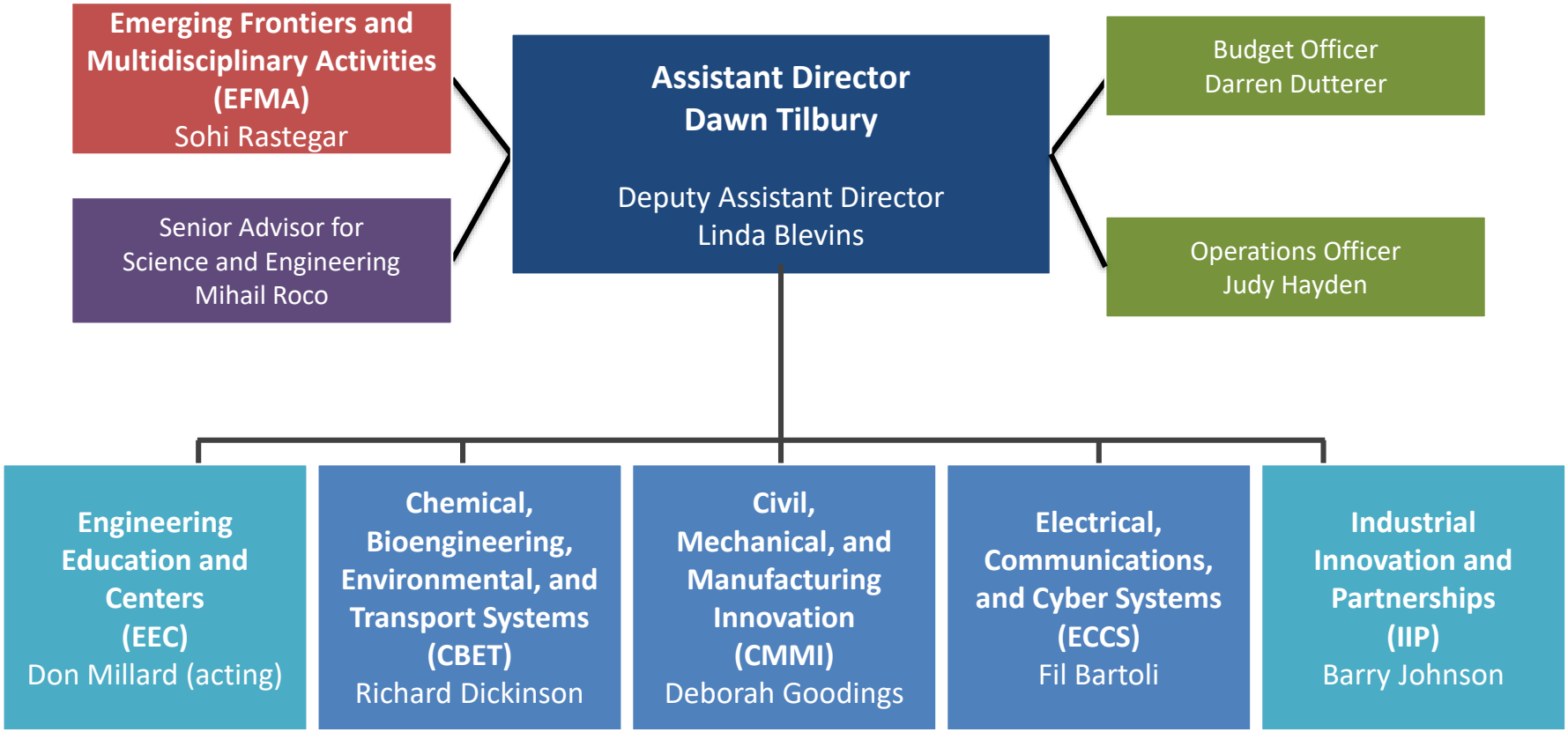
NSF program management experience in programs catalyzing industry-university partnerships and collaborative research

20+ years of leadership and innovation in large industry, small business and NSF

Chemical Engineer, Inventor and Entrepreneur

Patented innovations in energy efficient wastewater treatment technology currently installed in numerous large municipal treatment facilities nationwide and abroad

Engineering (ENG)



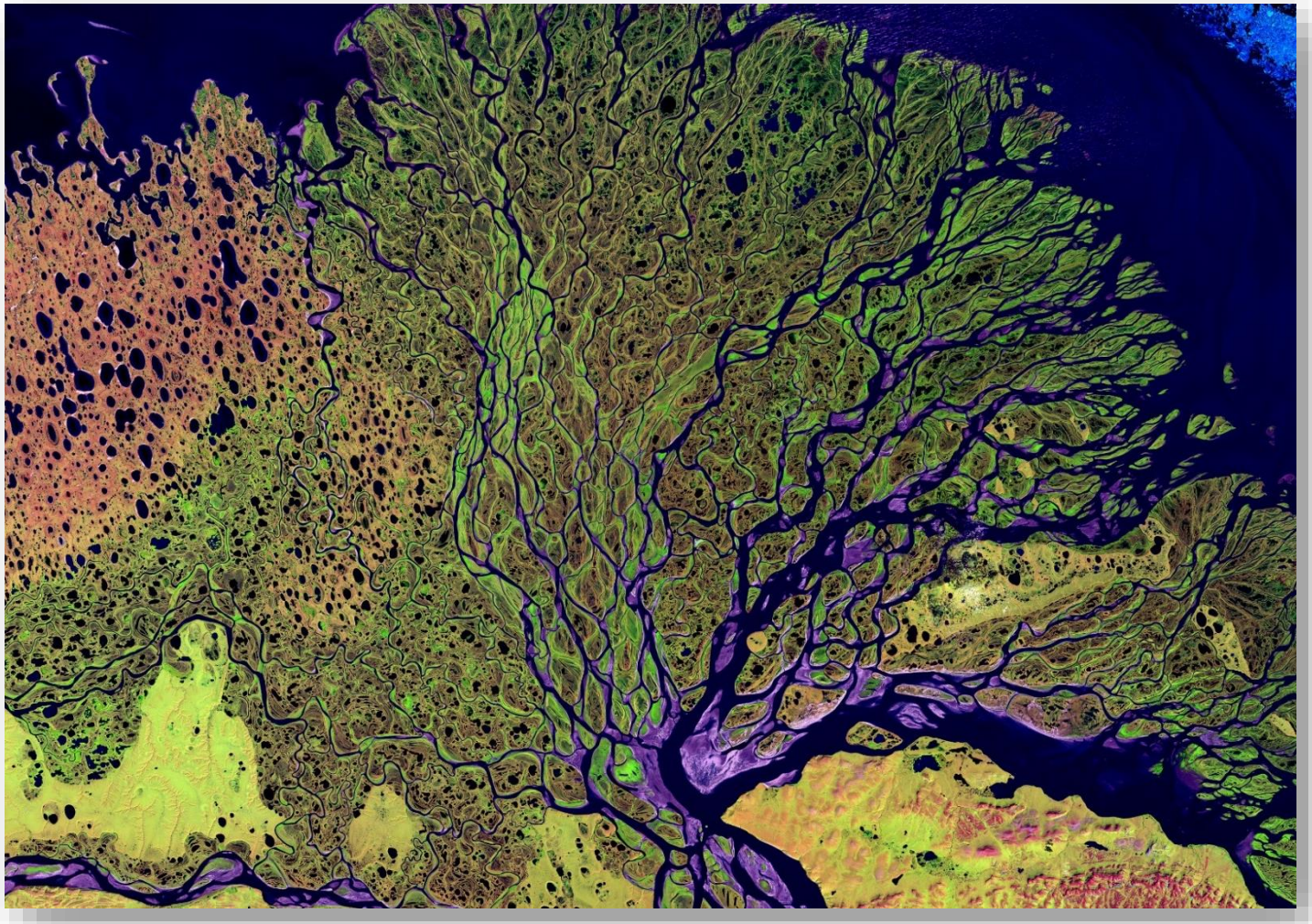
ENG Initiatives and Priorities Address National Interests

- **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**
  - **IUSE:RED**

- **GOALI : Grant Opportunities for Academic Liaison with Industry**
- **INTERN: non-academic grad student internships towards professional development**
- **Engineering Research Centers**
- **IUCRC: Industry University Cooperative Research Centers**
- **PFI: Partnerships for Innovation**
- **iCorps: Innovation Corps**
- **SBIR/STTR Small Business Innovation Research**

NSF Directorates and Offices

Geosciences (GEO)



Directorate for Geosciences (GEO)

Chungu Lu
Atmospheric and Geospace Sciences (AGS)
clu@nsf.gov

Program Director, Physical and Dynamic Meteorology Program (8 years at NSF)

INFEWS committee member

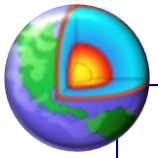
Research scientist for 15 years in a NOAA national lab

Member of American Geophysical Union and American Meteorological Society

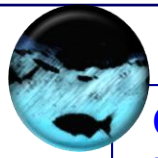
Likes hiking and traveling

Geosciences (GEO)

Dr. William Easterling, Assistant Director
Dr. Scott Borg, Deputy Assistant Director



Earth Sciences (EAR)
Lina Patino, Acting DD
Integrated Activities
Disciplinary Programs



Ocean Sciences (OCE)
Bauke Houtman, Acting DD
Marine Geosciences
Ocean
Integrated Programs

Atmospheric and Geospace Sciences (AGS)
Anjuli Banzai, Acting DD
Atmospheric Science
Geospace
NCAR and Facilities

Office of Polar Programs (OPP)
Kelly Falkner, Office Director
Antarctic Sciences
Arctic Sciences
Antarctic Infrastructure and Logistics
Polar Environment, Safety & Health

Geosciences (GEO)

Support basic research in the Earth, ocean, atmospheric and space sciences, from pole to equator, core to surface of the sun.

Support research facilities & infrastructure--instrument pools, research vessels, NCAR, US Antarctic Program, and more)

Promote education and diversity in the geosciences. NSF INCLUDES.

PREEVENTS--Prediction of and Resilience against Extreme EVENTS.
INFEWS--Innovations at the Nexus of Food, Energy, and Water Systems

Leads NNA--Navigating the New Arctic

Cross-directorate initiative: CoPe

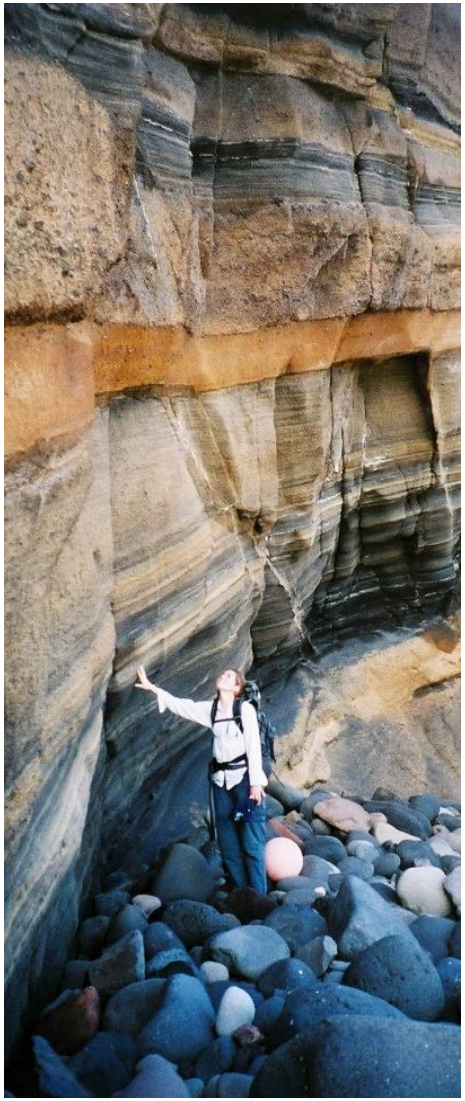
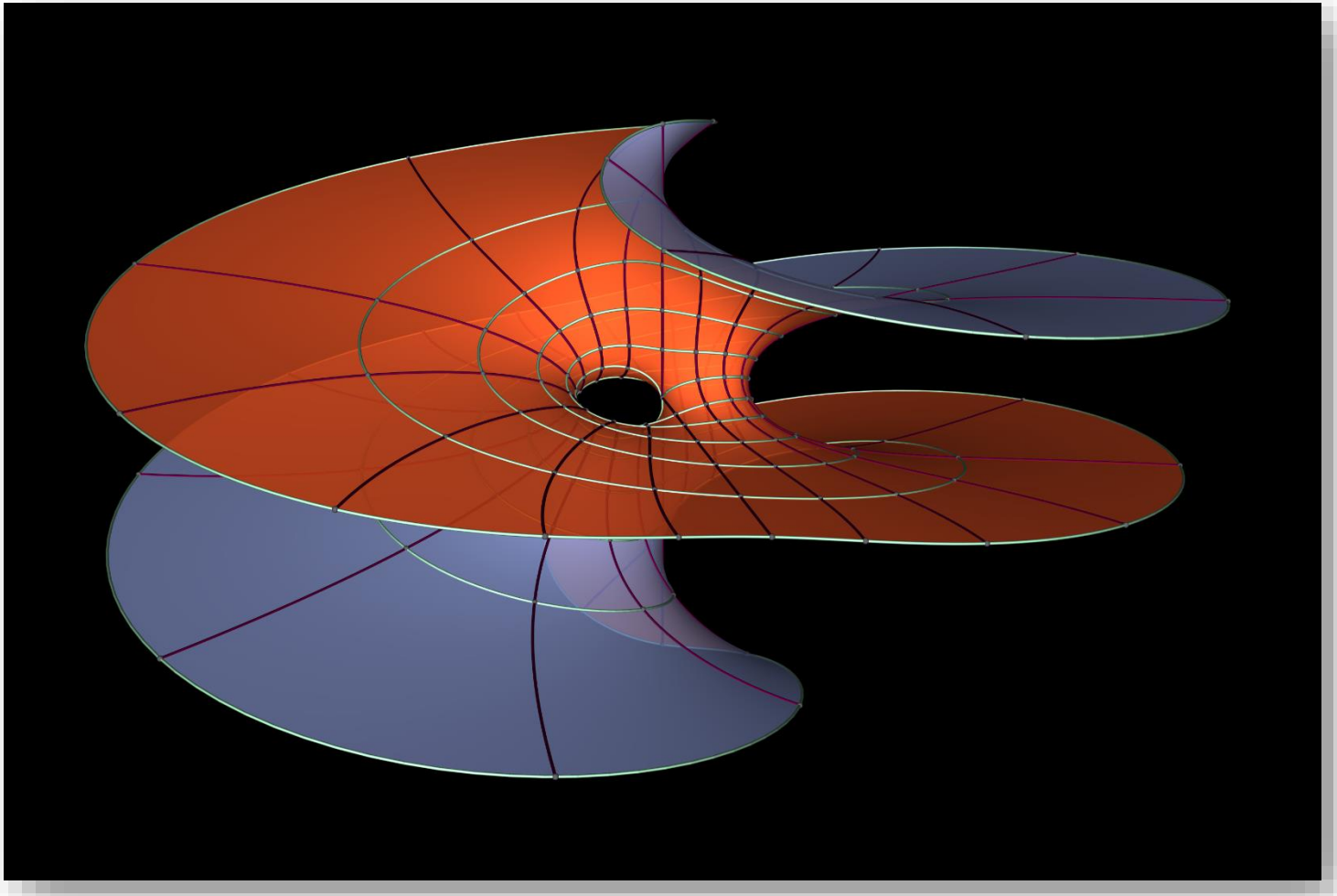


Photo credits: 1) Ben Edwards 2,4,5) Jennifer Wade 3) WiscSIMS

NSF Directorates and Offices

Mathematical & Physical Sciences (MPS)



Mathematical & Physical Sciences (MPS)

Tomasz Durakiewicz
Division of Materials Research (DMR)
tdurakie@nsf.gov

At NSF since 2014 and Program Director for Condensed Mater Physics, Division of Materials Research.

PhD in 1998 in Experimental Physics, University of Maria Curie-Sklodowska, Poland

1999 University of New Mexico

2000-2016 Los Alamos National Laboratory

Mathematical & Physical Sciences (MPS)

Vyacheslav "Slava" Lukin
Division of Physics (PHY)
vlukin@nsf.gov

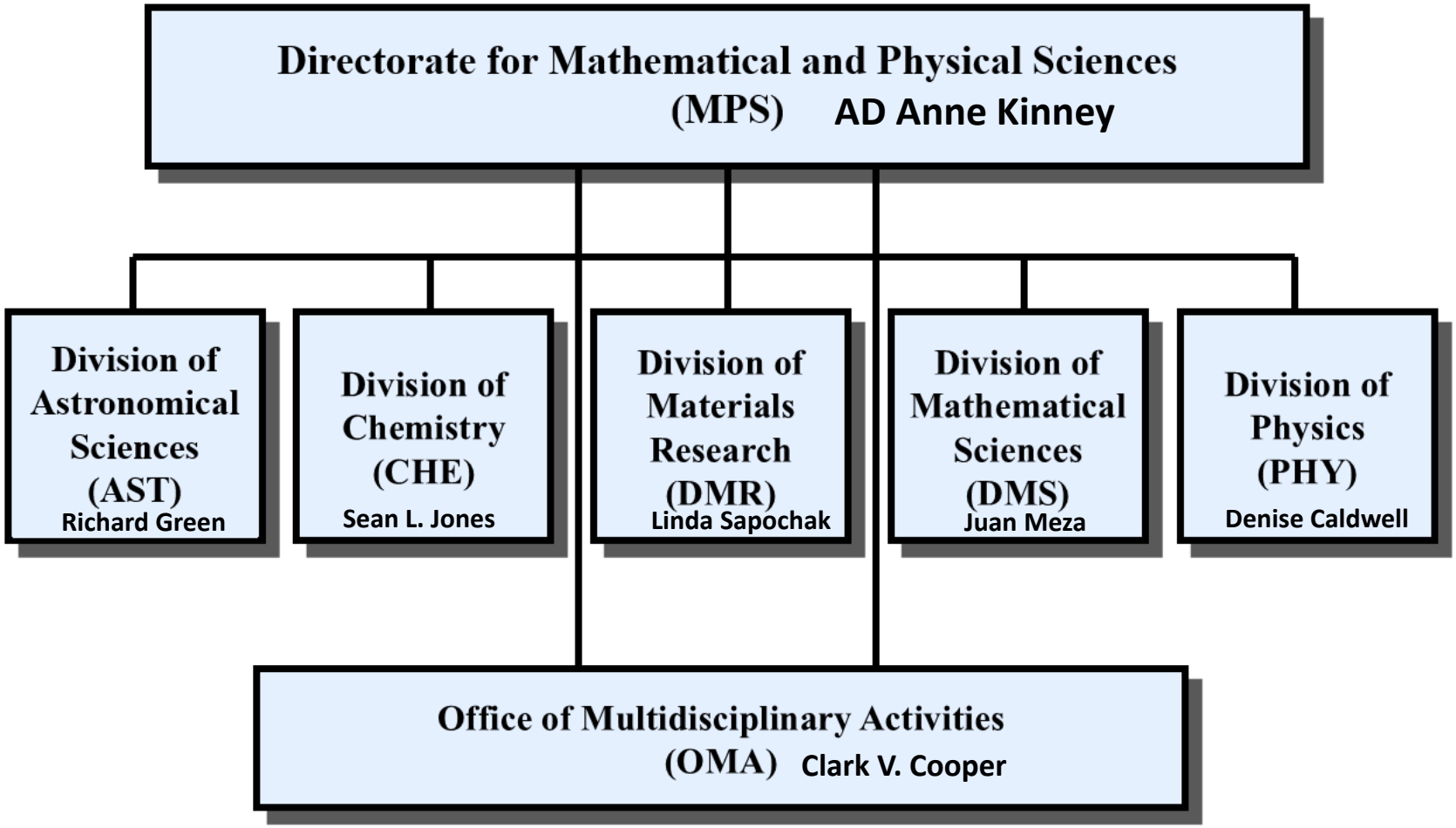
Program Director for Plasma Physics and Accelerator Science since 2014

Manage NSF/DOE Partnership in Basic Plasma S&E

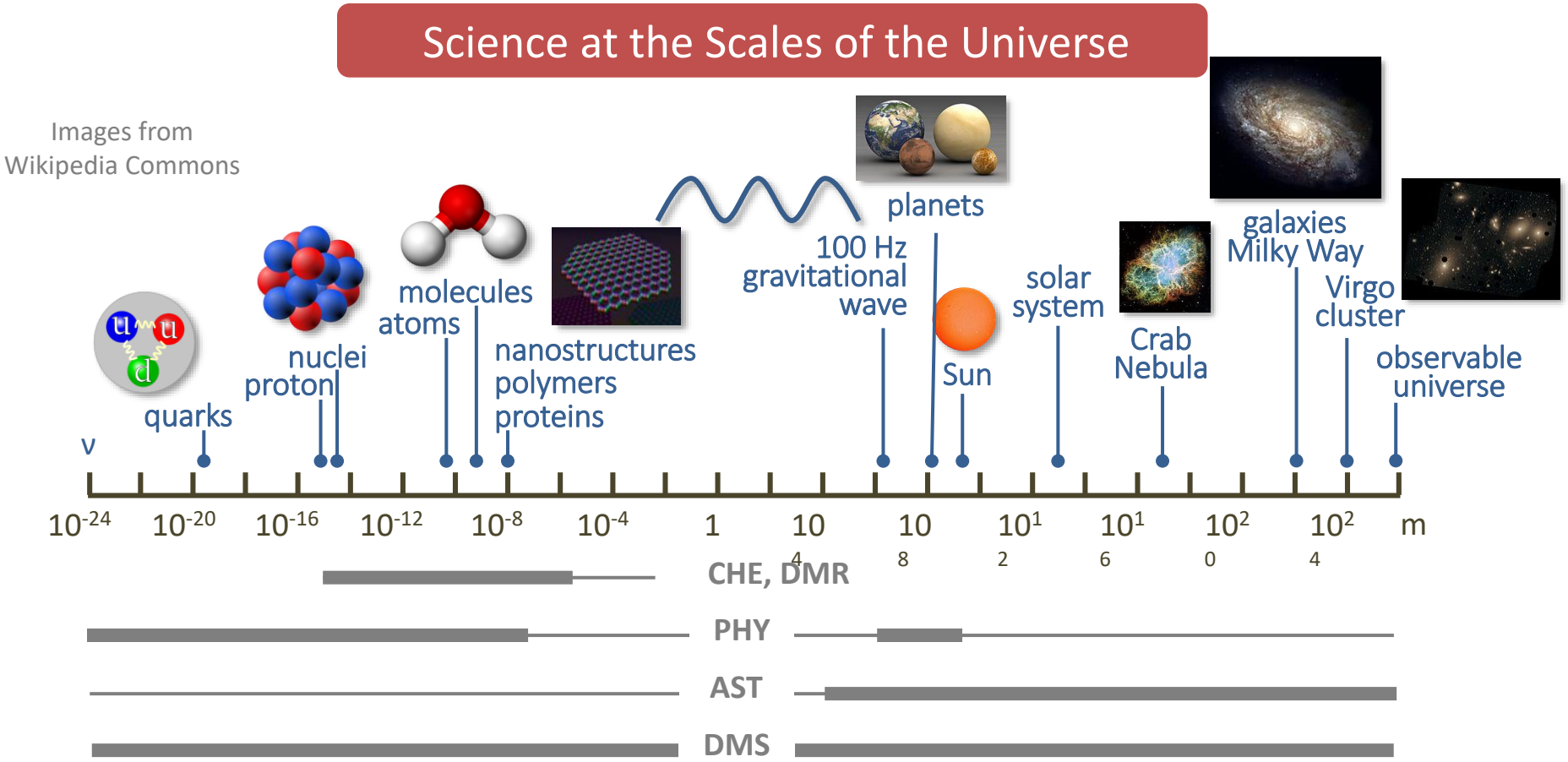
Education and career path went through R1 universities (Princeton, U. Washington), a liberal arts college (Swarthmore), National Labs (LANL, PPPL, and NRL)

Thoroughly enjoyed 2+ years in Los Alamos 10+ years ago

Mathematical & Physical Sciences (MPS)



Mathematical & Physical Sciences (MPS)

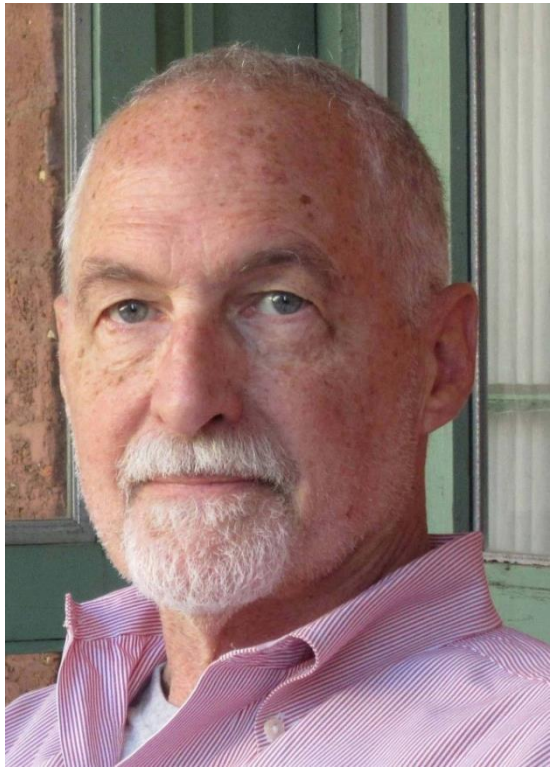


NSF Directorates and Offices

Social, Behavioral, & Economic Science (SBE)

Social, Behavioral, & Economic Science (SBE)

William "Bill" Badecker
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

SBE/BCS Representative for the CAREER Coordinating Committee

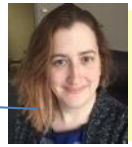
Social, Behavioral, & Economic Science (SBE)

Fay Lomax Cook
Assistant Director

Kellina Craig-Henderson
Deputy Asst. Director

Deborah Olster
Science Advisor

John Garneski
Budget Analyst



Madeline Beal
Communications Specialist

Behavioral and Cognitive Sciences

Marc Sebrechts
Division Director

Tamera Schneider
Deputy Division Director

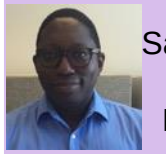
Social and Economic Sciences

Dan Sui
Division Director

Alan Tomkins
Deputy Division Director

National Center for Science and Engineering Statistics

Emilda Rivers



Samson Adeshiyan
Acting Deputy Division Director

Office of Multidisciplinary Activities

Social, Behavioral, & Economic Science (SBE)

Cross Directorate Research Priorities

Understanding the Brain (UtB)

Risk and Resilience: Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP)

Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS)

Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES)

Secure and Trustworthy Cyberspace (SATC)

Smart and Connected Communities (S&CC)

NSF's Big Ideas (especially: Work at the Human-Technology Frontier; Harnessing the Data Revolution; Navigating the New Arctic; and Understanding the Rules of Life)




NSF Directorates and Offices

Office of Integrative Activities (OD/OIA)

Office of Integrative Activities (OD/OIA)

Timothy M. VanReken

Established Program to Stimulate Competitive Research (EPSCoR)

tvanreke@nsf.gov

Coordinate RII (Research Infrastructure Improvement) Track-4: EPSCoR Research Fellows

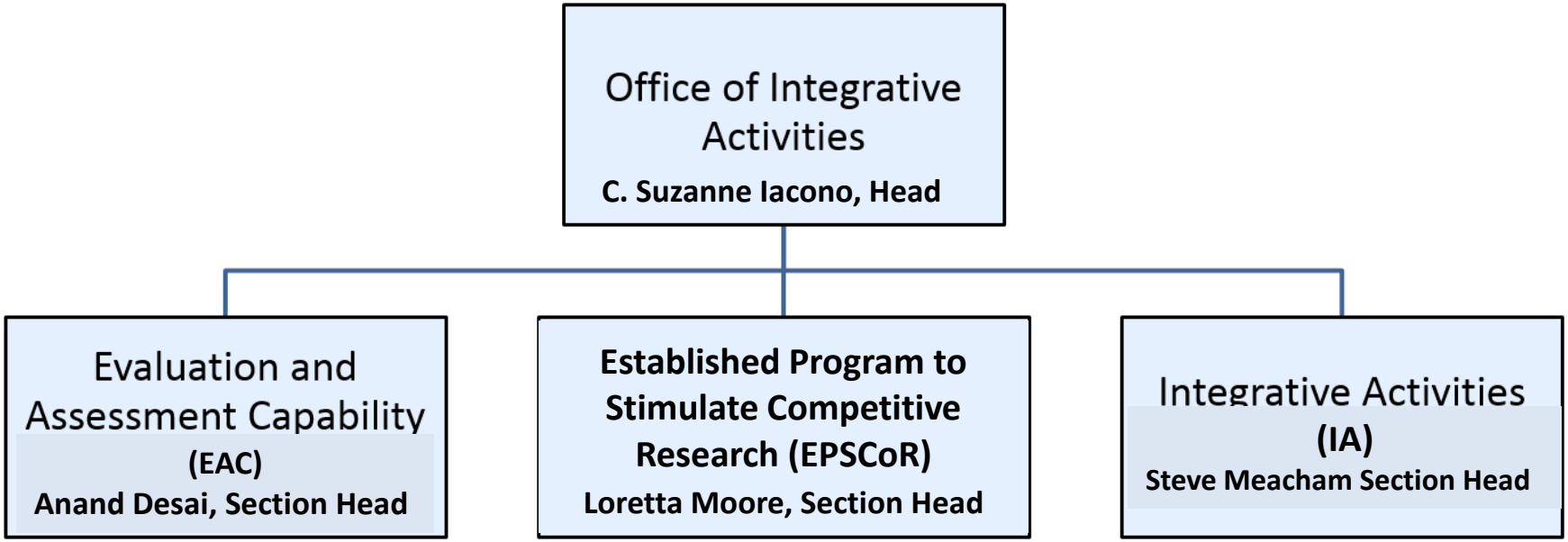
Support EPSCoR Co-Funding and Outreach

Member, INFEWS and INTERN working groups

Former Assoc Prof, Environmental Engineering, Washington State University (Pullman)

Expertise in atmospheric particles, air quality, and climate

Office of Integrative Activities (OD/OIA)



Office of Integrative Activities (OD/OIA)

IA: Science and Technology Centers - **STC**

IA: Major Research Instrumentation - **MRI**

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 Crosscutting programs

NSF Directorates and Offices

Office of International Science & Engineering

Office of International Science & Engineering

Sonia Ortega
Office of International Science & Engineering (OISE)
sortega@nsf.gov

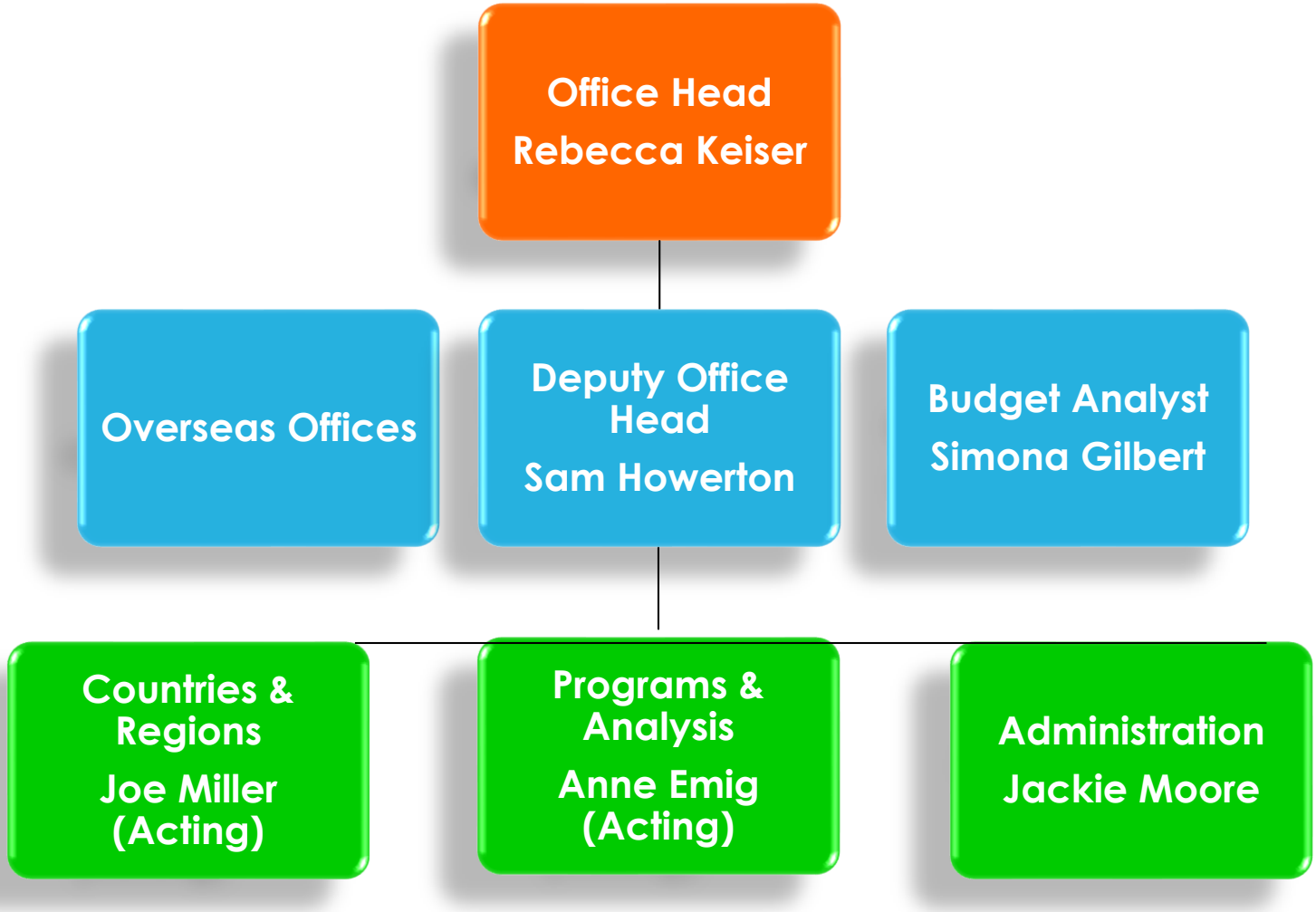
Joined NSF in 1989: Manage West Europe, Mexico and Brazil portfolio- serves as liaison with Education and Human Resources Directorate (EHR)

Headed NSF Europe Office until April 2018

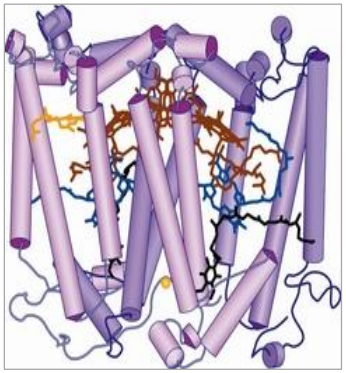
Spent three years on detail at UNM–LTER Network Office
Former Program Officer in Division of Graduate Education- DGE/EHR

Marine biologist, Private Pilot and Avid Traveler

Office of International Science and Engineering



Office of International Science & Engineering



PRIORITIES

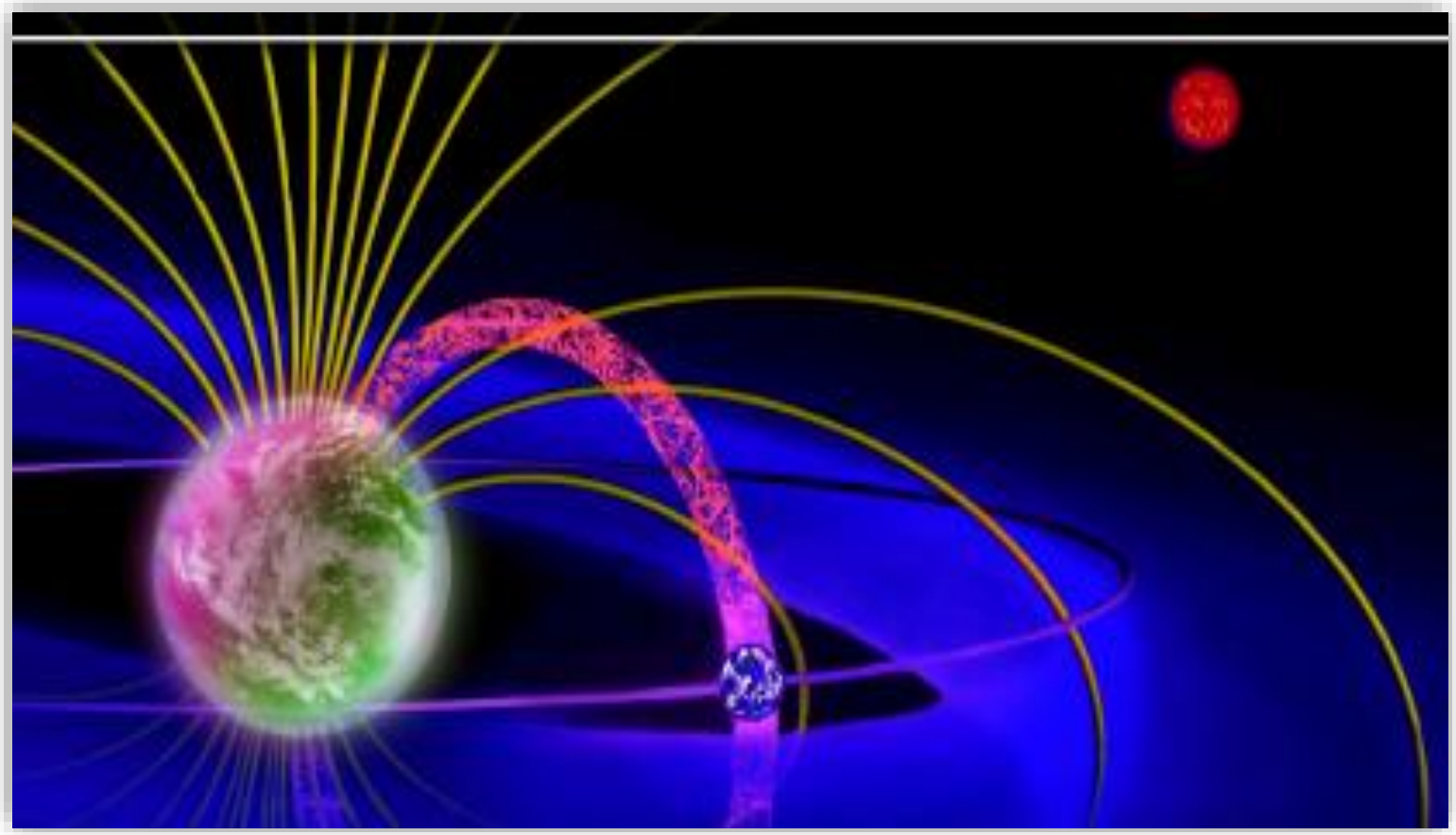
<u>Advance</u> the FRONTIERS of S&E via international collaboration

<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)

Jeremy Leffler
Policy Office, Division of Institution & Award Support
jleffler@nsf.gov

Serves as outreach specialist for proposal & award policy

Communicates policies and procedures to the research community and NSF staff

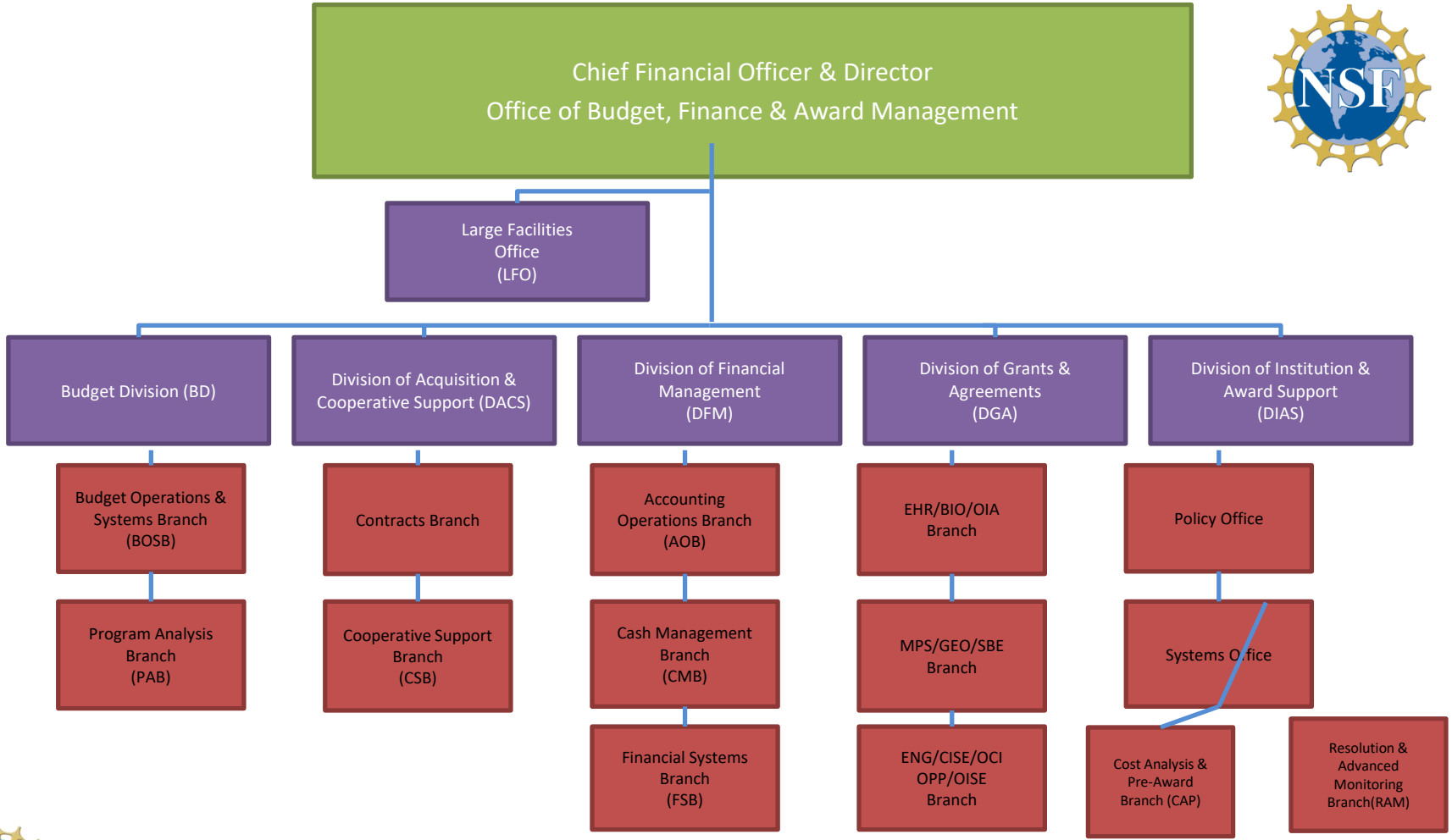
Organizes bi-annual NSF Grants Conference

Plans S & E research and education programs for institutions that are historically underserved in the federal arena.

Office of Budget Finance and Award Management

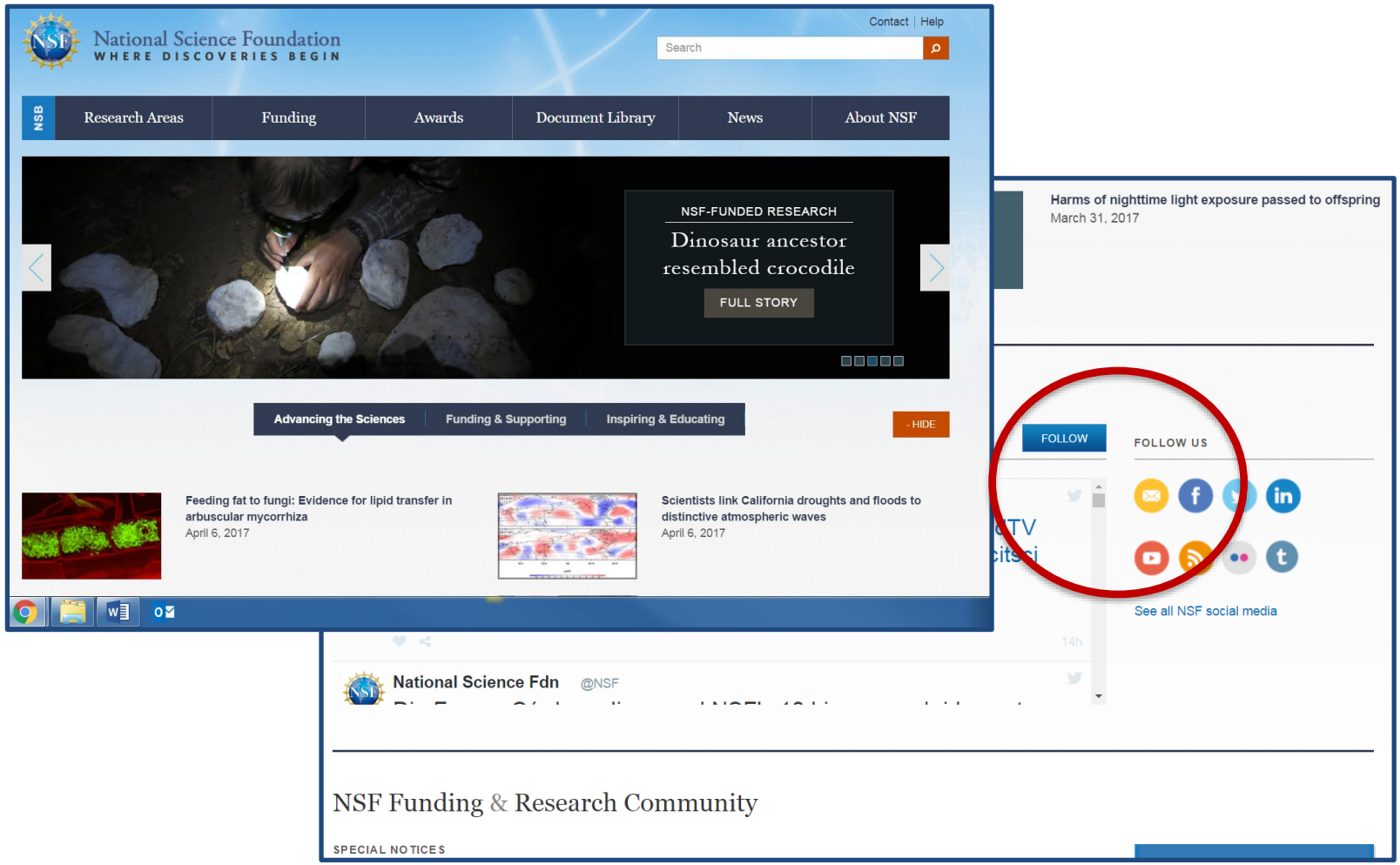
Stewardship Enabling Science

BFA Organizational Chart

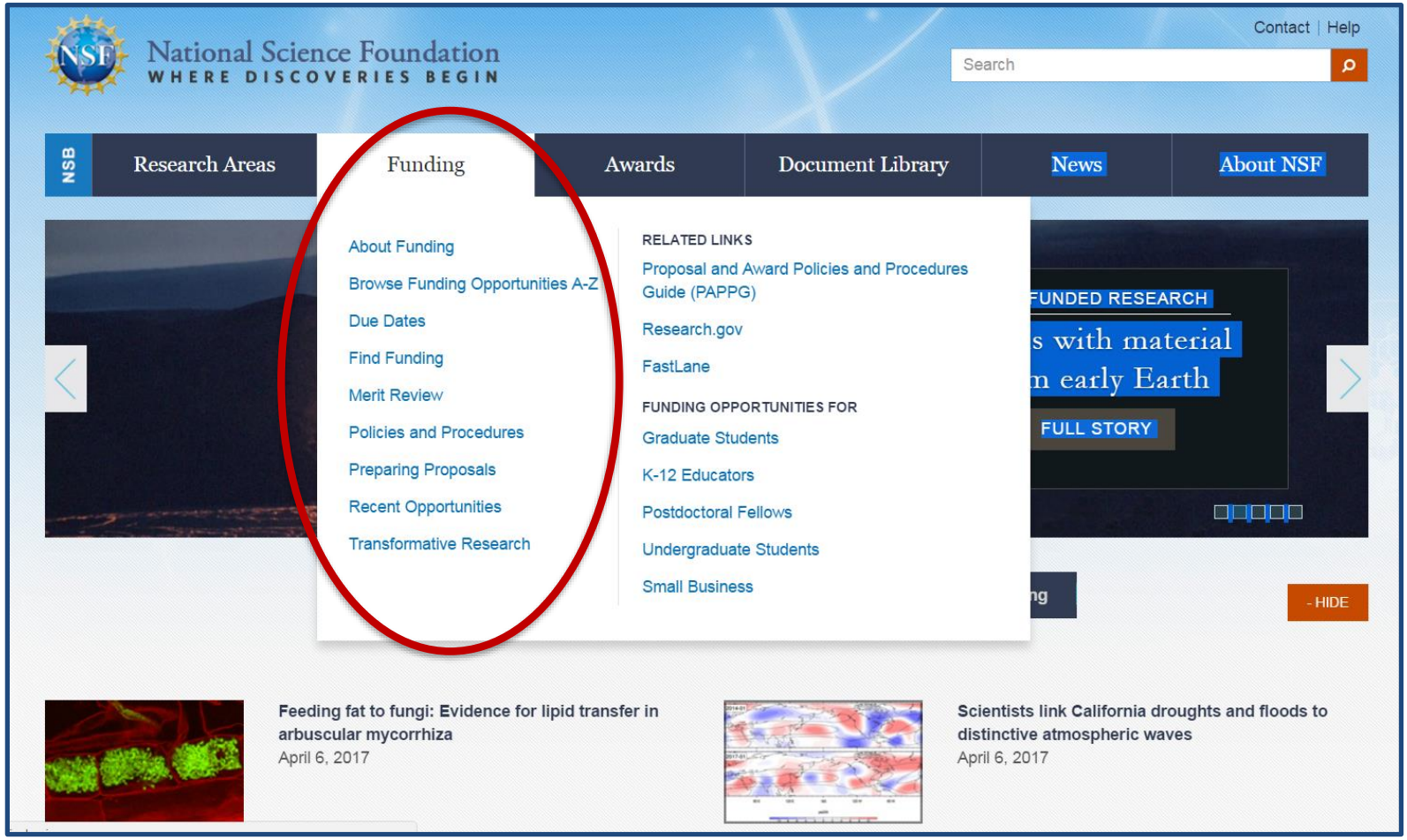


Getting Started
The Essentials

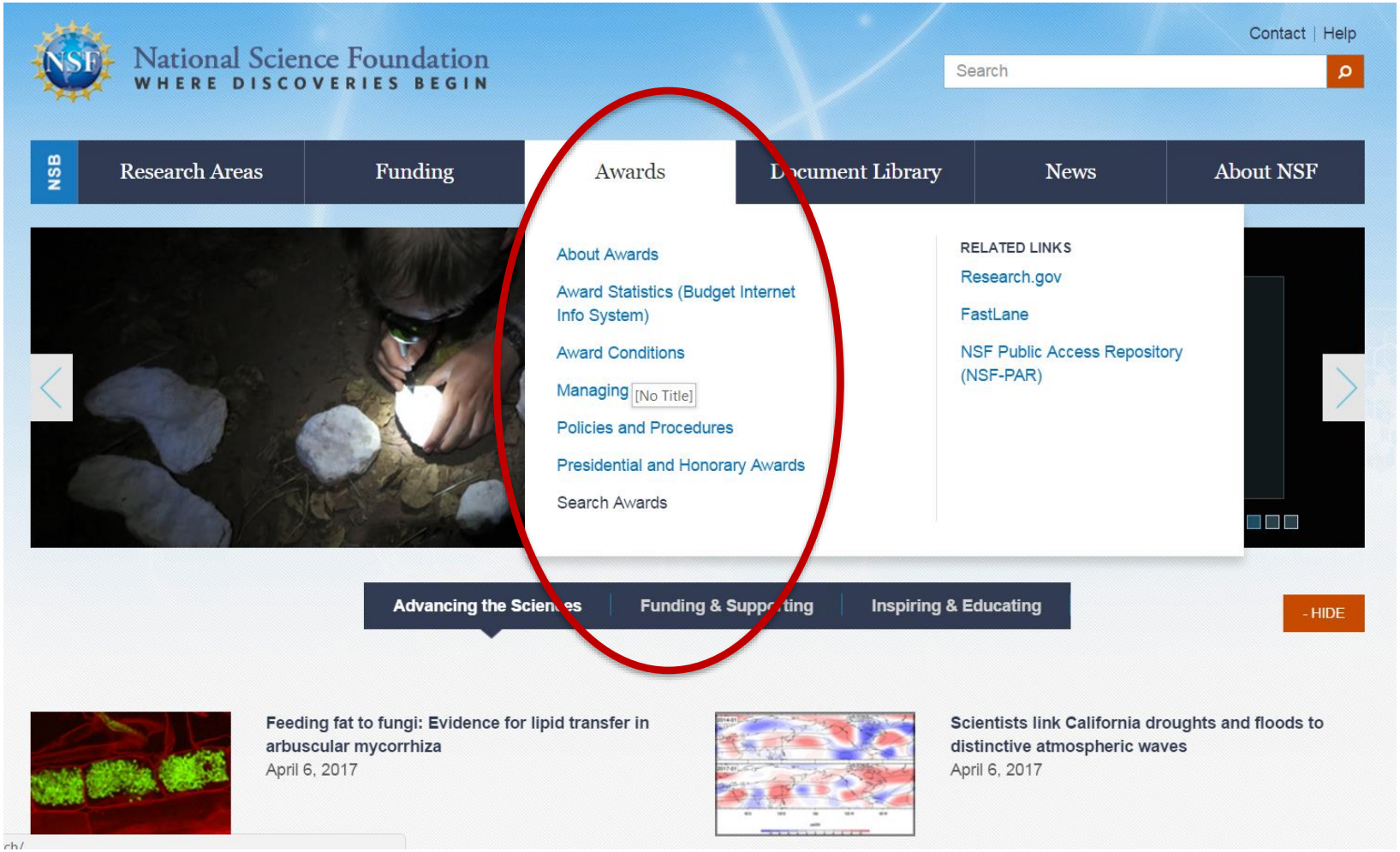
www.NSF.gov


National Science Foundation
WHERE DISCOVERIES BEGIN
Contact | Help
Search
Research Areas
Funding
Awards
Document Library
News
About NSF
NSF-FUNDED RESEARCH
Dinosaur ancestor resembled crocodile
FULL STORY
Advancing the Sciences
Funding & Supporting
Inspiring & Educating
- HIDE
Feeding fat to fungi: Evidence for lipid transfer in arbuscular mycorrhiza
April 6, 2017
Scientists link California droughts and floods to distinctive atmospheric waves
April 6, 2017
Harms of nighttime light exposure passed to offspring
March 31, 2017
FOLLOW
FOLLOW US
See all NSF social media
National Science Fdn @NSF
NSF Funding & Research Community
SPECIAL NOTICES

Navigating: Funding at www.NSF.gov



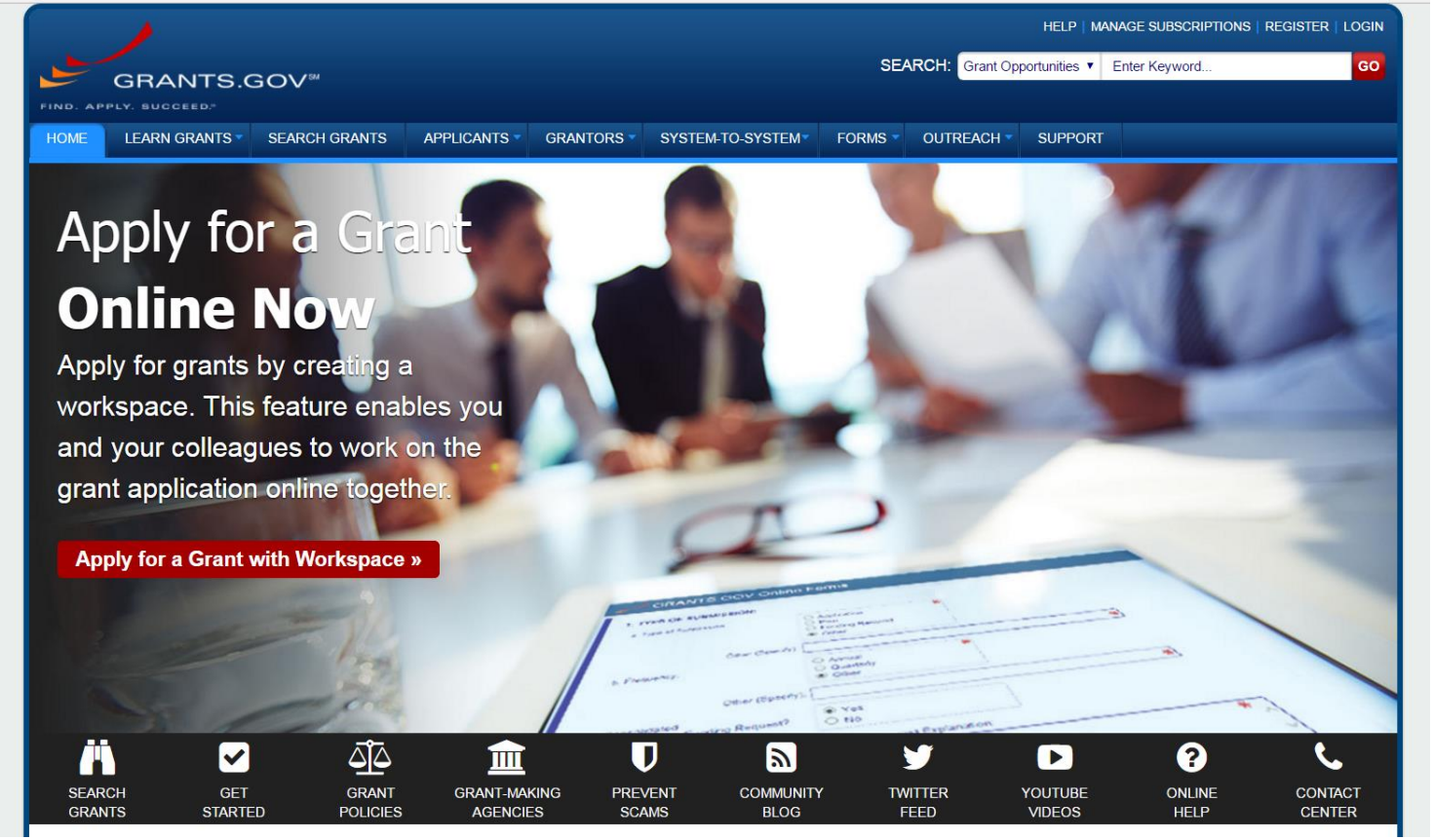
Navigating: Awards at www.NSF.gov



Additional Information on Resources

Join Directorate Specific Listserves!

Use Grants.gov's search feature

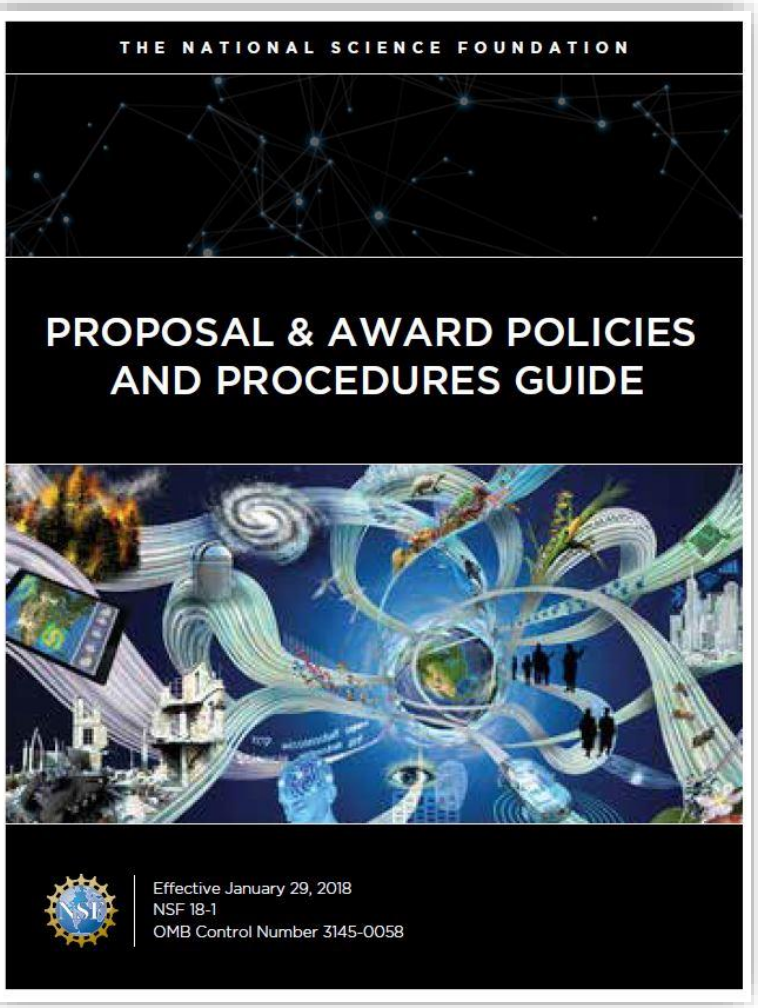


What is the Proposal & Award Policies & Procedures Guide?

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.

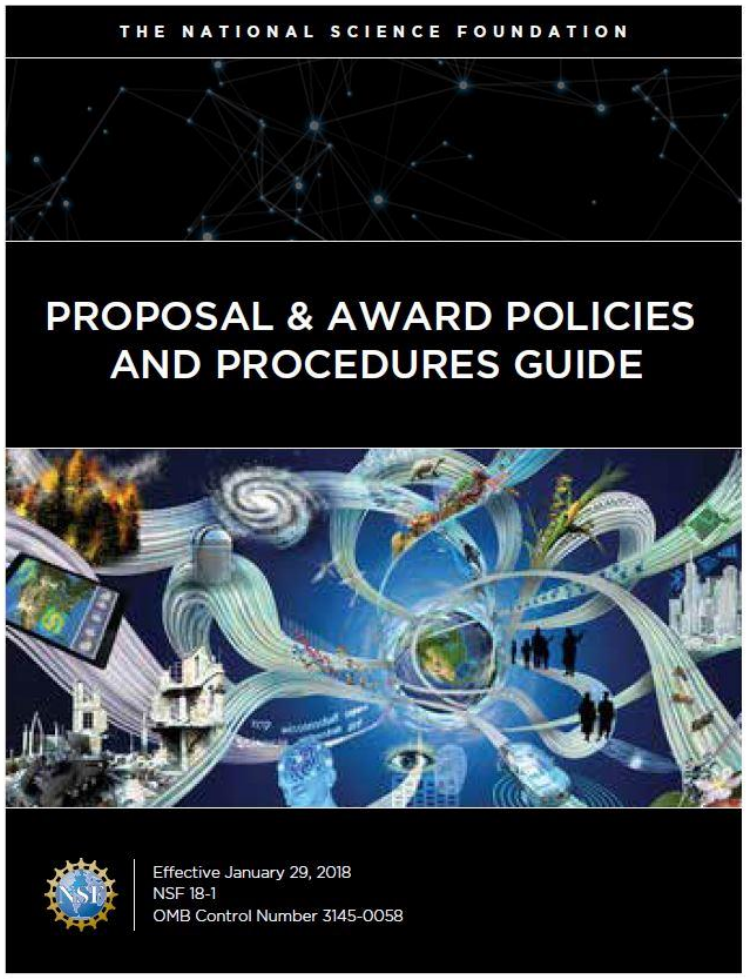
Part I is NSF’s proposal preparation and submission guidelines

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 Proposals

- Research
- RAPID
- EAGER
- RAISE
- GOALI
- Ideas Lab

- FASED
- Conference
- Equipment
- Travel
- Facility/Center
- Fellowship

Types of Funding Opportunities

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:

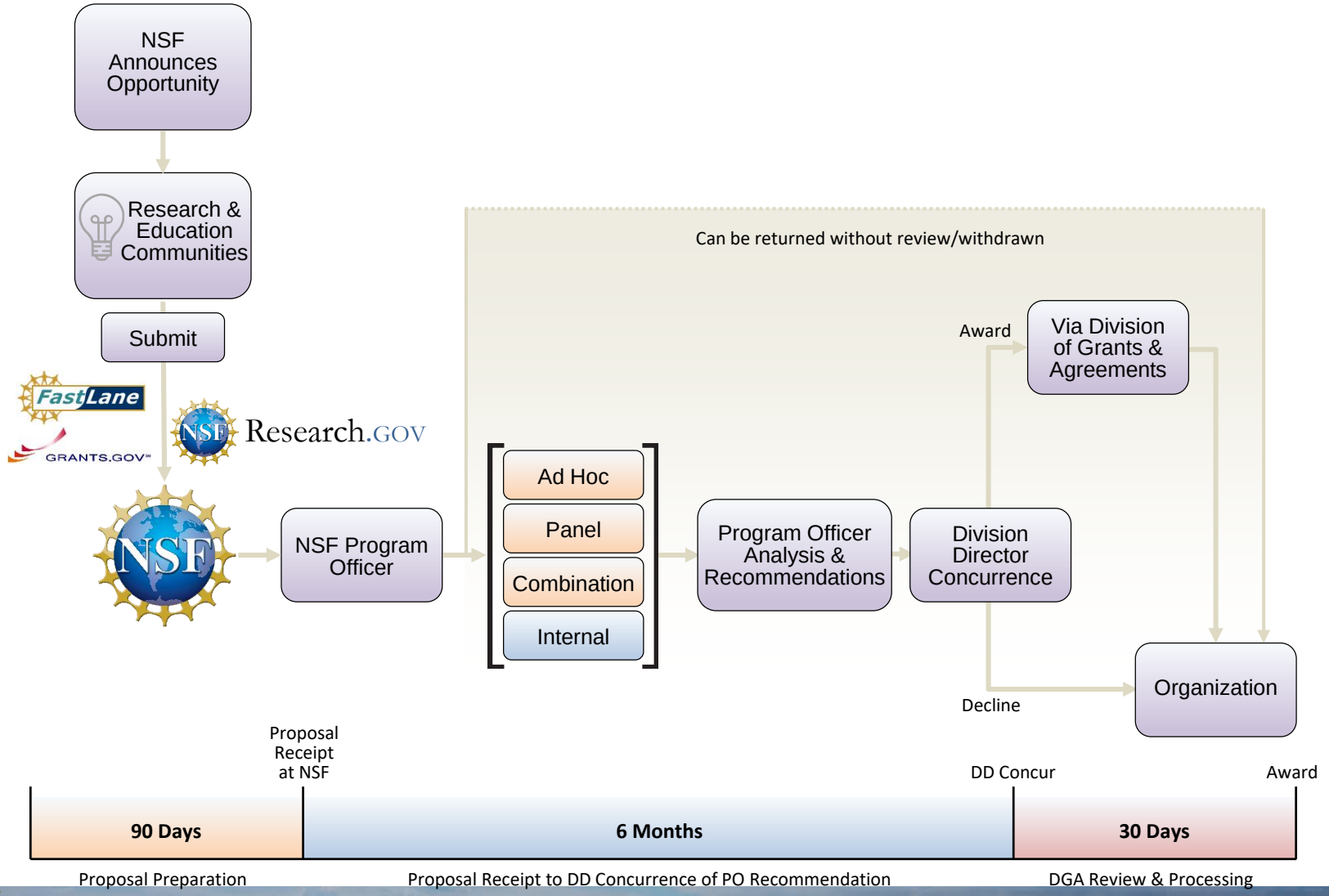
A proposer may be a Principal Investigator (PI) or co-PI on up to two proposals.

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

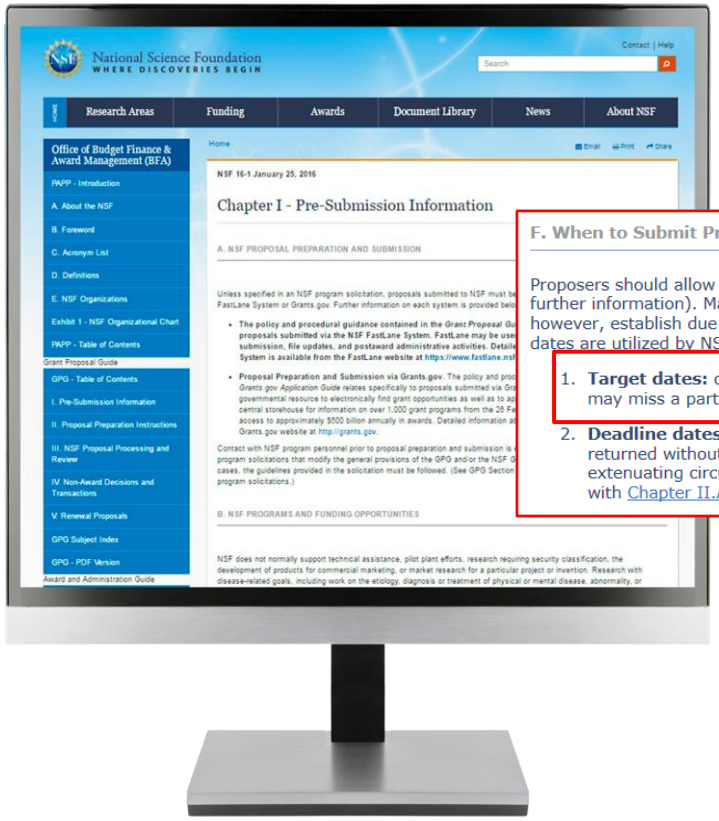


Types of Proposal Submissions

NO DEADLINES

Proposals may be submitted at any time

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 processing of proposals (see 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 will not be accepted or will 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 Chapter II.A.

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:

1. **Target dates:** dates after which proposals will still be accepted, although they may miss a particular panel or committee meeting.
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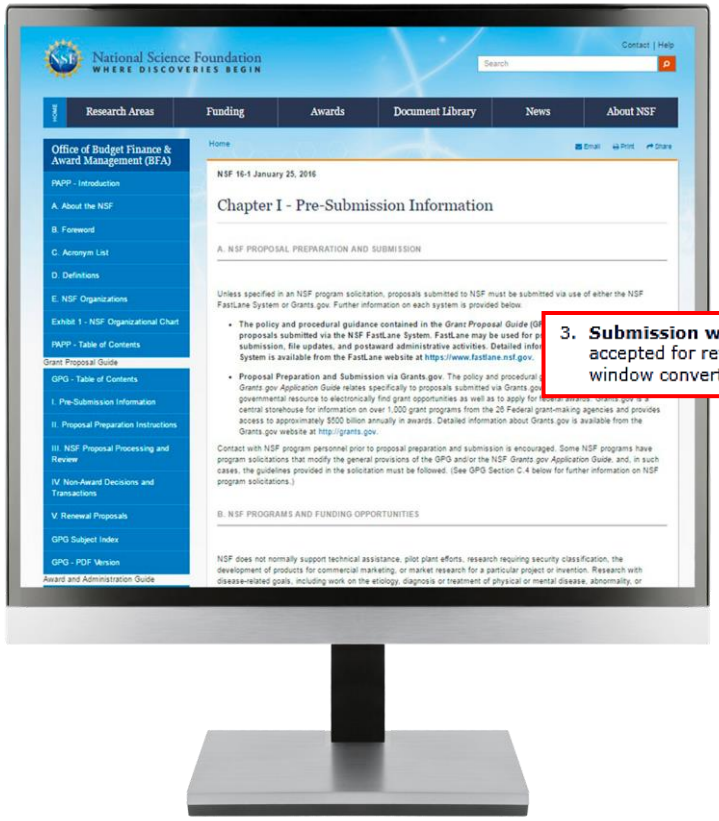
Types of Proposal Submissions

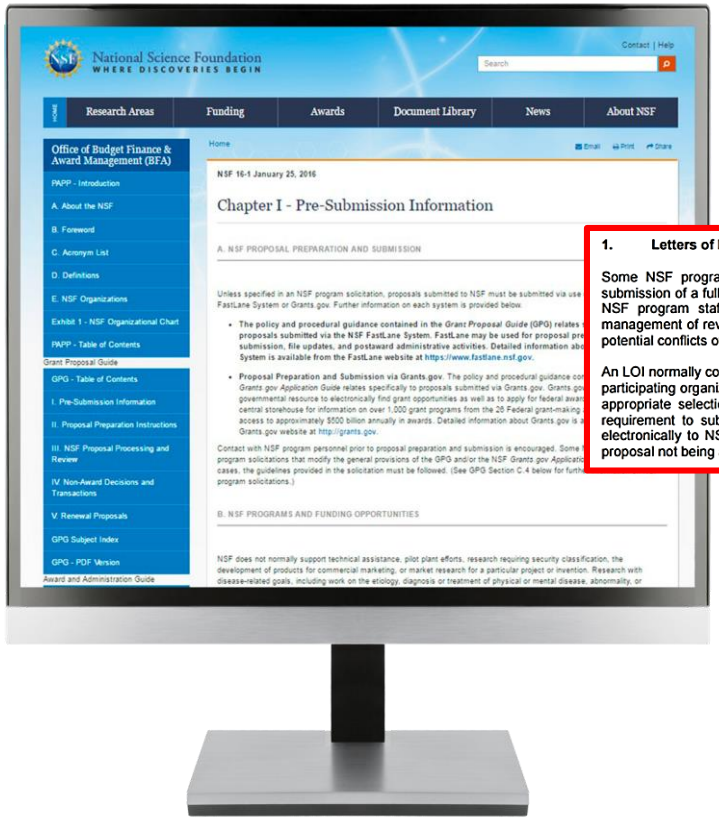


SUBMISSION WINDOWS

Proposals will not be accepted after this date and time (5 p.m. submitter's local time)

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

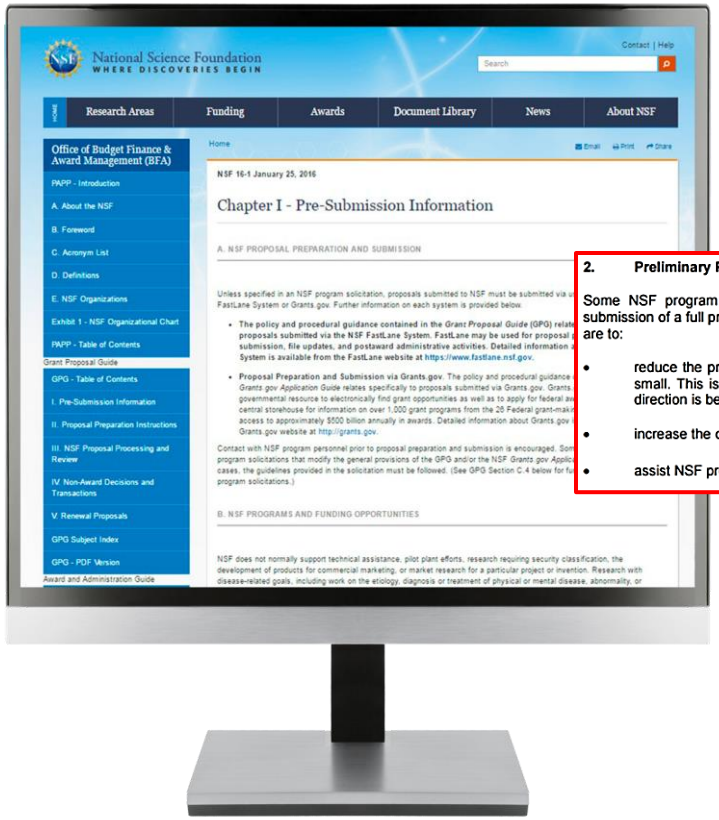
Enables better management of reviewers and panelists

1. Letters of Intent

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

An LOI normally contains the Principal Investigator's (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. An LOI is not externally evaluated or used to decide on funding. The requirement to submit an LOI will be identified in the program solicitation, and such letters are submitted electronically to NSF. Failure to submit a required LOI identified in a program solicitation will result in a full proposal not being accepted or returned without review.

Types of Proposal Submissions



PRELIMINARY PROPOSALS

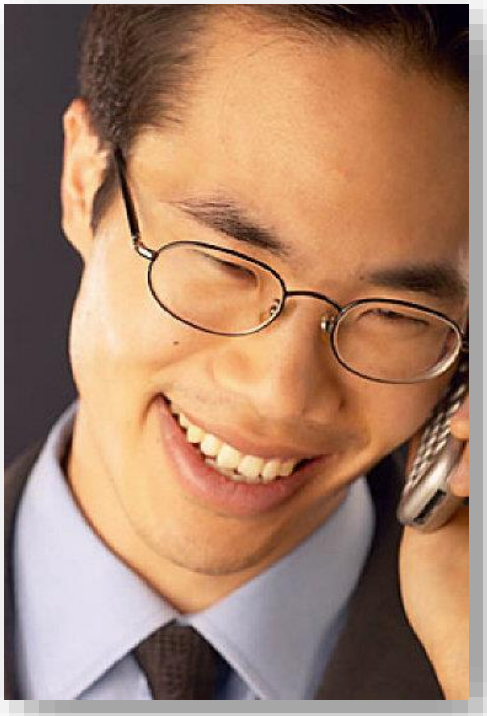
Sometimes required, sometimes optional

2. Preliminary Proposals

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

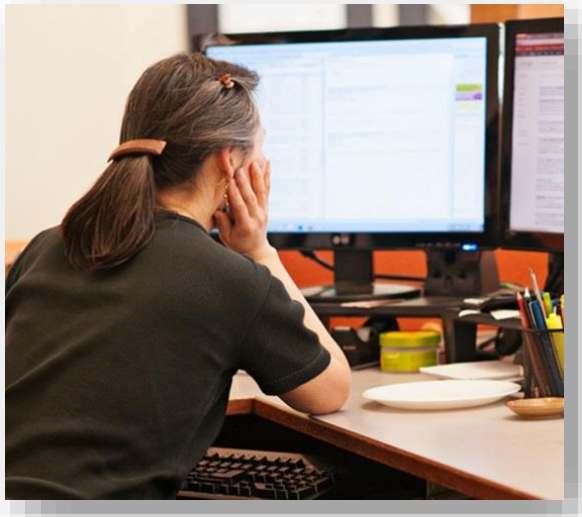
- reduce the proposers' unnecessary effort in proposal preparation when the chance of success is very small. This is particularly true of exploratory initiatives when the community senses that a major new direction is being identified, or competitions that will result in a small number of awards;
- increase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

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 …

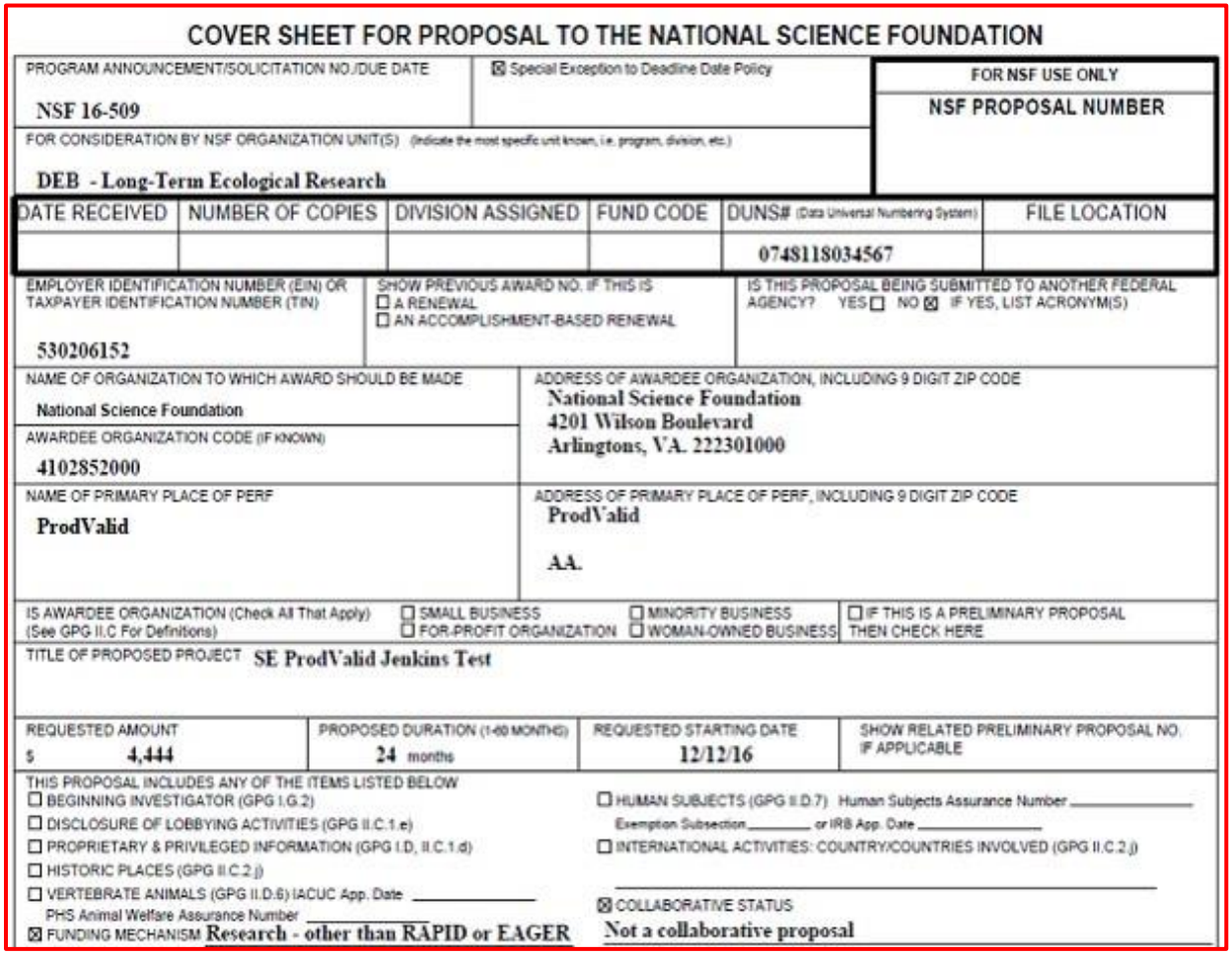
NSF PROPOSAL INGREDIENTS

- ❑ Cover Sheet
- ❑ Project Summary (1 page)
- ❑ Project Description (15 pages)
- ❑ References Cited
- ❑ Biographical Sketches (for all senior personnel)
- ❑ Budget
- ❑ Budget Justification (5 pages)
- ❑ Current and Pending Support
- ❑ Facilities, Equipment, and Other Resources
- ❑ Post-doctoral mentoring plan (if applicable)
- ❑ Data management plan

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./DUE DATE: NSF 16-509 | ☒ Special Exception to Deadline Date Policy | FOR NSF USE ONLY: NSF PROPOSAL NUMBER

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.): DEB - Long-Term Ecological Research

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
				074811803456 7	

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN): 530206152

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: National Science Foundation

AWARDEE ORGANIZATION CODE (IF KNOWN): 4102852000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE: National Science Foundation, 4201 Wilson Boulevard, Arlingtons, VA. 222301000

NAME OF PRIMARY PLACE OF PERF: ProdValid

ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE: ProdValid, AA.

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

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT: SE ProdValid Jenkins Test

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ 4,444	24 months	12/12/16	

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: Research - other than RAPID or EAGER

☐ 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

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

The Project Description must contain separate sections labeled *Intellectual Merit* and *Broader Impacts*

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

- All proposals are required to include, as a supplementary doc, a Data Management Plan of up to two pages.
- Plan should describe how the proposal will conform to NSF policy on dissemination and sharing of research results.
- A valid Data Management Plan may include only the statement that no detailed plan is needed, as long as a clear justification is provided.
- Plan will be reviewed as part of the Intellectual Merit and/or Broader Impacts of the proposal.

Single Copy Documents

Some proposal documents are for “NSF Use Only” and are not provided to reviewers

- Authorization to deviate from proposal preparation requirements
- List of suggested reviewers to include or not to include
- Proprietary or privileged information
- Proposal certifications
- Information about collaborators and other affiliations

Questions?


BREAK
TIME !!

The Merit Review Process

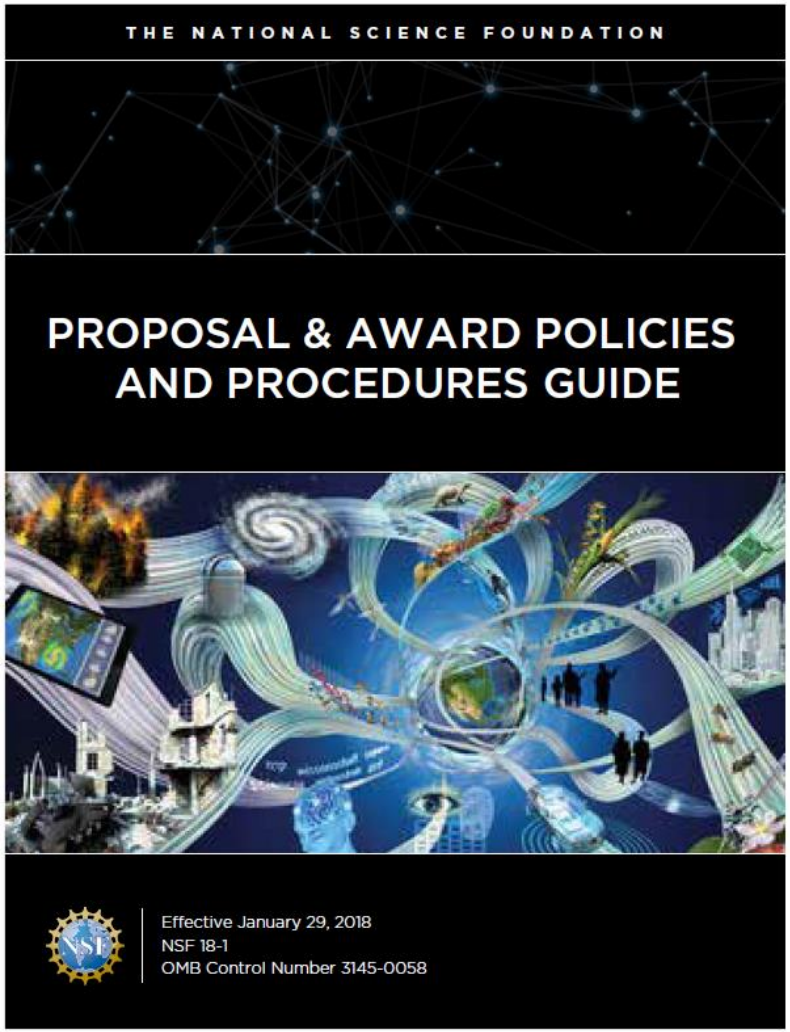
NSF's Proposal & Award Process Timeline

https://www.nsf.gov/bfa/dias/policy/merit_review/

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

Proposal & Award Policies and Procedures Guide (PAPPG)



NSF Merit Review Criteria:

1. **Intellectual Merit –**
   The potential to advance knowledge

2. **Broader Impact –**
   The potential to benefit society and contribute to the achievement of specific, desired societal outcomes

NSF Review Criteria: Review Elements

- The following elements should be considered in the review for both criteria:
- What is the potential for the proposed activity to:
  - ***advance knowledge*** and understanding within its own field or across different fields (**Intellectual Merit**); and
  - ***benefit society*** or advance desired societal outcomes (**Broader Impacts**)?
- To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- 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?
- How well qualified is the individual, team, or institution to conduct the proposed activities?
- Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?

Over 1,300 proposals were RWR in FY 2016

5 most common reasons why

1. Not responsive to the PAPPG or program announcement/solicitation (nearly half)
2. Does not meet an announced proposal deadline date and time
3. Duplicative or substantially similar to a proposal already under consideration
4. Not substantively revised from a proposal that was previously reviewed and declined
5. Duplicates another proposal that was already awarded

NSF's Proposal & Award Process Timeline

https://www.nsf.gov/bfa/dias/policy/merit_review/

Types of Reviews

- Ad Hoc (individual reviewer)
- Panel (gathered reviewers)

- Combination
- Internal
  - Reviewed by NSF Program Officers (special cases)

How are Reviewers Selected?

- **Three or more external reviewers per proposal**
- **No conflicts of interest**
- **Types of reviewers recruited: depth and breadth**

- **Sources of reviewers**
  - Former reviewers
  - Program Officer's knowledge of the research area
  - References listed in proposal
  - Recent professional society program
  - S&E journal articles related to the proposal
  - Reviewer recommendations included in proposal

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

What is the Role of the Reviewer?

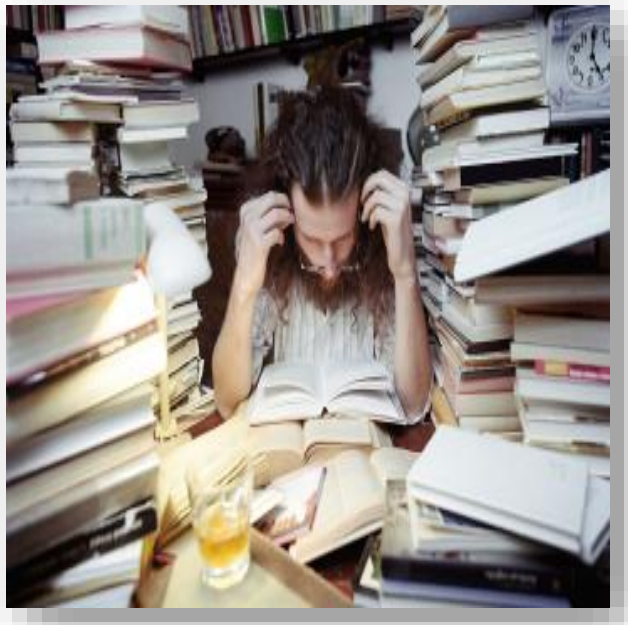
Review all proposal material and consider

- 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

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
- Discern relative merit of all proposals considered by panel



Managing Conflicts of Interest in the Review Process

- The primary purpose is to remove or limit the influence of ties to an applicant institution or investigator that could affect reviewer advice.

- The secondary purpose is to preserve the trust of the scientific community, Congress, and the general public in the integrity, effectiveness, and evenhandedness of NSF's merit review process.

NSF's Proposal & Award Process Timeline

https://www.nsf.gov/bfa/dias/policy/merit_review/

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
- If panel reviewed:
  - Panel summary
  - Context statement

- Program Officer comments, as necessary, to explain a decision

Examples of Reasons for Declines

- The proposal was not considered to be competitive based on the merit review criteria and the program office concurred.
- The proposal had flaws or issues identified by the program officer.
- The program funds were not adequate to fund all competitive proposals.

Revisions and Resubmissions

Points to consider:

- Do the reviewers and the NSF Program Officer identify significant strengths in your proposal?

- Can you address the weaknesses that reviewers and the Program Officer identified?

- Are there other ways you or your colleagues think you can strengthen a resubmission?

Again, if you have questions, contact the cognizant Program Officer.

NSF's Proposal & Award Process Timeline

For more info:

https://www.nsf.gov/bfa/dias/policy/merit_review/

Ask Early, Ask Often!

Contact the cognizant Program Officer

Questions?

Faculty Early Career Development Program

"CAREER"

www.nsf.gov/career

CAREER Awards

NSF 17-537

Future Due Dates:

Third Wed	**BIO, CISE, EHR**	July 17, 2019
Third Thursday	**ENG**	July 18, 2019
Third Friday	**GEO, MPS, SBE**	July 19, 2019

Future Years: Third Wednesday, Thursday, Friday of July

www.nsf.gov/career

CAREER Awards

Foundation wide

Supports junior faculty/new investigators

Research and education integration

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

CAREER Awards

Stable support for 5 years

Minimum award

$500K in BIO, ENG, Office of Polar Activities

$400K in other directorates

No official maximum, but subject to program's resources (speak with your Program Officer)

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
Award Size

NSF CAREER Coordinating Committee
Sets NSF-wide goals

Talk to Division Contact(s) for more information
(*http://www.nsf.gov/crssprgm/career/contacts.jsp*)

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!

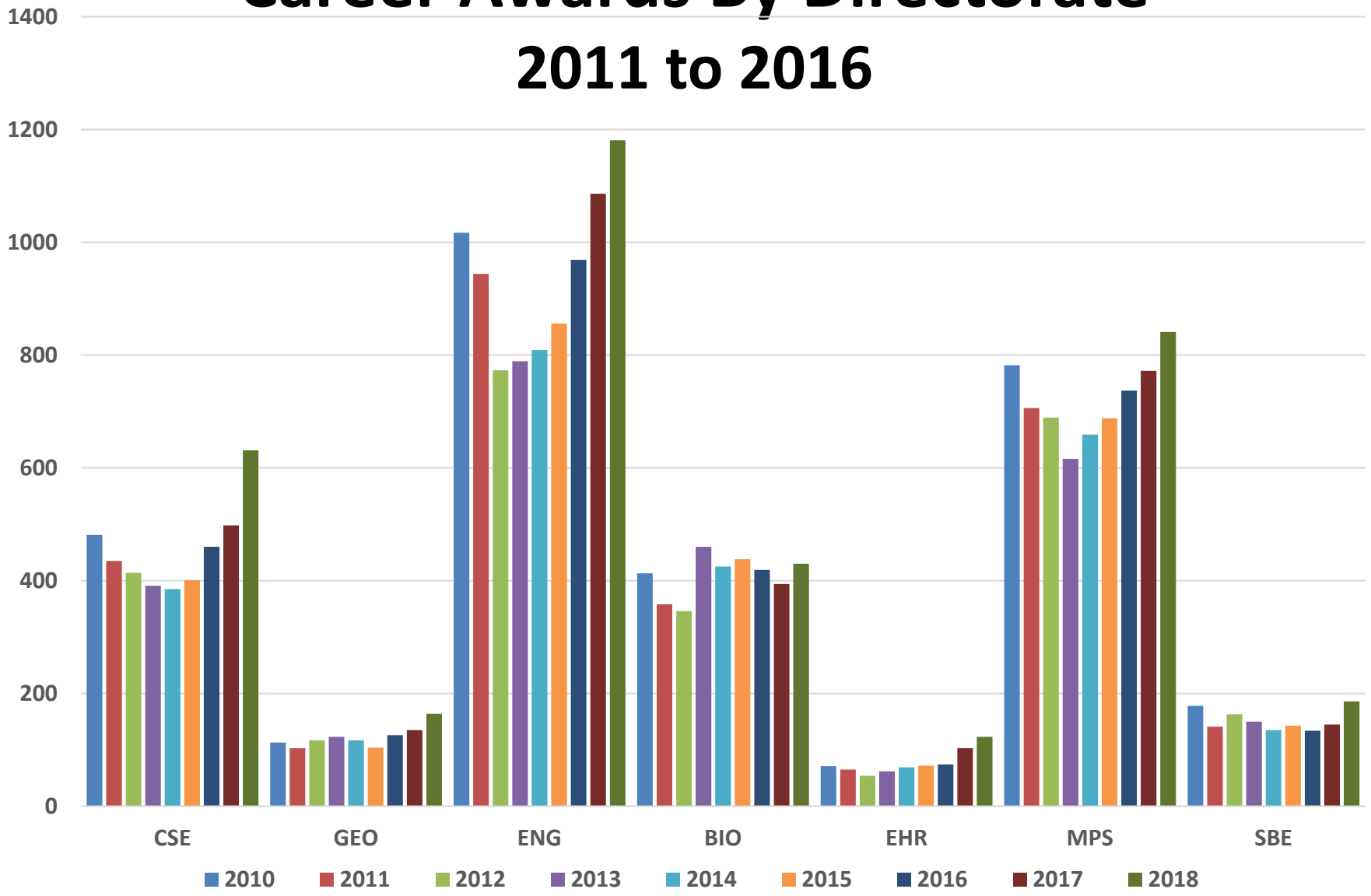
Goes outside the education box of regular research proposals in the field

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



Questions?

Panel

Lessons Learned From Successful Principal Investigators

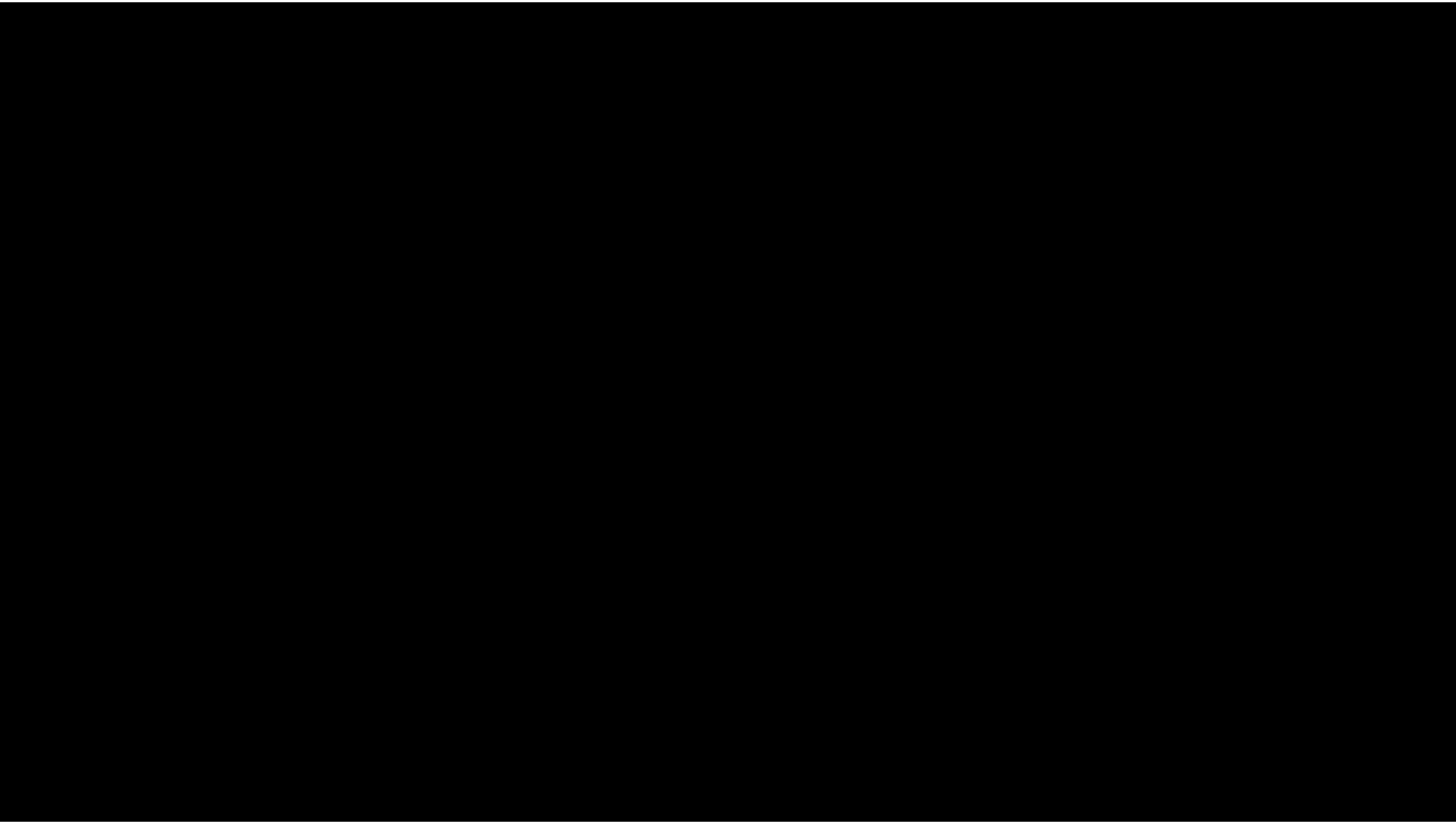
Laura Crossey, University of New Mexico
Bill Michener, New Mexico EpScoR
Thomas Manz - South Dakota State Univer
Jenn Rodgers – University of New Mexico
Lisa Young – New Mexico Tech

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

Lunch Break

Please join tables with colleagues whose disciplinary focus is similar to yours

NSF TRANSFORMS OUR FUTURE



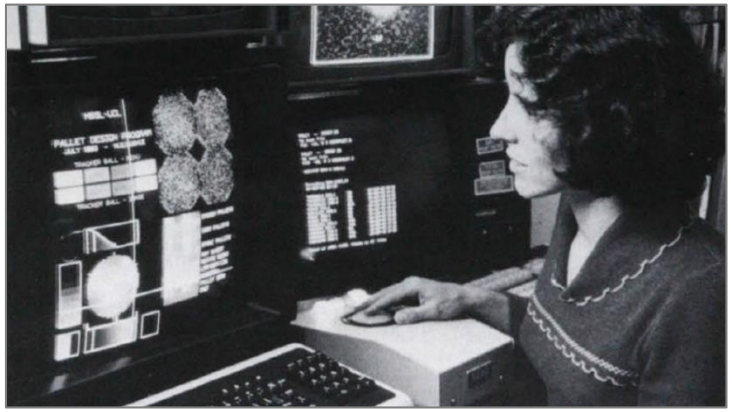
Dr. France Córdova, Director
National Science Foundation

Dr. France A. Córdova | Director, National Science Foundation

University of New Mexico | EPSCoR | August 29, 2018

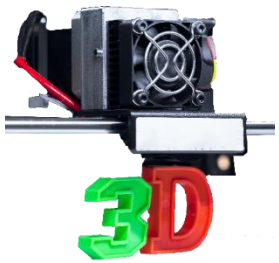
The Brain is Wider Than the Sky

Exploring the Mysteries of the Universe

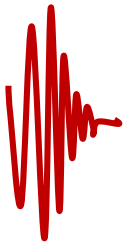


April 2, 2014

NSF Breakthroughs Have Changed the World

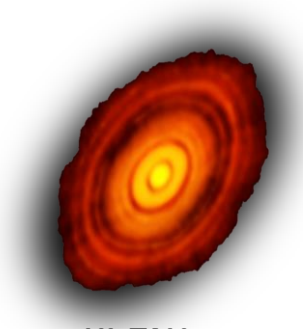


3-D PRINTING BREAKTHROUGH



LIGO GRAVITATIONAL WAVES

AUTONOMOUS CAR SOFTWARE



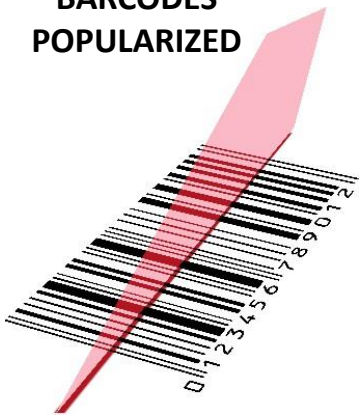
HL TAU DISCOVERY

FOUNDATION FOR THE INTERNET

QUALCOMM®

SBIR

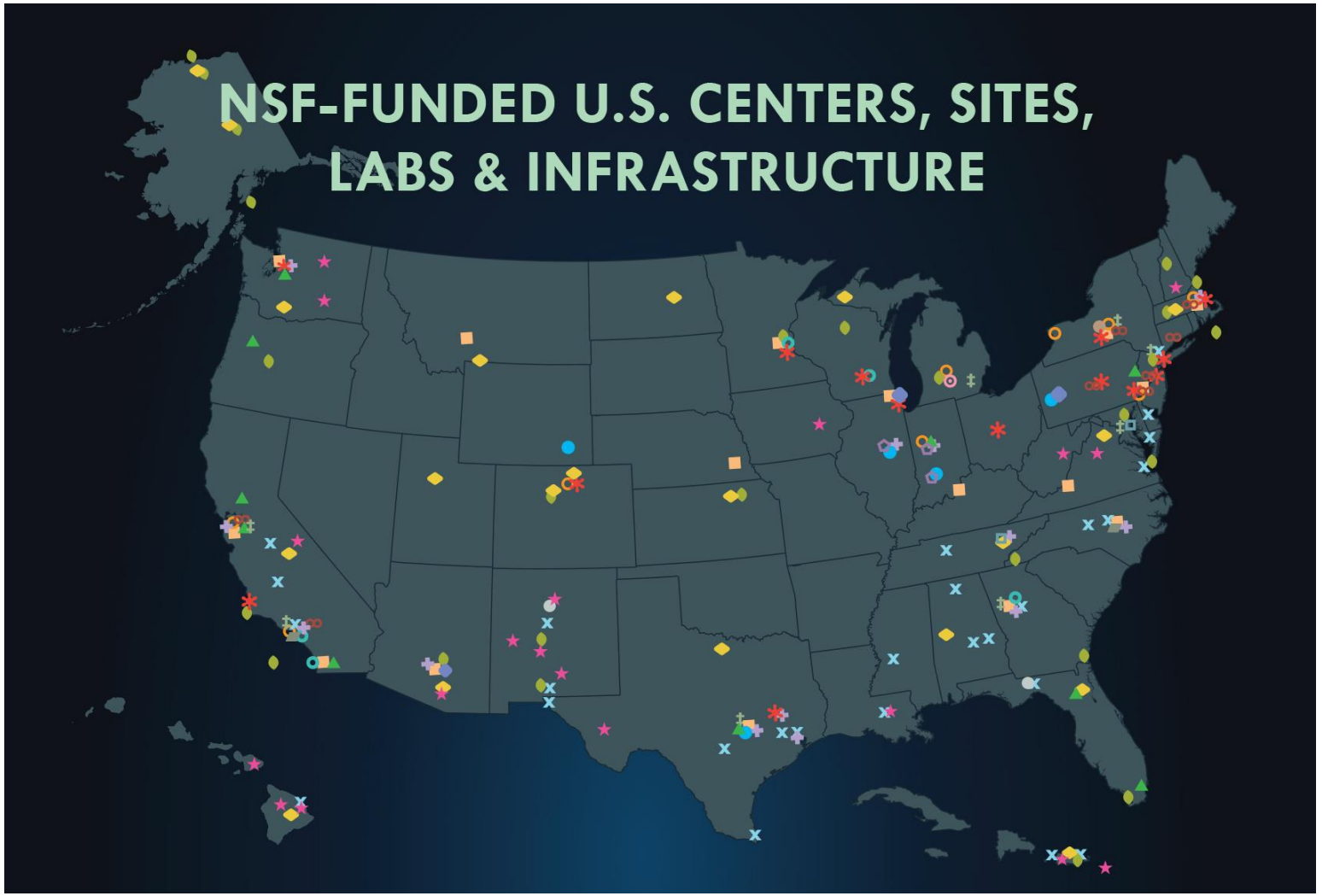
BARCODES POPULARIZED



Google

EARLY WEB BROWSER

NSF Presence in the U.S.



NSF Active in New Mexico (FY 2017)

Received $51,700,000 in NSF funding supporting:

Nine universities to bolster the STEM workforce and continued support for scientific research

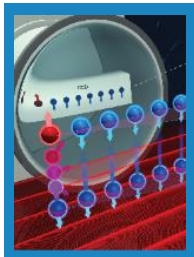
Four small businesses in order to create jobs and help rebuild the economy

NSF's 10 Big Ideas | Research Ideas

Harnessing Data for 21st Century Science and Engineering

The Future of Work at the Human-Technology Frontier

Navigating the New Arctic



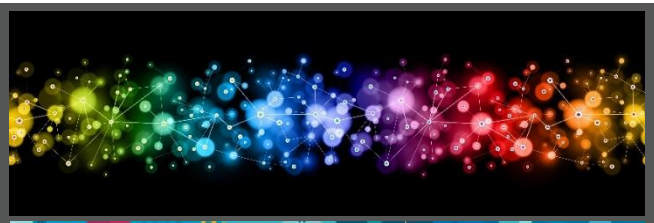
The Quantum Leap: Leading the Next Quantum Revolution

Understanding the Rules of Life: Predicting Phenotype

Windows on the Universe: The Era of Multi-messenger Astrophysics

NSF's 10 Big Ideas | Process Ideas

Growing Convergence Research at NSF



NSF 2026: Seeding Innovation

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

Mid-scale Research Infrastructure

The NSF 2026 Idea Machine

We need YOU to help create the Big Ideas of the future

Competition Opens August 31, 2018

http://bit.ly/NSF_IDEA_MACHINE

#NSFIdeaMachine

Dr. France A. Córdova | Director, National Science Foundation

University of New Mexico | EPSCoR | August 29, 2018

Crosscutting & NSF-wide Opportunities

What Is meant by crosscutting?

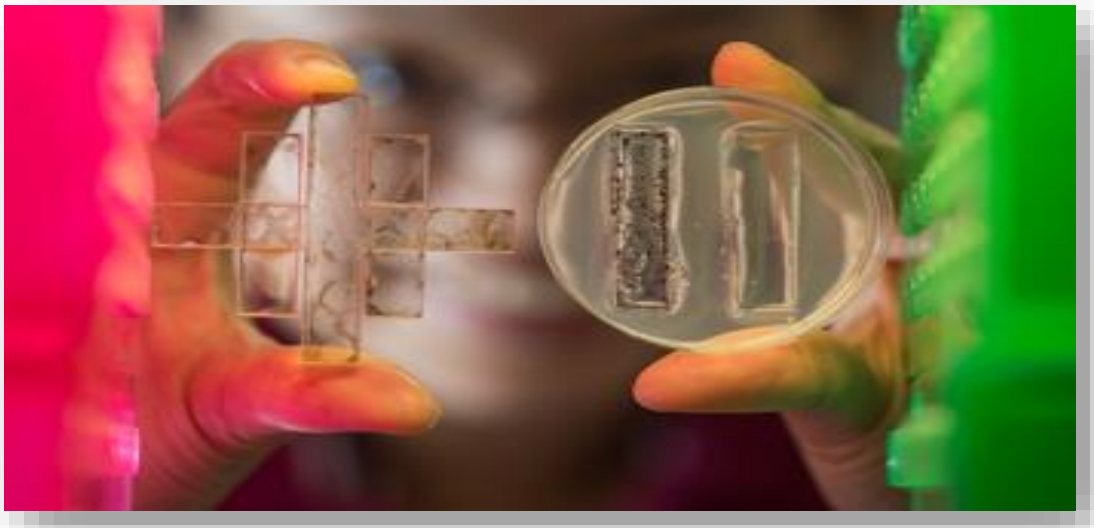
Sponsored by >1 NSF unit….

Cuts across NSF in different ways...

Collaborative with other
U.S. government agencies…

Types of Crosscutting Activities

- Cross-disciplinary (10 Big Ideas)
- Broadening participation or People-oriented
- Fellowships/Opportunities Education & Training
- Building Research Communities
- Infrastructure
- Data Sciences
- Translational
- International



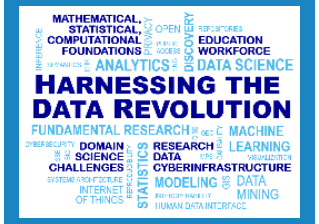
Cross-Disciplinary Initiatives

10 BIG IDEAS

INFEWS

Ten Big Ideas for Future NSF Investments

RESEARCH IDEAS

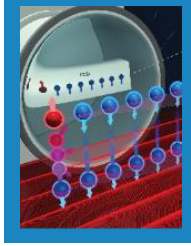


Harnessing Data for 21st Century Science and Engineering

Work at the Human-Technology Frontier: Shaping the Future

Navigating the New Arctic

Windows on the Universe: The Era of Multi-messenger Astrophysics



The Quantum Leap: Leading the Next Quantum Revolution

Understanding the Rules of Life: Predicting Phenotype

PROCESS IDEAS

Mid-scale Research Infrastructure

NSF 2026

Growing Convergent Research at NSF

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

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

Goal is to build a community of interdisciplinary scholars

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

The Central INFEWS Competition

Requires attention to food, energy and water systems

Requires involvement from disciplines supported by 3 directorates

Requires a systems framework

Proposals go to one of three tracks:

- Modelling
- Innovative Systems Solutions
- Research Coordination Networks

Maximum funding: $2.5 M (Tracks 1,2); $750 K (Track 3)
Solicitation nsf18545
Deadline: Sept. 26, 2018

Broadening Participation

NSF INCLUDES

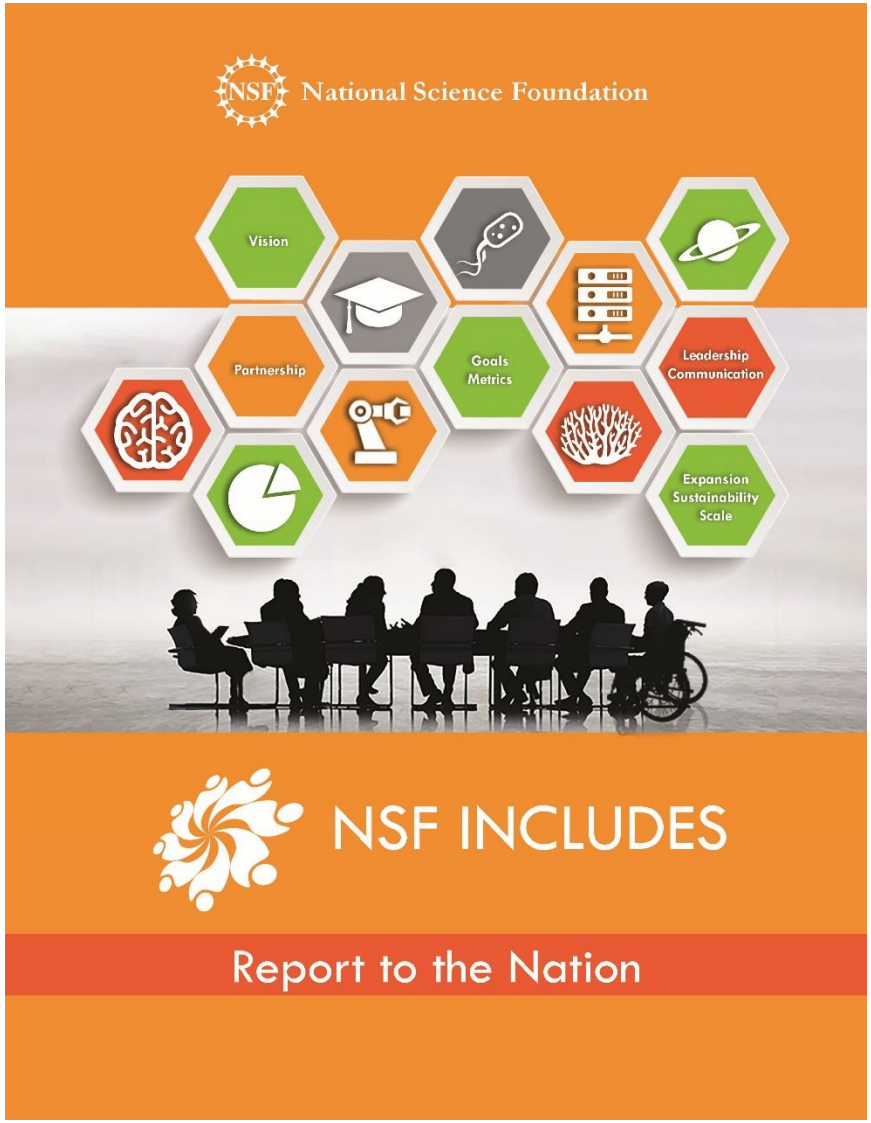
ADVANCE

HBCU-UP, EiR

TCUP

NSF "INCLUDES"

Inclusion across the
Nation of
Communities of
Learners of
Underrepresented
Discoverers in
Engineering and
Science



NSF INCLUDES

***Collaborative Infrastructure**
***Networked-relationships**
***Talent from all sectors *STEM workforce**
***Spur a national conversation for "bold visions"**

- **Launch Pilots: planning for partners to share goals and purposes.**
- **Alliances: leverage pilots adding new partners.**
- **Backbone organizations: provide increased communications, interoperability, coordination, support and accountability for the Network of Alliances.**
- **NSF 18-529**

Deadline: April 2, 2019

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
NSF 16-594

COMPETITION WILL RUN EVERY OTHER YEAR

INSTITUTIONAL TRANSFORMATION

Preliminary Proposals – April 2019

Full Proposals – January 2020

ADAPTION

Letter of Intent – August 2019

Full proposal – September 2019

PARTNERSHIPS

Letter of Intent – December 2018

Full proposal – January 2020

Historically Black Colleges and Universities Undergraduate Program

HBCU-UP

NSF organizations participating in EiR:

BIO CISE ENG GEO MPS SBE OIA

Types of Awards:

Collaborative projects of up to $1,000,000 to build and support the development of research capacity at HBCUs.

Research projects of up to $500,000 to support research by individual PIs.

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

Undergraduate Research

Student Stipends

Equipment

Facilities

Travel and…

TCUP – NSF 18-546

Transformative Capacity Building

ICE-TI , TSIP, TEA Centers, Pre-TI

Multiple Institution Collaborations

PAGE, PADLE

Individual Investigator Studies

SGR, SEA-PHAGES in TCUs

Fellowships and Opportunities

GRFP

GRIP

INTERN

PRFs

Graduate Research Fellowship Program

GRFP Goals

- To select, recognize, and financially support individuals who have demonstrated the potential to be high achieving scientists and engineers, early in their careers.

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

GRFP Unique Features

- **Fellowship**: Awarded to individual
- **Flexible:** Choice of project, advisor & graduate program
- **Unrestrictive:** No service requirement afterward
- **Portable:** Can be used at any accredited U.S. institution
  - MS, PhD, both degrees

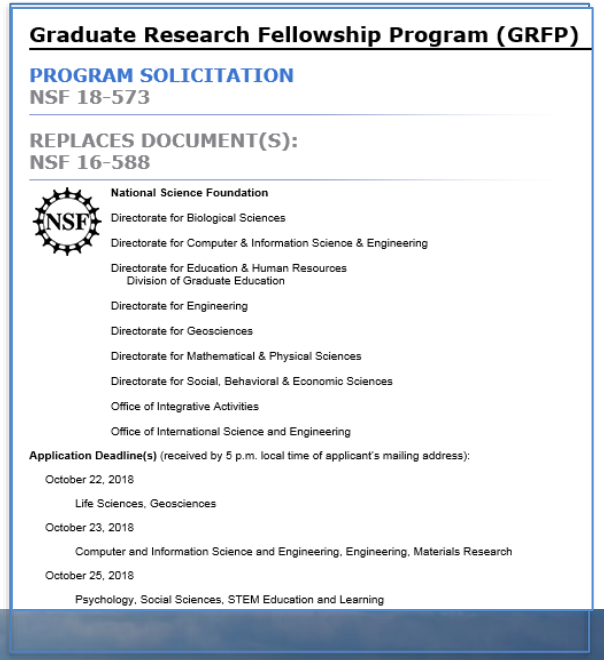
- **2010 - 2018:** 2,000 Fellowships yearly
  - 2016: ~16,800 Applications - ~12 % success rate
  - 2017: ~13,200 Applications - ~15 % success rate
  - 2018: ~12,400 Applications - ~16 % success rate

GRFP Benefits

Five Year Award – $138,000

- Three years of support
  - $34,000 Stipend per year
  - $12,000 Educational allowance to institution
- Professional Development Opportunities:
  GRIP: Internships at federal agencies
  INTERN: other internships
- Supercomputer access: XSEDE
- Career Life Balance (family leave)

See GRFP Solicitation NSF 18-573



Graduate Research Fellowship Program (GRFP)

PROGRAM SOLICITATION
NSF 18-573

REPLACES DOCUMENT(S):
NSF 16-588

National Science Foundation

Directorate for Biological Sciences

Directorate for Computer & Information Science & Engineering

Directorate for Education & Human Resources
Division of Graduate Education

Directorate for Engineering

Directorate for Geosciences

Directorate for Mathematical & Physical Sciences

Directorate for Social, Behavioral & Economic Sciences

Office of Integrative Activities

Office of International Science and Engineering

Application Deadline(s) (received by 5 p.m. local time of applicant's mailing address):

October 22, 2018
Life Sciences, Geosciences

October 23, 2018
Computer and Information Science and Engineering, Engineering, Materials Research

October 25, 2018
Psychology, Social Sciences, STEM Education and Learning

- $5,000 research allowance for Fellows
- Additional research support varies with host

- Access to facilities, equipment, field sites, etc.
- New collaborations and expanded network
- Skill development and exposure to different cultures

Graduate Research Internship Program (GRIP)

Current Hosts:

- Office of Naval Research
- Smithsonian Institution
- Department of Homeland Security
- Federal Bureau of Investigation
- Environmental Protection Agency
- National Oceanic & Atmospheric Administration
- U.S. Census Bureau
- U.S. Dept. of Agriculture
- U.S. Geological Survey

INTERN (Dear Colleague Letter 17-091)

Supplement to NSF GRFP award for Fellows to gain knowledge, skills and experiences through internships in non-academic settings:

- Industry laboratories or industry research and development groups
- Start-ups
- Government agencies and National Laboratories
- Policy think-tanks
- Non-profit organizations

Also available to graduate students (with advisors supported by NSF) in Engineering, Education and Human Resources, and in the Office of Advanced Cyberinfrastructure (OAC; CISE)

RESOURCES:

Solicitation and links www.nsf.gov/grfp

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

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

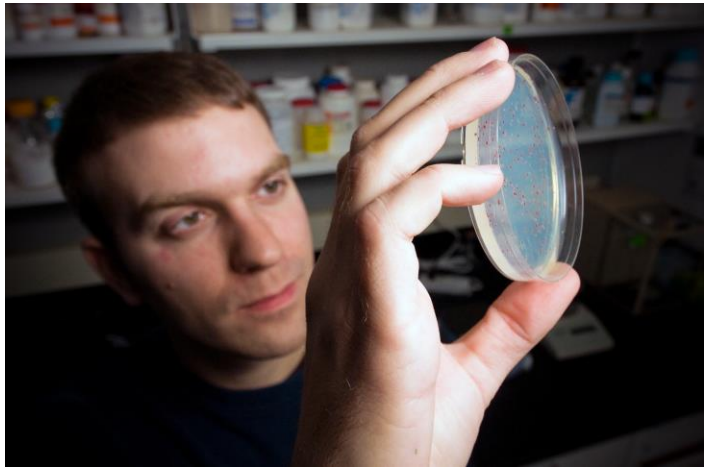
Current & former Fellows 866-NSF-GRFP,
info@nsfgrfp.org

To be a reviewer: https://nsfgrfp.org/panelists

Postdoctoral Research Fellowships

- Allows Postdocs to serve as their own PI
- Directorate/Division-specific; not all Divisions award them
- Up to 2 or 3 years of funding (varies by division)
- Choice of institution and mentor
- Must be US Citizen or permanent resident
- Provides both a Stipend and an Allowance (amounts vary by division and directorate)

- Allowance used for:
  - Benefits
  - Travel
  - Publications
  - Research expenses



https://www.nsf.gov/funding/education.jsp?fund_type=3

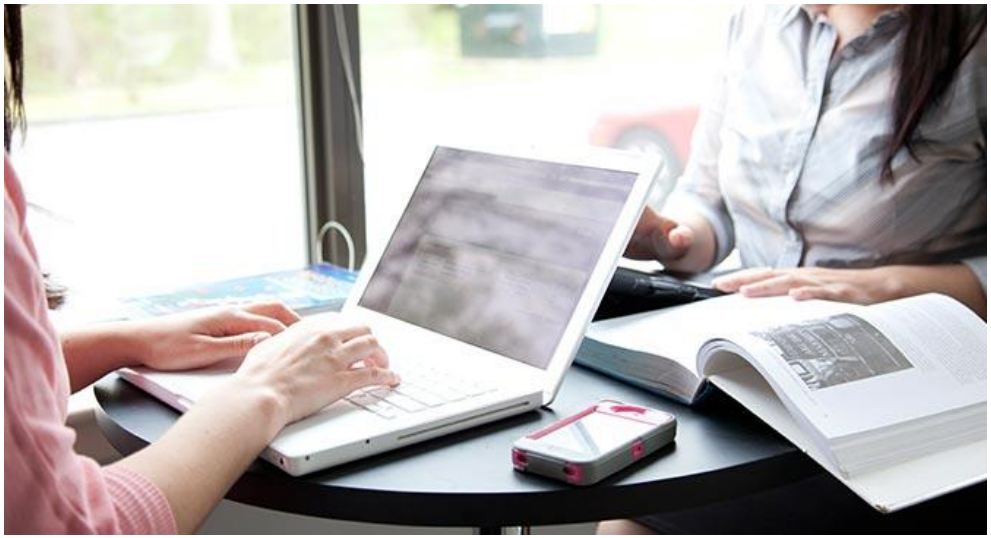
Integrating Research and Education Training

REU

NRT

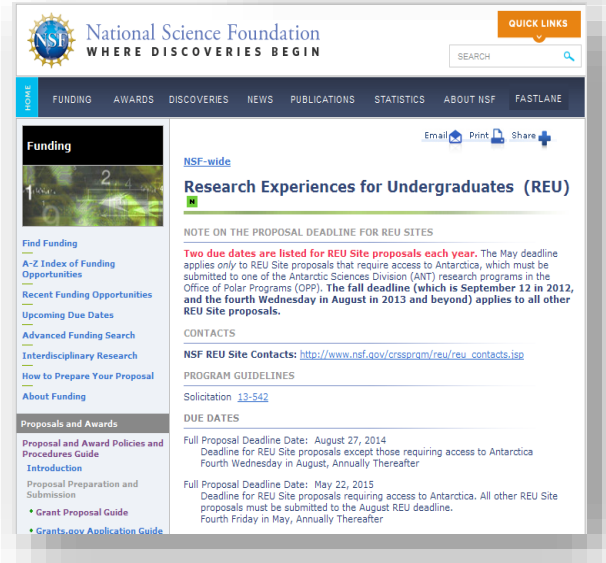
RET

RUI, ROA, PUI



Research Experiences for Undergraduates

NSF 13-542



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.

To search for an REU site, visit: www.nsf.gov/crssprgm/reu/reu_search.jsp

NSF Research Traineeship (NRT) Program 18-507

The **NRT Program,** encourages the development of innovative models for STEM graduate training

- Supports training STEM graduate students in high priority interdisciplinary research areas
- Supports professional development to foster an inclusive workforce ready to enter diverse STEM career

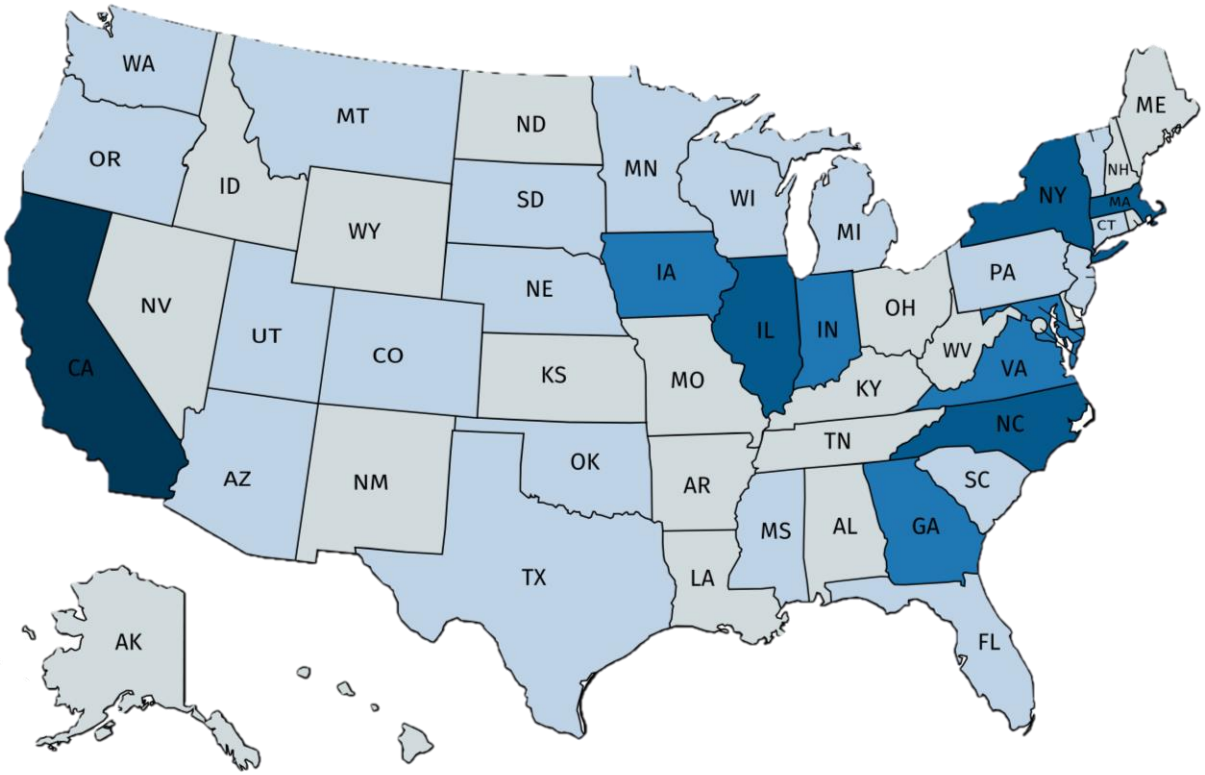
Letter of Intent Submission: Nov. 26 to Dec. 6, 2018
Full grant proposal due date: Feb. 6, 2019

NSF Research Traineeship (NRT) Program

Awards

51 Funded Projects

30 States



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

14-579

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

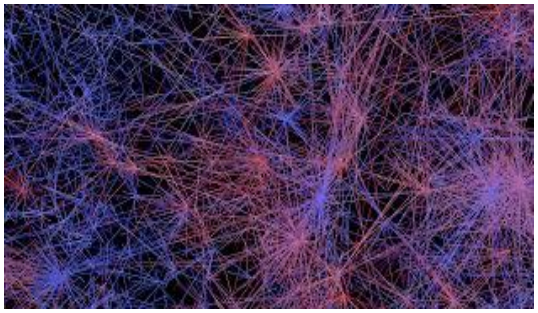
Building Research Communities

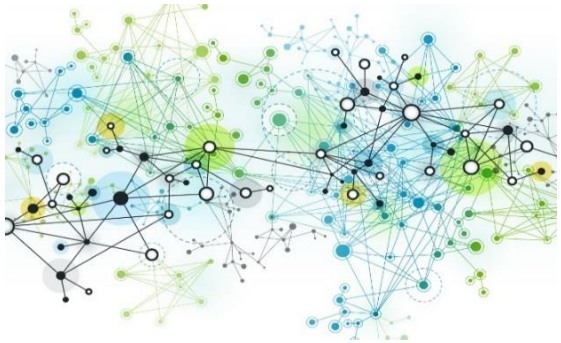
RCNs

Workshop proposals

Ideas Lab

Research Coordination Networks (RCNs)





Goal is to advance a field or create new directions by supporting groups of investigators to communicate and coordinate research, training, and educational activities across boundaries.

Does not support primary research activities
Deadline varies by program
Not all programs accept RCN proposals

Contact the relevant program before submitting RCN proposal

Program Solicitation – NSF 17-594

Workshops

One mechanism to bring together different components of the research community (sectors, fields, nationalities) to address common areas of interest

- Discuss research directions, gaps, techniques, advances, approaches
- Share ideas and best practices
- Build connections and identify potential areas of collaboration
- Promote student/early career participation

Contact the relevant program before submitting a workshop proposal

Infrastructure

EPSCoR

MRI

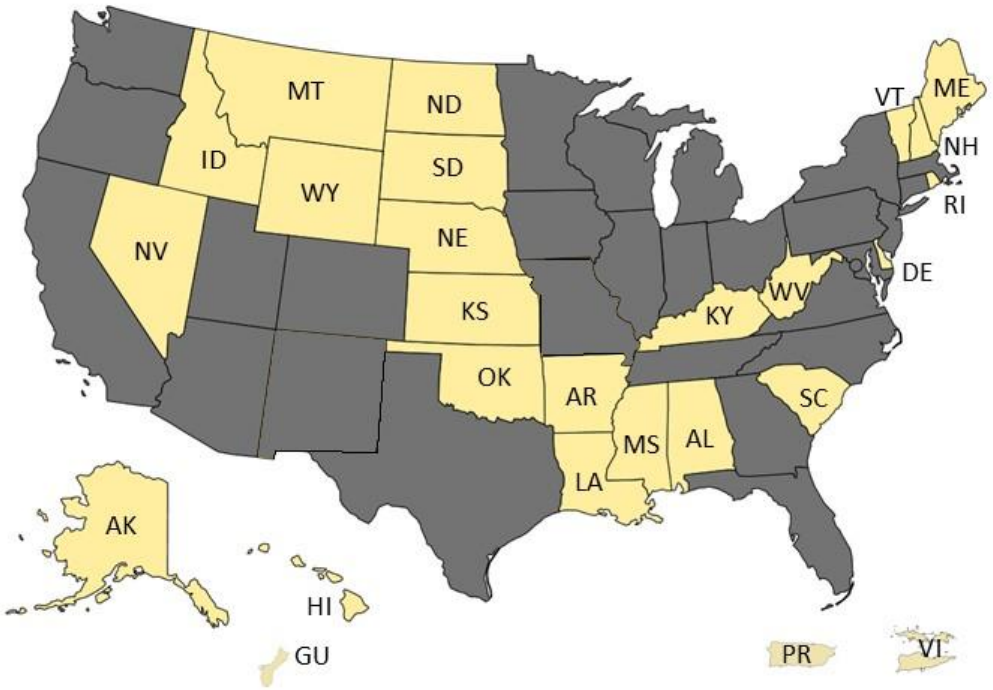
STC

ERC

Established Program to Stimulate Competitive Research (EPSCoR)

Enhances research capacity and competitiveness of targeted jurisdictions by strengthening STEM capability

NSF EPSCoR FY18 Eligibility



States

AL Alabama
AK Alaska
AR Arkansas
DE Delaware
HI Hawaii
ID Idaho
KS Kansas
KY Kentucky
LA Louisiana
ME Maine
MS Mississippi
MT Montana
NE Nebraska
NH New Hampshire
ND North Dakota
NV Nevada
OK Oklahoma
RI Rhode Island
SC South Carolina
SD South Dakota
VT Vermont
WV West Virginia
WY Wyoming

Other

GU Guam
PR Puerto Rico
VI U.S. Virgin Islands

EPSCoR states and other U.S. jurisdictions eligible for EPSCoR during FY 2018

EPSCoR Investment Strategies

- **Research Infrastructure Improvement (RII)**

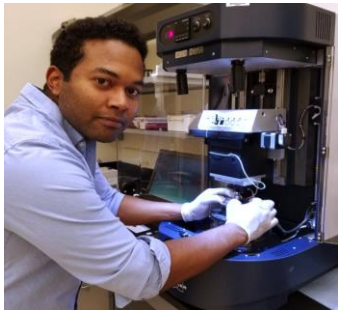
  Support physical, human, and cyber infrastructure

- **Co-Funding with NSF Directorates and Offices**

  Meritorious proposals reviewed in other NSF programs

- **Outreach and Workshops**

  EPSCoR Community-wide activities and NSF staff interaction



EPSCoR & New Mexico

EPSCoR funding since 2001: $89.9 M

$60.0M in RII, $29.8M in co-funding, and $0 in outreach

NSF funding in FY 2017: $51.7M; 92 awards;

24.3 percent success rate

New Mexico EPSCoR https://www.nmepscor.org/

NM RII Track-1 Award https://www.nmepscor.org/about-science-focus

Major Research Instrumentation (MRI)

- **Acquisition or development** of research instrumentation (incl. cyber-infrastructure)
- **Shared-use/multi-user** instrumentation for **research** and **training**
- **Academic and private sector partnerships**

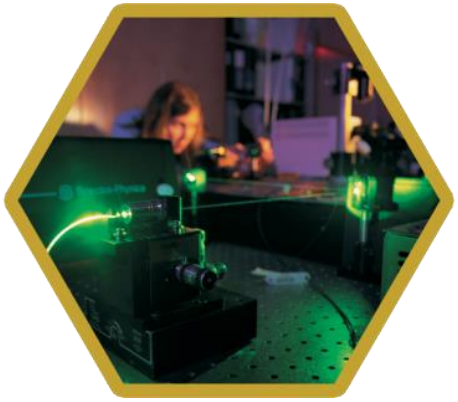
FY 2018 MRI Competition

- Solicitation **NSF 18-513** (significant changes from prior years)

Full proposal window: January 1, 2019 - January 22, 2019; January 1 - January 19, annually thereafter

Science and Technology Centers, Integrative Partnerships (STCs)

- Promote frontier investigations across and/or within NSF-supported S&E area
- Advance discovery and innovation through the integration of cutting-edge research, excellence in education, diversity, and transfer of new knowledge
- 12 current STCs across all NSF disciplines – coordinated and co-managed by IA w other NSF Directorates



Engineering Research Centers (ERCs)

Funded **for 10 years at ~ $4M/year** (a 5-year initial award / 5-year renewal)

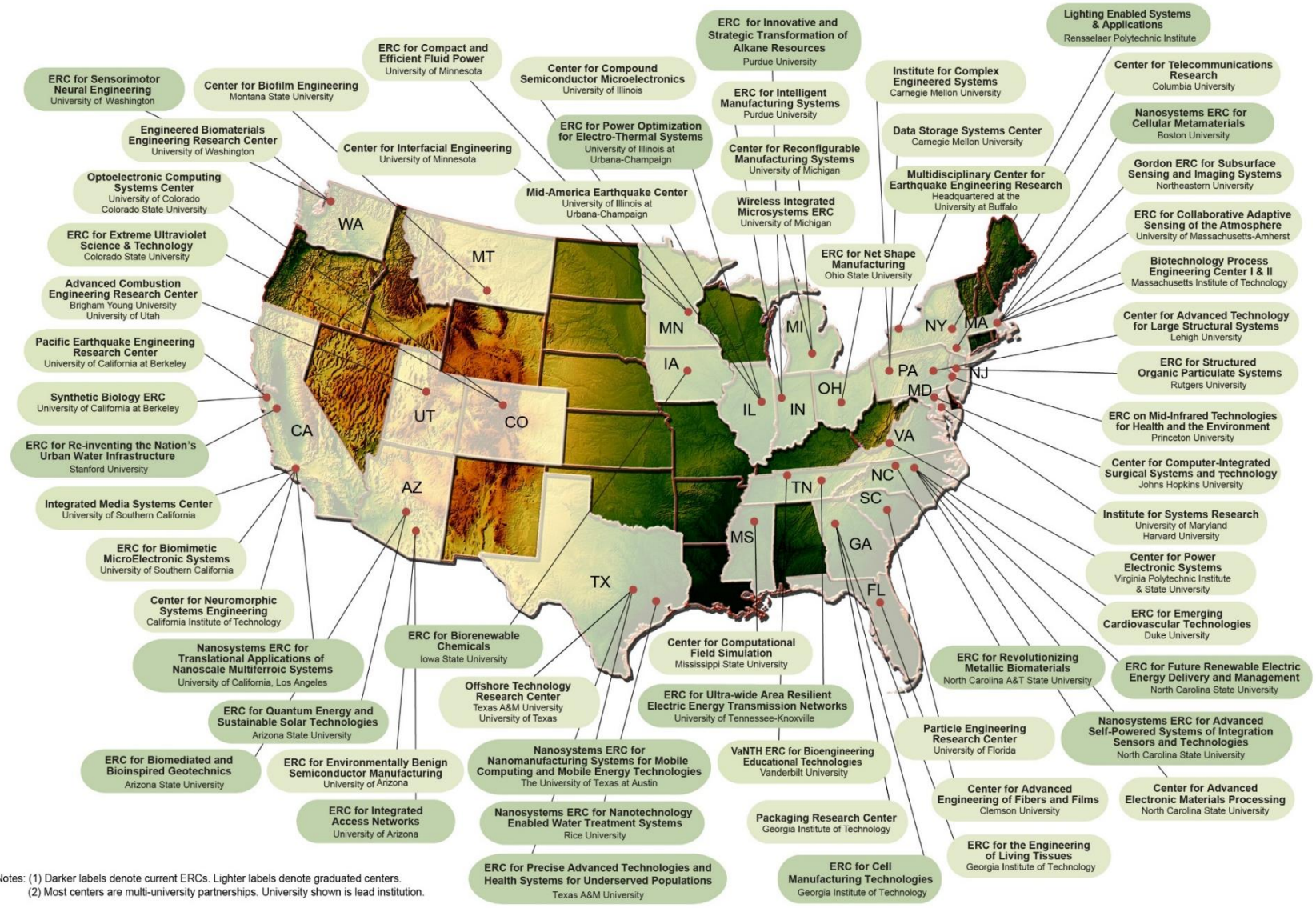
Multi-university, cross-disciplinary academic collaboration

Driven by leading edge complex engineering challenge with significant potential societal impact

Additional support provided by industry, and other partners

Strong integration of research, education and workforce development, diversity and culture of inclusion and innovation ecosystem.

Engineering Research Centers (ERCs)



Notes: (1) Darker labels denote current ERCs. Lighter labels denote graduated centers.
(2) Most centers are multi-university partnerships. University shown is lead institution.

Engineering Research Centers (ERCs)

14 active ERCs -- 4 new ERCs awarded in FY17

- Innovative and Strategic Transformation of Alkane Resources, *Purdue University*
- Cell Manufacturing Technologies, *Georgia Tech*
- Cellular Metamaterials, *Boston University*
- Precise Advanced Technologies and Health Systems For Underserved Populations, *Texas A&M University*

- NASEM's report (2017): "A New Vision for Center-Based Engineering Research"

Data and Cyber Sciences

Big Data

NRI

SaTC

BIGDATA

Goals: Identify novel computation, statistical or mathematical techniques and technologies or novel analyses or experimental evaluation

Two categories for submission:

Foundations: Encourages fundamental techniques, theories, methodologies and technologies of broad applicability.

Innovative Applications: Encourages novel techniques, methodologies, and technologies of interest to at least one specific application (special requirements).

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

Expands the scale and variety of collaborative interactions.

FY 17 Participants
CISE, ENG, SBE,
EHR, USDA/NIFA
DOE/EM, DOD

Open to US universities and colleges, as well as non-profit, non-academic organizations

SaTC
Secure and Trustworthy Cyberspace

- 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

- Proposal designations:
  - Core
  - Education
  - Secure, Trustworthy, Assured and Resilient Semiconductors and Systems (STARSS)
  - Transition to Practice (TTP)

Translational Research and Commercialization

Basic Research

$7.8B

Division of Industrial Innovation and Partnerships

$265M

Translational Research

Tech Translation Partnerships & Commercialization Driven Activities

Partnerships are Critical

Industry

States

National labs

Interagency

International

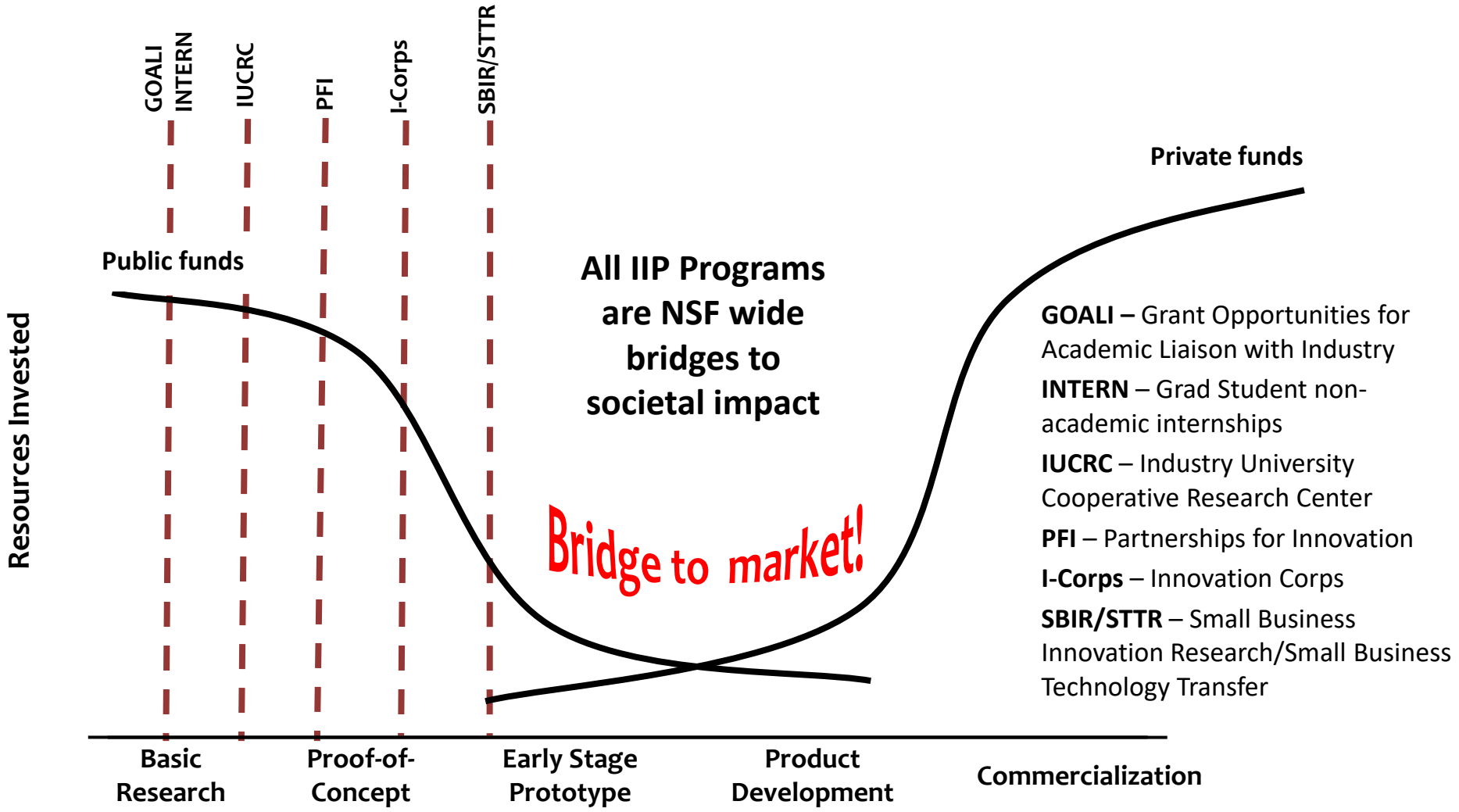
Academia

Foundations

Scientific societies

Division of Industrial Innovation and Partnerships (IIP)

Driving basic research towards societal application



GOALI – Grant Opportunities for Academic Liaison with Industry

INTERN – Grad Student non-academic internships

IUCRC – Industry University Cooperative Research Center

PFI – Partnerships for Innovation

I-Corps – Innovation Corps

SBIR/STTR – Small Business Innovation Research/Small Business Technology Transfer

Division of Industrial Innovation and Partnerships

A key NSF portal driving technological translation and innovation activities

- Build strong industry/University collaborations
  - Industry-University Cooperative Research Centers (IUCRC)
  - Grant Opportunities for Academic Liaison with Industry (GOALI)
- Prepare your graduate students for non-academic careers
  - Internships via INTERN supplements
- Build innovative technology from your research
  - through the Partnerships for Innovation (PFI) Program
- Plan your high-tech startup venture
  - via the Innovation Corps Program: I-Corps
- Commercialize technology via small business
  - Small Business Innovation Research (SBIR/STTR) Program

GOALI Proposals – Key dimensions

- Available NSF-wide as a specialized type of proposal that can be submitted to most programs
- Typical grant is 3-5 years and $100-150K per year.
- Basic research with strong academic-industry collaboration
- Requires an industrial partner (industry co-PI).
- Requires intellectual property agreement completed in advance of funding.

Faculty & Students: Industrial collaboration, education and training

Industry: Access top university research capacity and talent

NSF: Catalyze transformative research & collaborations

Universities: Build pathways to new/stronger links with industry

https://www.nsf.gov/pubs/policydocs/pappg18_1/pappg_2.jsp#IIE4

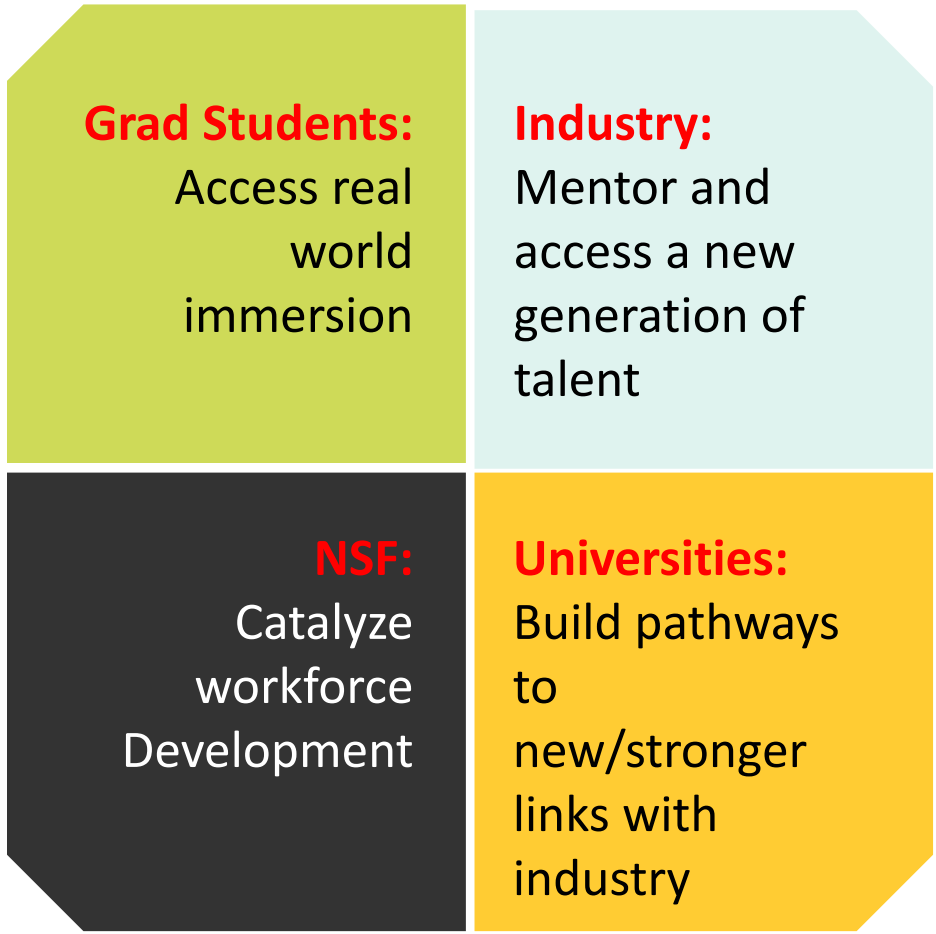
INTERN – Non Academic Internships for Grad Students

Host organizations may include:

- Industry laboratories or research and development groups.
- Start-ups or small businesses.
- Government agencies and National Laboratories.
- Policy think-tanks.
- Non-profit organizations.

$55K for up to 6 months of internship

Need an Intellectual Property agree-ment between university and Host



DCL: https://www.nsf.gov/pubs/2018/nsf18102/nsf18102.jsp?org=NSF

Due dates: May 1, 2019 (FY2019 funds) and May 1, 2020 (FY2020 funds).

Industry-University Cooperative Research Centers (IUCRC)

Collaborate strongly with industry
Leverage Industry funding
Industrial exposure to students/faculty

NSF provides $ for administrative and management costs + Members provide $ for research (only 10% overhead) = Increased $ for university Research

Broad areas of coverage

- **Advanced Electronics & Photonics**
- **Advanced Manufacturing**
- **Advanced Materials**
- **Biotechnology**
- **Civil Infrastructure Systems**
- **Energy and Environment**
- **Health and Safety**
- **Information Communication & Computing**
- **System Design and Simulation**

Partnerships for Innovation (PFI)

www.nsf.gov/PFI

- Primary source of technology development funding at NSF for researchers in academia and non-profits
  - projects with *potential for accelerated commercialization*
  - proof-of-concept work
  - prototype development
- Support partnerships and multi-disciplinary innovation ecosystems
- Broadening participation, Professional development, mentoring on entrepreneurship and technology translation
- Drive basic research into a technology innovation phase!

I-Corps™ - *Entrepreneurial training towards effective business model creation*

Most academic spinouts fail because they develop something

NO ONE CARES ABOUT

Do customers want something more efficient?

or maybe just cheaper?

or just smaller?

How do they adopt new technologies ?

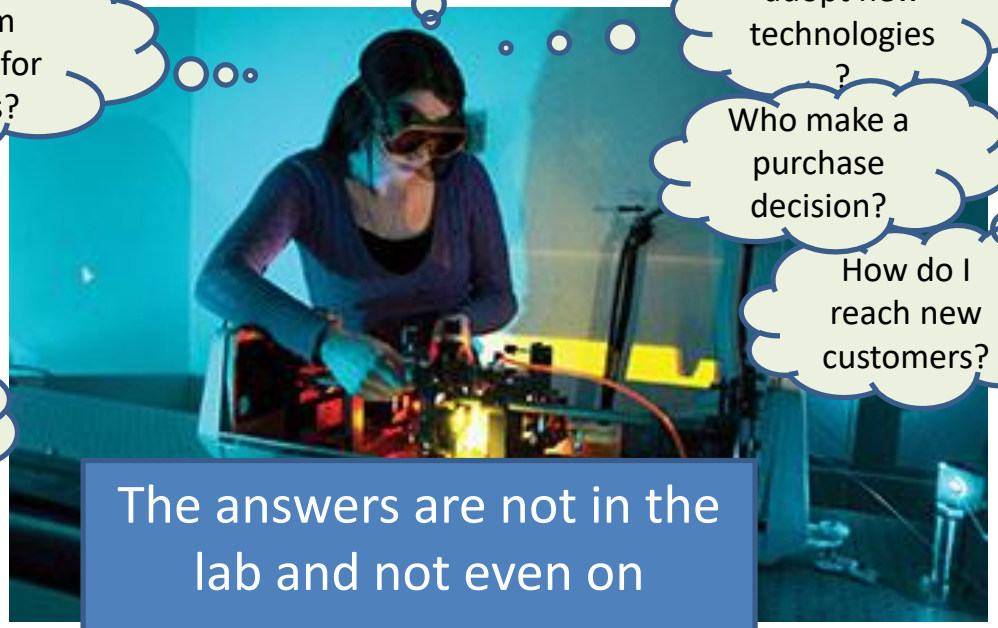
Who make a purchase decision?

How do I reach new customers?

What problem does this solve for my customers?

Is that a big problem?

or maybe just inconvenient ?



The answers are not in the lab and not even on campus

America's SEED FUND
SBIR.STTR

- Awards $200 million per year to roughly 400 small businesses/startups
- Supports research and development of groundbreaking, high-impact, high-risk technology
- Since 2014 NSF funded startups have raised $3.5B in private follow-on investment!

https://seedfund.nsf.gov

Informational Websites

Industry University Cooperative Research Centers
http://www.iucrc.org

Grad Student INTERN Program
https://www.nsf.gov/pubs/2017/nsf17091/nsf17091.jsp

I-Corps™ - Entrepreneurial Education
www.nsf.gov/icorps

Partnerships for Innovation
www.nsf.gov/PFI

Small Business Innovation Research
seedfund.nsf.gov

Questions?

Directorate Breakout Sessions

Thank you for participating in NSF Day!

Please share candid feedback and turn in your evaluation form