NSF Opportunities for Marine Labs and Field Stations

NEAMGLL - Schiller Coastal Studies Center
via Zoom

October 4, 2023

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NSF supports all areas of science and engineering

A New “Horizontal”: Strengthen, Scale Use-Inspired and Translational Research

BIO Structure

Directorate for
Biological Sciences (BIO)

Division of Environmental Biology (DEB)

- Ecosystem Sciences
- Evolutionary Processes
- Population and Community Ecology
- Systematics and Biodiversity Science

Division of Integrative Organismal Systems (IOS)

- Behavioral Systems
- Developmental Systems
- Neural Systems
- Physiological and Structural Systems
- Plant Genome Research Program

Division of Molecular and Cellular Biosciences (MCB)

- Cellular Dynamics and Function
- Genetic Mechanisms
- Molecular Biophysics
- Systems and Synthetic Biology

Division of Biological Infrastructure (DBI)

- Research Resources
- Human Resources
- Centers, Facilities, and Additional Research Infrastructure

How the BIO Divisions Support Research Across Scales

Molecule → Gene → Protein → Cell → Organism → Population → Community → Ecosystem → Biosphere

- Molecular & Cellular Biosciences (MCB)
- Integrative Organismal Systems (IOS)
- Environmental Biology (DEB)
- Biological Infrastructure (DBI)

DBI Structure

Core Programs

Human Resources

Postdoctoral Research Fellowships in Biology (PRFB)
Research Coordination Networks in Undergraduate Biology Education (RCN-UBE)
Research Experiences for Undergraduates (REU)
Building Research Capacity for New Faculty in Biology (BRC-BIO)
Research and Mentoring for Postbaccalaureates in Biological Sciences (RaMP)
Research Experiences for Teachers Sites in Biological Sciences (BIO-RETS)
Leading Culture Change through Professional Societies of Biology (BIO-LEAPS)

Research Resources

Infrastructure Innovation for Biological Research (Innovation)
Infrastructure Capacity for Biological Research (Capacity)
Major Research Instrumentation Program (MRI)

Centers, Facilities, and Additional Research Infrastructure

Biology Integration Institutes (BII)
Center for Advancement of Synthesis of Open Environmental Data and Sciences
Management of Operations and Maintenance of the National Ecological Observatory Network (NEON)
Mid-scale Research Infrastructure-1
Mid-scale Research Infrastructure-2

DBI Structure

Core Programs

Human Resources

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Research Resources

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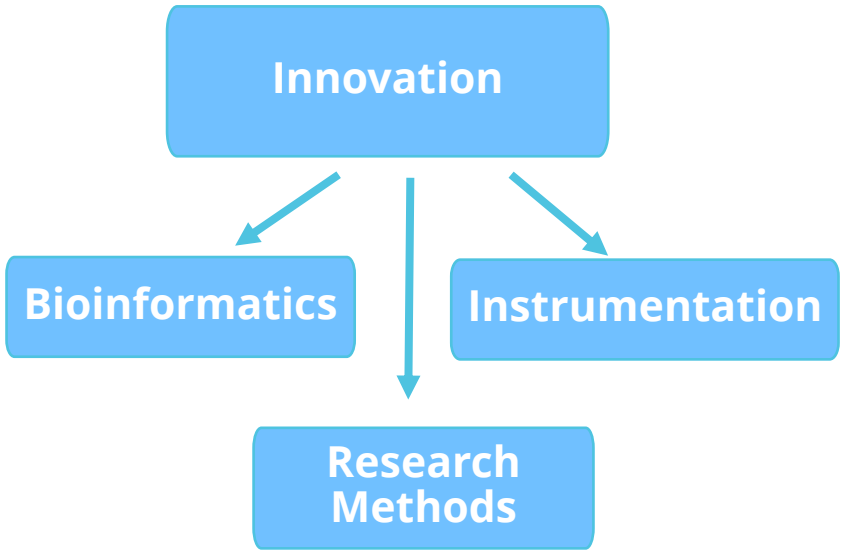
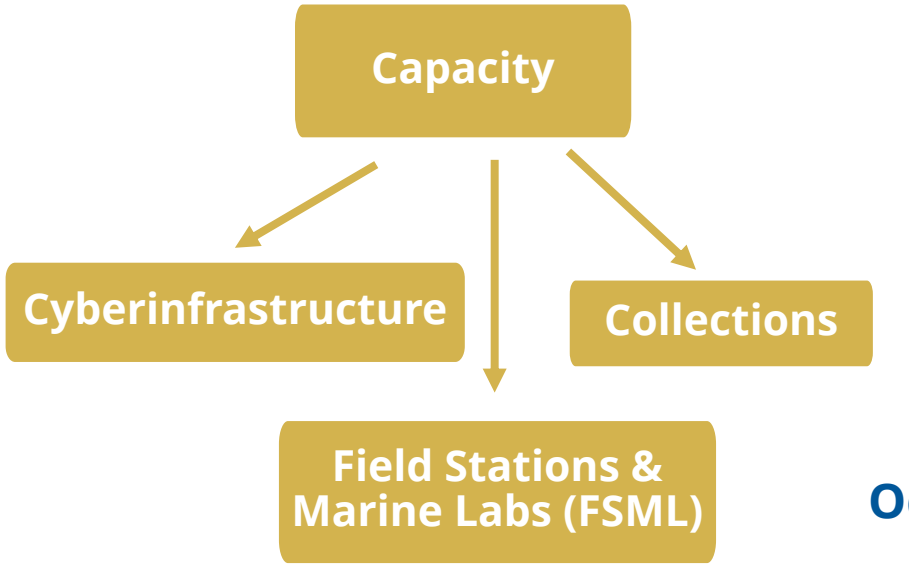
Centers, Facilities, and Additional Research Infrastructure

Biology Integration Institutes (BII)
Synthesis Centers
Management of Operations and Maintenance of the National Ecological Observatory Network (NEON)
Mid-scale Research Infrastructure-1
Mid-scale Research Infrastructure-2
Sustaining

Research Resources Infrastructure



Infrastructure Innovation for Biological Research (Innovation) *NSF 23-538*



Infrastructure Capacity for Biology (ICB) *NSF 23-580*

Major Instrumentation Program

Major Instrumentation Program *NSF 23-519*

October 16, 2023 – November 15, 2023

NO DEADLINES!

Infrastructure Innovation for Biological Research (Innovation)

- **Synopsis**
  - Support research to design novel or greatly improved research tools and methods that advance contemporary biology
- **Programmatic Areas**
  - Innovation: Bioinformatics
  - Innovation: Instrumentation
  - Innovation: Research Methods
- **Program Information**
  - Duration of projects: usually 3 years
  - Number of Awards: 20 to 40
    Anticipated Budget: $18M to $20M

Innovation: Informatics

- **Goal**

  Seek pioneer new approaches to the application of informatics to biological problems

- **Priorities**
  - Creating computational/informatics tools and database architectures that are applicable to a ***broad range*** of biological research questions
  - High degree of novelty and potential impact
  - Publication of new methodologies, proof of concept, or production of a prototype for further development
  - Solve challenging, high-risk problems

Innovation: Instrumentation

- **Goal**

  Supports the design of novel and innovative instrumentation and associated methods

- **Priorities**
  - A significant application to one or more biological science questions
  - Potential to be used by a community of researchers beyond a single research team
  - Projects may include instrumentation for observing any level of biological phenomena (e.g., molecular, cellular, organismal, ecosystem, biome)

Innovation: Research Methods

- **Goal**

  Supports the design of novel and innovative laboratory- or field-based methodologies

- **Priorities**
  - A significant application to one or more biological science questions
  - Potential to be used by a community of researchers beyond a single research team
  - Including any method for measurement, perturbation, or analysis of biological systems in the lab or field
  - Not supported: refinement, optimization, or scaling of existing methods and validation of new reagents for standard approaches (e.g., new antibodies or fluorescent tags).

Infrastructure Capacity for Biology (Capacity)

- **Synopsis**

  Support the implementation of, scaling of, or major improvements to research tools, products, and services that advance contemporary biological research.

- **Programmatic Areas**
  - Capacity: Field Stations & Marine Labs (FSML)
  - Capacity: Cyberinfrastructure
  - Capacity: Biological Collections
- **Program Information**
  - Anticipated Budget: $18M to $20M
  - Number of Awards: 50 to 75

Capacity: Cyber Infrastructure (previously CIBR)

- **Goal**

  Provide robust cyberinfrastructure that will enable transformative biological research

- **Priorities**
  - Finished product that will have demonstrable impact
  - User engagement, design quality, engineering practices, management plan, and dissemination
  - Bringing a proof of concept into a robust, broadly-adopted cyberinfrastructure

Capacity: Biological Collections (previously CSBR)

- **Goal**
  - Support major improvements to or digitization of biological collections and collection-based information increasing the broader applicability of collections
- **Priorities**
  - Enhance, secure, and improve existing research collections
  - Improve the accessibility of collection-related data
  - Develop capacity for curation and collection management
  - Transfer ownership of collections that are significant to the NSF BIO-funded research community
- **Types of [non-federal] biological collections supported**
  - Living stock/culture collections
  - Natural history voucher collections
  - Jointly-curated ancillary collections such as preserved tissues and libraries of genetic and genomic materials

Capacity: Field Stations and Marine Labs (FSML)

- **Goal**

  Supports major improvements to biological field stations or laboratories in any terrestrial, marine, estuarine, or freshwater environment for research and education.

Proposals should focus on well-defined and significant efforts rather than a compilation of small improvements.

- **Improvement Grants**
  - Improvements in the physical plant of a field station or marine laboratory.
- **Planning Grants**
  - Strategic planning for advancing science and education activities at a site or network of sites.

Why NSF Invests in FSMLs

- Natural conditions for experiment, observation, and collection leading to new discovery in biology.
- Environments for training the next generation of biologists, through exposure and participation in field research.
- Venues for the translation of basic science into actions that are beneficial to society.
- Portals for communication of science to the general public.

It is also in the Chips and Science Act

SEC. 10349.

BIOLOGICAL FIELD STATIONS AND MARINE LABORATORIES.

“The Director shall continue to support enhancing, repairing and maintaining research instrumentation, laboratories, telecommunications and housing at biological field stations and marine laboratories.”

FSML program area: Who is eligible?

- “off campus” facilities
- Direct access to habitat where biological observation and/or experimental research can be conducted
- Open to external users

Program Priorities

- Advance capacity for basic research in biology with potential for new discovery
- Enable research funded by NSF's science programs, particularly BIO and GEO
- Promote shared resources accessible to a broad and collaborative community
- Contribute to nation’s research infrastructure capacity
- Broaden the participation in, exposure to, and impacts of biological sciences across the entire social spectrum

We also take into account

- Expectations for energy efficiency, green and sustainable design, and long-term fiscal management.
- Loss of infrastructure due to weather, fire, and other forces
- Expiration of infrastructure use life through deterioration or obsolescence.
- Pandemic impacts

Budgeting Issues

- Salaries
- Cost estimation
- Cost share
- Facilities and Administrative Costs (IDC)
- Contingency
- Build America, Buy America Act

New for the Capacity and Innovation solicitations

- NSF 23-578, Infrastructure Innovation for Biological Research (Innovation)
- NSF 23-580, Infrastructure Capacity for Biology Core Program (Capacity)

- Safe and Inclusive Working Environments:
  - proposers who include off-campus or off-site research as part of their project submit, as supplementary documentation, a Plan for Safe and Inclusive Working Environments.
  - Proposals submitted after July 19, 2023 that involve off-campus or off-site research, defined as data/information/samples collected off-campus or off-site, must include a Safe and Inclusive Work Environments Plan.
  - For this solicitation, this document replaces the required plan associated with the certification in Chapter II.E.9 of the Proposal and Award Policies and Procedures Guide (PAPPG, NSF 23-1). Instructions for inclusion of the Plan for Safe and Inclusive Working Environments can be found in additional proposal preparation instructions.

Major Research Instrumentation (MRI)

- The MRI program assists with the acquisition or development of a shared research instrument that is, in general, too costly or not appropriate for support through other programs.
- Support proposals for shared instrumentation that fosters the integration of research and education in research-intensive learning environments.
- Three tracks:
  - Track 1, up to two proposals less than ~$1.4M.
  - Track 2, up to one proposal between $1.4 – $4.0M.
  - Track 3, up to one additional proposal for He recovery.

Major Research Instrumentation (MRI)

- Instrument Acquisition.
  - A purchase requiring limited personnel and having limited risk to complete.
  - A demonstrated need for the purchase or upgrade of a generally available (yet sophisticated) instrument with little or no modification.
  - Does not support the request for general purpose ancillary laboratory equipment.
  - Does not support the request for multiple instruments.

Major Research Instrumentation (MRI)

- Instrument Development.
  - Demonstrated need for a new or extensively upgraded instrument
  - Should provide enhanced or potentially transformative use and performance.
    - New types of measurements, accuracy, speed, resolving power, capacity, ease of operation, etc.
  - Open up new areas of research or research training.
  - Design, construction, testing, and commissioning.
  - Have potential as a commercial product.

BIO Opportunities for Specific Career Stages

Academic STEM Enterprise: ***NSF & BIO Programs along the Pathways***

Career Stage:	**K-12**	**Undergraduate**		**Post-Bacc**	**Graduate**		**Postdoc**	**Faculty**		
Milestone:	HS Diploma	AA/AS	BA/BS	*Research experience & Prof. Dev & Science identity*	MA/MS	PhD	Postdoc	New	Early-Career	Mid-Career
NSF & BIO Programs:	**[Supp: RET, RAHSS]** **BIO-RET**	**RCN-UBE, REU-Sites, [Supp:REU]**		[Supp: REPS] **RaMP**	*GRFP, NRT, IGE, INTERN*		**PRFB**	**BRC-BIO**	*CAREER,* **ROA**	*MCA NSF21-516,* **Transitions**
								HBCU-EIR, TCUP, ADVANCE, INCLUDES, AGEP, EPSCoR, **[Supp:RUI/ROA]**		

Research Environment Component:	*Culture:* **BIO-LEAPS**

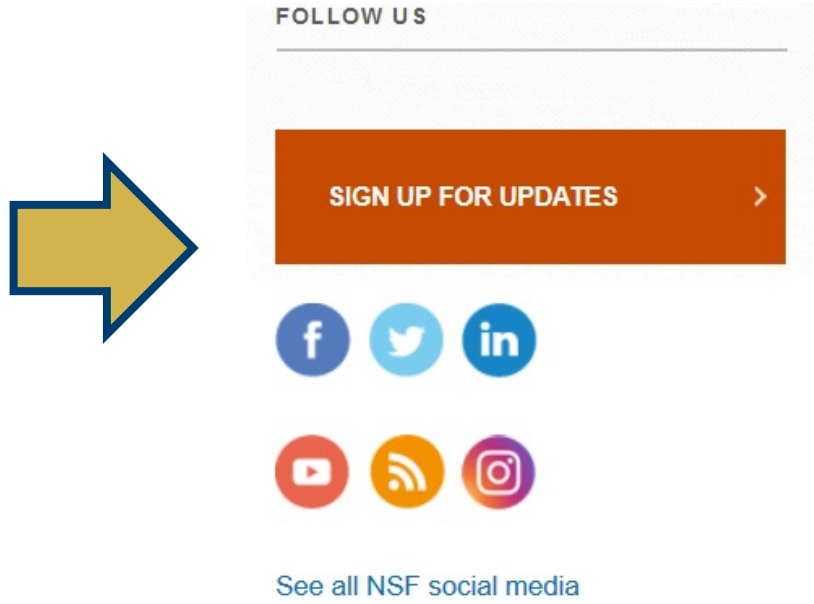
REU Research Experiences for Undergraduates

- **Synopsis**
  - Provides funding to engage undergrads in research
  - Two mechanisms:
    1. REU Sites: Organized training of a group of undergrads in a theme-focused bioscience research. Sites include immersive dive into science and activities to develop student professional skills.
    2. REU Supplements: Supplements to new or existing awards to engage one or more students in the research activity
- **Where do I find more information?**
  - **NSF 23-601, proposals due August 21, 2024**
  - Program Officer: Andrea Holgado de Brigueda

BIO News and Updates

Sign-up for emails on new solicitations; events; due date reminders; and BIO's quarterly newsletter, including information on new priorities and solicitations, highlights from the community, and more!

Visit www.nsf.gov and scroll down until you see the orange sign-up box, click, and follow the prompts.

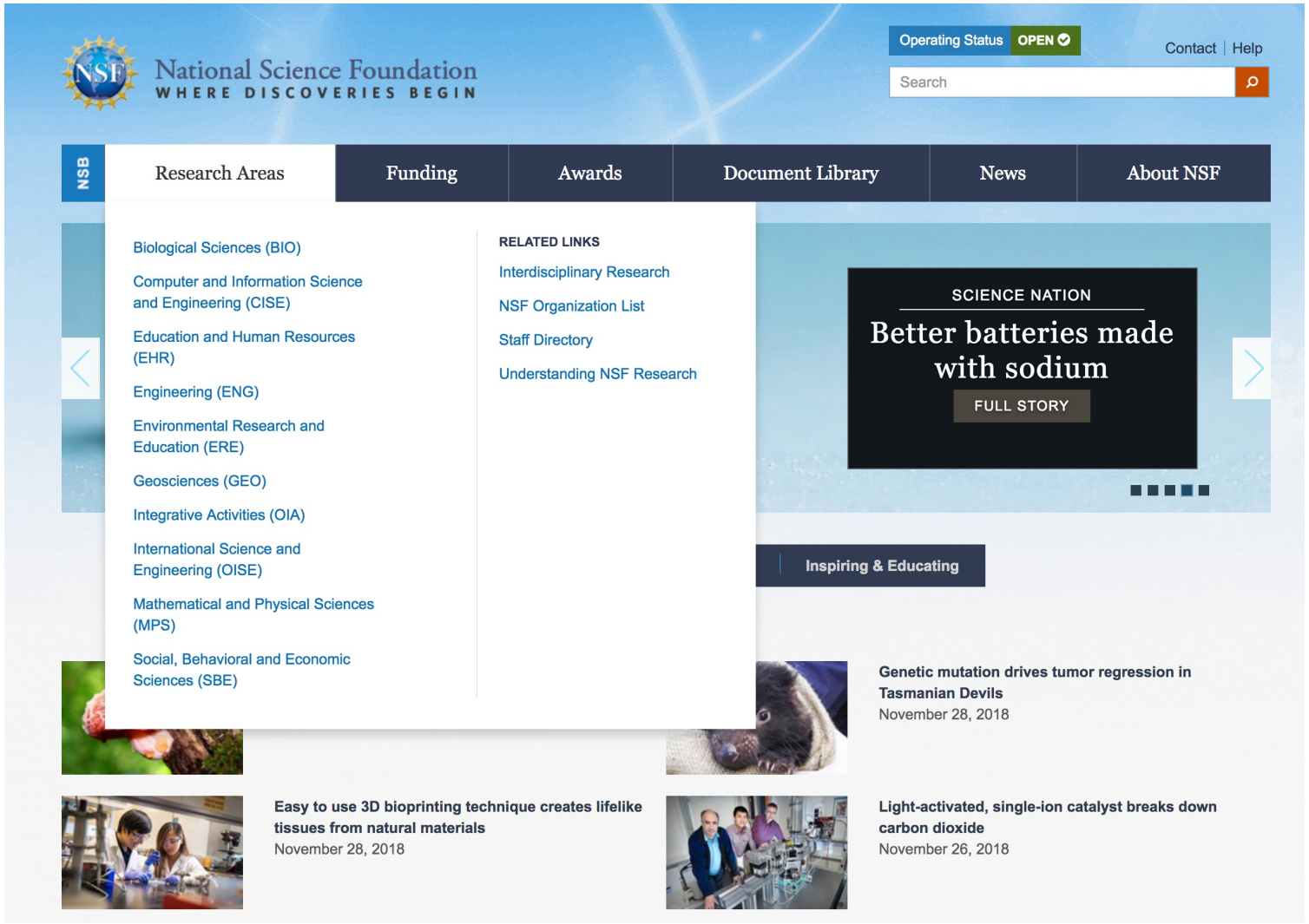


BIO Blogs

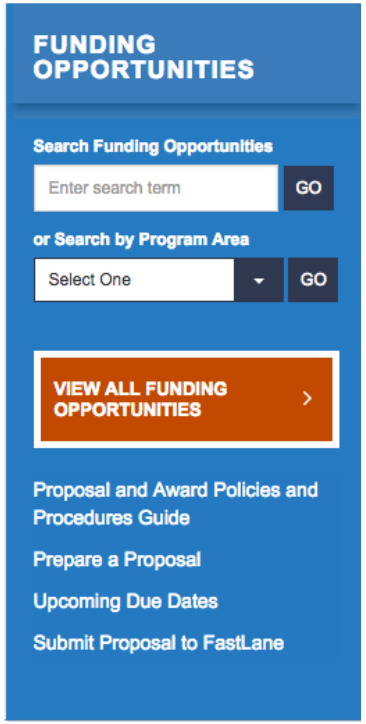
News, features, highlights, and more from OAD and the BIO Divisions

- BIO Buzz (OAD): https://oadblog.nsfbio.com/
- DBInfo (DBI): https://dbiblog.nsfbio.com/
- DEBrief (DEB): https://debblog.nsfbio.com/
- IOS in Focus (IOS): https://iosblog.nsfbio.com/
- MCB Blog (MCB): https://mcbblog.nsfbio.com/

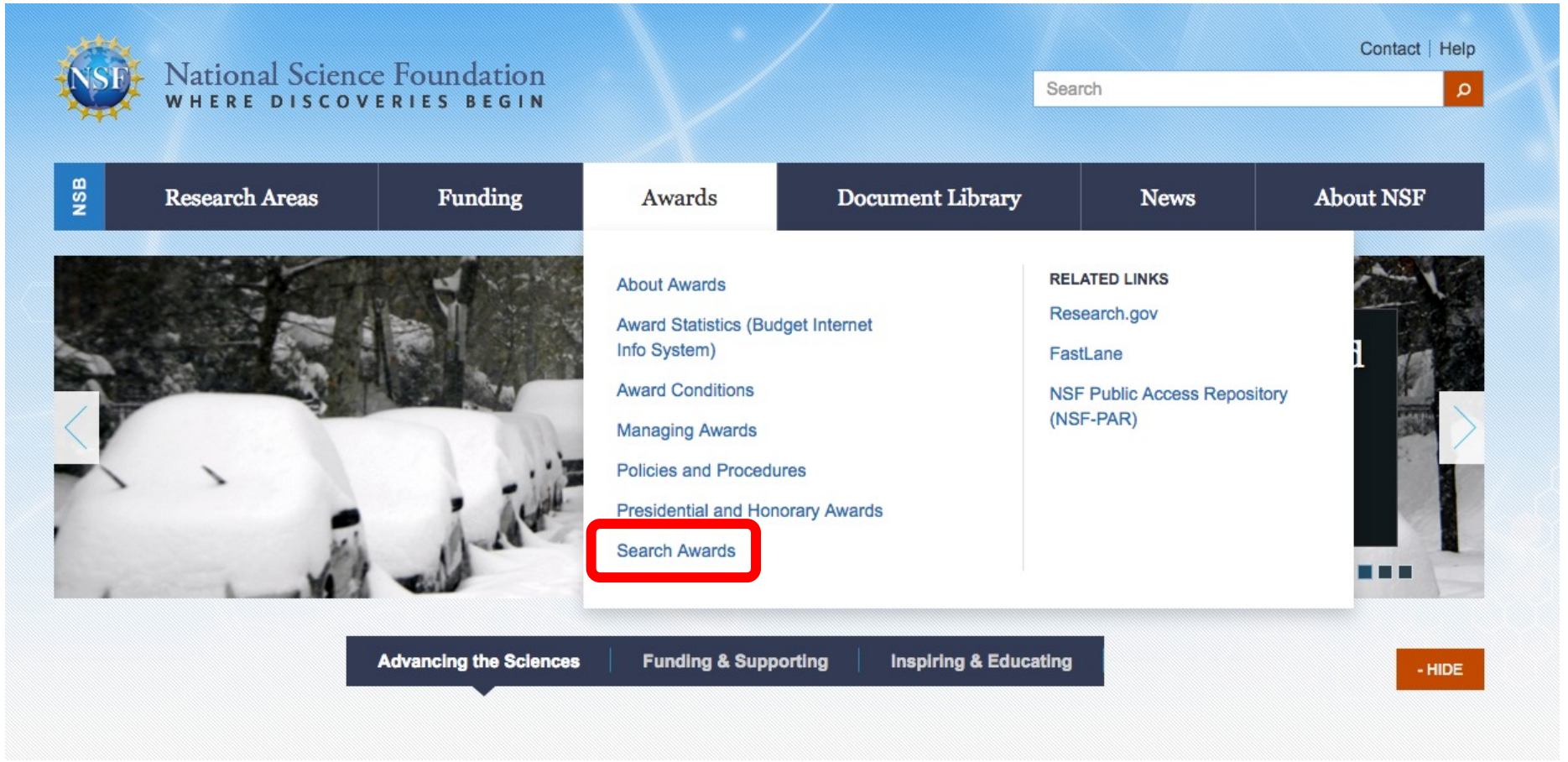
How to Find Funding Opportunities



www.nsf.gov



Where Does My Research Fit?



NSF Needs You!

FSML Contact Information

- Reed Beaman, BIO/DBI, rsbeaman@nsf.gov
- Kandace Binkley, GEO/OCE, kbinkley@nsf.gov

Questions?


NSF

Cross-divisional / cross-directorate programs

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URoL Understanding the Rules of Life

- **Who:** There are no restrictions
- **What:** Convergence research that will allow us to better understand biological interactions and identify causal, predictive relationships across scales -- so-called "rules" for how life functions. *Current theme: Emergent Networks*
- **Where:** At any U.S. Institution of Higher Education or non-profit organization
- **When:** Varies by theme
- **Contact:** e-networks@nsf.gov

IntBIO Integrative Research in Biology

- **Who:** There are no restrictions
- **What:** Integrative biological research spans subdisciplines and incorporates cutting-edge methods, tools, and concepts from each to produce groundbreaking biological discovery. Research should be synergistic and produce novel, holistic understanding of how biological systems function and interact across different scales of organization.
- **Where:** At any U.S. Institution of Higher Education or non-profit organization
- **When:** January 24, 2023
- **How:** Research.GOV ONLINE GRANTS MANAGEMENT FOR THE NSF COMMUNITY

RUI Research in Undergraduate Institutions

- **Who:** Faculty at Primarily Undergraduate Institutions
- **What:** An opportunity to support PUI faculty engagement in their professional field, build capacity for research at the institution, and support integration of research and undergraduate education.
- **Where:** At any U.S. PUI (awarded ≤20 PhDs in last 2 years)
- **When:** Any time (in BIO)
- **Contact:** Program officer in the appropriate program
- **See also:** ROA (Research Opportunity Award) supplements to existing awards to support PUI faculty research at collaborator's institution

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GRFP Graduate Research Fellowship Program

- **Who:** Graduate or undergraduate student pursuing Master's or PhD studies (has to be a U.S. citizen, national, or permanent resident)
- **What:** A 5-year year STEM fellowship (3 years of financial support)
- **Where:** At any U.S. Institution of Higher Education or non-profit organization
- **When:** Can apply as an undergraduate in their final year of study, recent graduates, and graduate students within the first 12 months of study
  - **Applications due:** Oct./Nov. each year
- **How:** To apply go to fastlane.nsf.gov/grfp

CAREER Faculty Early-Career Development Program

- **Who:** Tenure track faculty members at assistant professor level, or equivalent
- **What:** Designed to help junior faculty members develop activities that can **effectively integrate research and education** within the context of his/her organization.
- **Where:** At any U.S. Institution of Higher Education or non-profit organization
- **When:** Application deadline is in the Summer
- **Contact:** nsf-ccc@nsf.gov

MCA Mid-Career Advancement

- **Who:** Scientists and engineers at the Associate Professor rank (or equivalent) with at least 3 years at that rank
    - Pilot Track in BIO and GEO extends eligibility to Full Professors (or equivalent) at Primarily Undergraduate Institutions (PUIs) only
- **What:** An opportunity to substantively enhance and advance the PI's research program and career trajectory through synergistic and mutually beneficial mentored partnerships
- **Where:** At any U.S. Institution of Higher Education or non-profit organization
- **When:** Submission window between February 1 and March 1, annually
- **How:** Research.GOV ONLINE GRANTS MANAGEMENT FOR THE NSF COMMUNITY