NSF Strategic Plan for FY18-22

VISION

A Nation that is the global leader in research and innovation

MISSION

To promote the progress of science, to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes

GOALS

Expand knowledge in science, engineering, and learning

Advance the Nation’s capability to meet current and future challenges

Enhance NSF’s performance of its mission
ENG Vision and Mission

Vision: ENG will be a global leader in identifying and catalyzing fundamental engineering research, innovation, and education.

Mission: To enable the engineering and scientific communities to advance the frontiers of engineering research, innovation, and education, in partnership with the engineering community, and in service to society and the nation.
NSF Directorate for Engineering

Emerging Frontiers and Multidisciplinary Activities (EFMA)
Sohi Rastegar

Senior Advisor for Science and Engineering
Mihail Roco

Assistant Director
Dawn Tilbury
Deputy Assistant Director
Linda Blevins

Budget Officer
Darren Dutterer

Operations Officer
Judy Hayden

Engineering Education and Centers (EEC)
Kon-Well Wang

Chemical, Bioengineering, Environmental, and Transport Systems (CBET)
Richard Dickinson

Civil, Mechanical, and Manufacturing Innovation (CMMI)
Robert Stone

Electrical, Communications, and Cyber Systems (ECCS)
Fil Bartoli

Industrial Innovation and Partnerships (IIP)
Andrea Belz
(Formerly Barry Johnson)

NATIONAL SCIENCE FOUNDATION
ENG and SBIR/STTR R&RA Budgets

FY Appropriated Funds

NATIONAL SCIENCE FOUNDATION
ENG by the Numbers: FY 2018

- $978 M FY 2018 research budget
- 13,092 proposals
- 692 panels
- 2,458 competitive awards
- 23,697 people supported
- 19% competitive award success rate
- 9,299 senior researchers
- 1,937 other professionals
- 484 postdoctoral associates
- 7,760 graduate students
- 4,217 undergraduate students

NATIONAL SCIENCE FOUNDATION
NSF ENG Strategy

- Attract, stimulate, catalyze and challenge research communities to think big, enable transformational advances, and expand national innovation capacity
- Portfolio balance between fundamental, applied and translational as well as small, medium and large projects
- New approaches to address engineering education challenges
- Collaborate and partner within and outside NSF to maximize opportunity for the engineering research and education community to address major national priorities
CBET Areas of Interest

- **Chemical process systems**
  Seeks innovations in catalytic design, reaction engineering, multiphase chemical separations processes, molecular thermodynamics, process control and design, and sustainable energy conversion.

- **Engineering biology and health**
  Supports engineering research to improve human health and the understanding of biological and physiological systems.

- **Environmental engineering and sustainability**
  Seek projects that identify, monitor, and mitigate impacts of human activities, advance resource and energy conservation and recovery, ... , and support cost-effective solutions to protect ecological and human health.

- **Transport phenomena**
  Supports single- and multi-phase flow dynamics, particulate, heat and mass transfer, and combustion and fire dynamics.
CMMI Areas of Interest

- **Advanced Manufacturing**
  transformative advances in manufacturing and materials processing, with emphases on efficiency, economy, sustainability and scalability

- **Dynamic, Control, and Cognition**
  modeling, analysis, diagnostics, measurement, and control of dynamical systems, including but not limited to those involving physical interaction between human and embodied artificial intelligences

- **Mechanics and Engineering Materials**
  understanding the behavior and use of materials in engineered and natural systems

- **Resilient and Sustainable Infrastructures**
  innovation to advance resilience and sustainability of civil infrastructure and distributed infrastructure networks

- **Operations and Design**
  decision-making aspects of engineering, including design, control, optimization and systems science
Electrical, Communications, and Cyber Systems (ECCS)

Division Director
Fil Bartoli
Deputy Division Director
Carmiña Londoño

Larry Goldberg
Senior Engineering Advisor

Electronics, Photonics, and Magnetic Devices (EPMD)
Dominique Dagenais
Program Director
Paul Lane
Program Director
Usha Varshney
Program Director

Communications, Circuits, and Sensing Systems (CCSS)
Shubhra Gangopadhyay
Program Director
Jenshan Lin
Program Director
Akbar Sayeed
Program Director

Energy, Power, Control, and Networks (EPCN)
Kishan Baheti
Program Director
Alireza Khaligh
Expert
Anthony Kuh
Program Director
Anil Pahwa
Program Director
ECCS Priorities

- Address fundamental research issues at the nano, micro, and macro scales underlying device and component technologies for energy and power, controls, networks, communications, computation, and sensing applications

- Support research on systems and networks for advanced engineering applications

- Support education of a diverse workforce in electrical and computer engineering to meet the technological challenges of a 21st century global economy
Engineering Centers and Networks

- Large-scale research, education, broadening participation and workforce development investments in ENG
- Supports collaboration with industry and other stakeholders to promote innovative research and education
- Engineering Research Centers (ERC)
  - Four generations (70+ centers) since 1985 (a new solicitation was just released this week: NSF 19-503)
- Network for Computational Nanotechnology
  - Cyber-resource for nanotechnology theory, modeling and simulation
  - nanoHUB.org gateway for nanotechnology research and education
  - > 180k users globally
Division of Industrial Innovation and Partnerships (IIP)

- Invests in high-tech small businesses and collaborations between academia and industry to transform discoveries into innovative commercial technologies with societal benefits.

Partnerships for Innovation

Industry-University Cooperative Research Centers (IUCRC)

INTERN & GOALI
Funding Opportunities in ENG
Funding Mechanisms

- **Core/Unsolicited**: Two to four years; Individual/small collaborative teams: funds increase for collaboration

- **Solicitations**: Small to large funding size; multiple divisions/directorates can be involved
  - Special research call – LEAP-HI, DMREF, NRI, CPS
  - Early Career – CAREER
  - Instrumentation – MRI
  - Centers – ERC, STC, IUCRC

- **Workshops/Conferences**: Not a vehicle to fund a get-together of friends and like-minded people
ENG Divisions Remove Deadlines for Core Programs

New, unsolicited proposals may be submitted at any time:

- Change effective *August 15th, 2018* for CBET, CMMI, ECCS, and EEC Divisions.
- Core Programs only. Solicitations and CAREER still have deadlines.
- Investigators have a one year moratorium on submitting a proposal substantively similar to a declined proposal.

By accepting proposals at any time ENG is affording PIs the opportunity to:

- think more creatively about proposed work;
- build strong collaborations;
- converse with Program Directors; and
- carefully prepare proposals.

*It is our hope that the elimination of deadlines will reduce the burden on institutions and the community.*
Now You Have More Time! What Should You Consider?

Be bold in your ideas! Propose work that
◦ Advances your field in leaps and bounds, and
◦ Has broad societal impacts.

Ask for the funds you need to complete your work!
For example:
◦ Livable graduate research assistant wage,
◦ Funding for summer salary,
◦ Small to mid-scale equipment funding, and
◦ Duration of funding.
NSF’s 10 Big Ideas | Research Ideas

- The Future of Work at the Human-Technology Frontier
- Navigating the New Arctic
- Harnessing the Data Revolution
- 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 | Enabling Ideas

Growing Convergence Research at NSF

NSF 2026: Seeding Innovation

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

Mid-scale Research Infrastructure
Emerging Frontiers in Research and Innovation (EFRI)

Supports high-risk, high-reward opportunities that:
- Are potentially transformative
- Address a national need or grand challenge
- Involve multi- or inter-disciplinary research

Recent topic areas:
- Flexible Bioelectronics Systems (BioFlex)
- Origami Design for the Integration of Self-assembling Systems for Engineering Innovation (ODISSEI)
- Advancing Communication Quantum Information Research in Engineering (ACQUIRE)
- New Light and Acoustic Wave Propagation: Breaking Reciprocity and Time-Reversal Symmetry (NewLAW)

4-year awards at ~$500K per year

Topics for FY 2020: Distributed Chemical Manufacturing and Engineering the Elimination of End-of-Life Plastics
Find Funding

You can also find NSF funding opportunities at Grants.gov. Get NSF funding information by email or by RSS.

Enter Your Search Term

Keyword or Title

Advanced Funding Search | Search Tips

A-Z Index

Use the A-Z Index to find funding opportunities by title.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Get More Information

www.nsf.gov

@NSF_ENG
@NSF
@NSFSBIR

https://www.youtube.com/user/VideosatNSF

Science360 and Science360 Radio Apps

https://www.facebook.com/US.NSF
Questions & Answers

CONTACT:
BARRY JOHNSON, ENG/IIP, SBIR@NSF.GOV
KARL ROCKNE, KROCKNE, @NSF.GOV