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Funding Opportunities in Climate Change Solutions

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Program Director
Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET), Directorate for Engineering

NSF at a Glance

- $8.8 B budget (FY2022)
- 25% of federally funded basic research at U.S. colleges and universities
- Directorates:
  - **Engineering (ENG)**
  - Mathematical & Physical Sciences (MPS)
  - Biological Sciences (BIO)
  - Computer & Information Science & Engineering (CISE)
  - Geosciences (GEO)
  - Social, Behavioral and Economic Sciences (SBE)
  - Education & Human Resources (EHR)
  - **Technology, Innovation, & Partnerships (TIP) (new)**

NSF's headquarters in Alexandria, VA

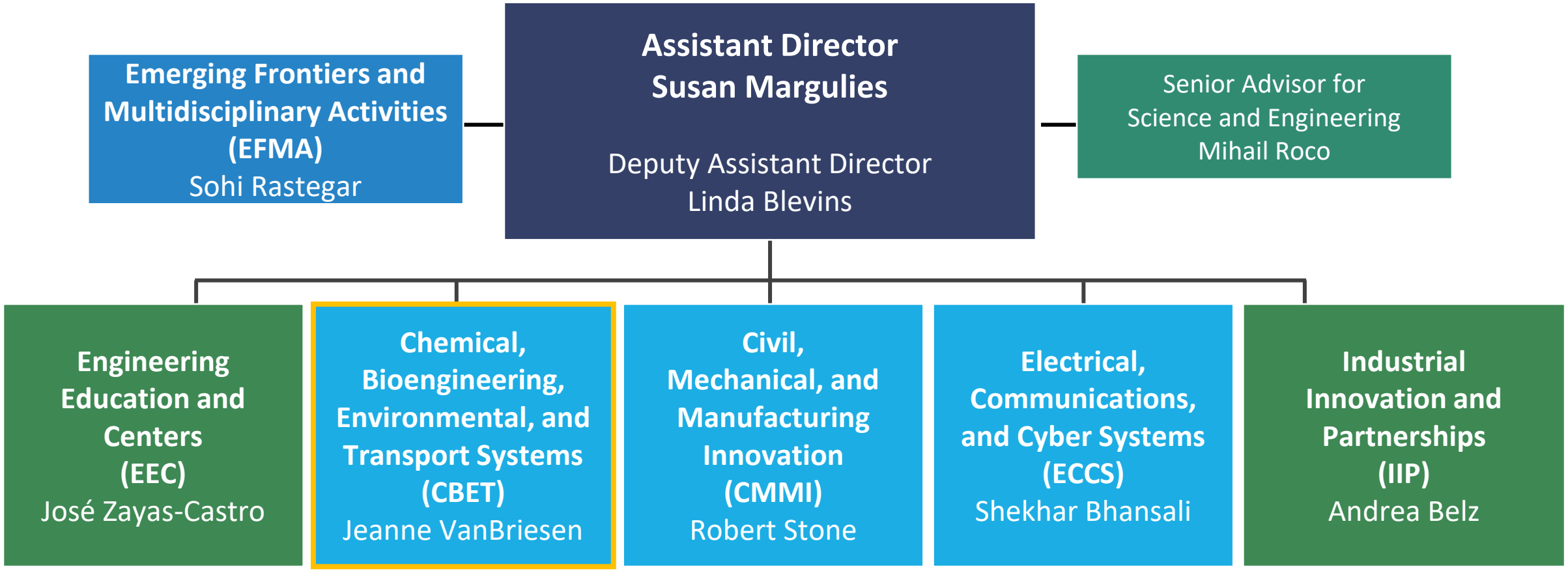
Scale: Single investigator to mid-size teams to centers and networks

Breadth: Single discipline through convergence research

Career stage: Undergraduate to grad to postdoc to early to middle to later career

Innovation cycle: Basic research through translational research

NSF Directorate for Engineering



Division of Chemical, Bioengineering, Environmental, and Transport Systems

Division Director
Jeanne VanBriesen

Deputy Division Director
William Olbricht
(Acting)

Chemical Process Systems

1401
Catalysis
Robert McCabe

1417
Interfacial Engineering
Christina Payne

7644 Electrochemical Systems
Carole Read

1403 Process Systems, Reaction Engineering, & Molecular Thermodynamics
Raymond Adomaitis

Engineering Biology & Health

1491 Cellular & Biochemical Engineering
Steven Peretti

5345
Engineering of Biomedical Systems
Stephanie George

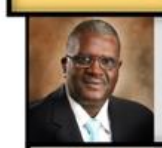
7236
Biophotonics
Leon Esterowitz

7909
Biosensing
Aleksandr Simonian

5342 Disability & Rehabilitation Engineering
Grace Hwang

Engineering Biology & Health Cluster
Steven Zehnder

Environmental Engineering & Sustainability



1440
Environmental Engineering
Mamadou Diallo

1179
Nanoscale Interactions
Nora Savage

7643
Environmental Sustainability
Bruce Hamilton

Transport Phenomena

1407
Combustion & Fire Systems
John Daily

1443
Fluid Dynamics
Ronald Joslin

1415 Particulate & Multiphase Processes
Shahab Shojaei-Zadeh
(Acting)

1406
Thermal Transport Processes
Ying Sun

Special Programs & Detail Positions

Special Programs & Integrative Activities
Brandi Schottel

AI and Data Initiatives
Shahab Shojaei-Zadeh

Chemical Process Systems Cluster
ON DETAIL - CHE
Catherine Walker

Division Experts

Environmental Engineering & Sustainability Expert
William Cooper

Environmental Engineering & Sustainability Expert
Jim Jones

Engineering of Biomedical Systems Expert
Carol Lucas

Multiple Programs Expert
Geoffrey Prentice

Cross-cutting Opportunity: ECO-CBET

Environmental Convergence Opportunities in CBET (ECO-CBET)

ECO-CBET (NSF 21-596) – seeks to integrate environmental engineering/sustainability with chemical/biological/transport process sciences to address environmental grand challenges

Combating Climate Change and Mitigating Its Impacts – Transformative, high-risk/high-reward approaches to attenuate the threat of climate change

$1.5-1.7M over 4 years; competitive renewal for 4 additional years
Preliminary Proposal Due: September 19, 2022

Requires to demonstrate the long-term potential to become industrially and/or environmentally feasible

CAS (Critical Aspects of Sustainability): Innovative Solutions to Climate Change

(NSF 21-214; cas@nsf.gov)

This "Dear Colleague Letter (DCL)" – encourages submissions to existing programs.
Focusing on solutions: Mitigation and Adaptation

1. **Reduction of GHG emissions and energy use**
2. **Energy innovations**
3. **GHG Sequestration and Removal**
4. **Climate Change Adaptation**
5. **Synergistic Topics**

* *Mitigation: efforts to reduce the amount and speed of future climate change by limiting emissions or removing carbon dioxide from the atmosphere https://www.globalchange.gov/*

Deadlines and rules for these existing programs apply.

Prospective PIs must send an email inquiry to cas@nsf.gov prior to submission to ascertain whether the proposal is suitable. Submit research concept outlines (up to 2 pages).

CAS-CLIMATE: ENG (CBET, CMMI, ECCS, EEC, IIP)

1. Reduce GHG Emissions & Energy Use
   - Reduced energy use and emissions (CBET, CMMI, IIP)
   - Green chemistry, refrigerants, and manufacturing; sustainable materials/systems, circular economy (CBET, CMMI)
   - Increased energy efficiency (CBET, CMMI, IIP)
2. Energy Innovations to Climate Change Mitigation
   - Clean energy conversion and storage (CBET, CMMI, ECCS, IIP)
   - Efficient integration of distributed energy resources (ECCS)
   - Resilient and smart infrastructure (CMMI, ECCS, IIP)
   - Machine learning for clean energy (ECCS)
3. Enhance GHG Sequestration
   - Advanced approaches for carbon capture (CBET, CMMI, IIP)
4. Climate Change Adaptation
   - Enhancing the resilience of all entities to climate change challenges (CBET, CMMI, IIP)
   - Social dynamics of climate change adaptation (CMMI, EEC, IIP)
5. Synergistic Topics
   - Innovative measurement, sensing, IoT, on-device learning (CBET, CMMI, ECCS, EEC, IIP)
   - Education and broadening participation (all)

CBET


Bruce Hamilton

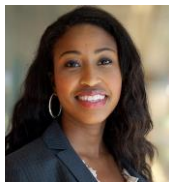

Brandi Schottel


John Daily

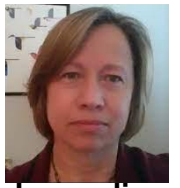

Ying Sun

CMMI

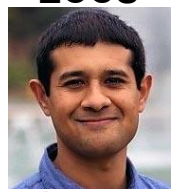

Khershed Cooper


Nakhiah Goulbourne


Giovanna Biscontin


Jacqueline Meszaros

ECCS


Aranya Chakrabortty


Richard Nash

EEC


J. Kemi Ladeji-Osias


Katie Bratlie

IIP


Ela Mirowski


Rajesh Mehta

Thermal Transport Processes (TTP) Program

TTP program supports projects that lay the foundation of new discoveries in thermal transport phenomena. Specific areas of interest include:

- Convection/Diffusion/Radiation
- Thermodynamics
- Bio- Heat and Mass Transport
- Nano-, Micro- and Meso-thermics
- Novel metrology and AI/ML Methodologies
- Thermal/Quantum Interface

- **Thermal solutions to climate change**
  - Decarbonizing industrial processes
  - Novel heating/cooling technologies with minimal GHG emissions
  - Thermal-driven clean energy concepts
  - Thermal and thermochemical energy storage
  - Waste heat recovery and transmission
  - Thermal transport in electrification of energy services

https://beta.nsf.gov/funding/opportunities/thermal-transport-processes-1

Questions? contact me yisun@nsf.gov

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