

U.S. National Science Foundation Programs Intending to Support Supplemental Funding Requests to Conduct U.S.-India Collaborative Research

February, 2022



Opportunity

- In February 2022, the NSF **Directorate for Computer and Information Science and Engineering (CISE)** and **Directorate for Engineering (ENG)** notified the community of their intention to support supplemental funding requests in coordination with six Technology Innovation Hubs (TIHs) supported by the Indian Department of Science & Technology.
- Interested NSF PIs are encouraged to email the NSF-India program team at india-collaboration@nsf.gov with a summary of the request and also identify the award which this funding would supplement.
- PIs are encouraged to submit by the target date of **April 25, 2022**.



Eligibility

Active NSF-funded researchers within the following programs may propose collaborative projects with Indian counterparts:

- Computer and Network Systems (CNS) Core
- Cyber-Physical Systems (CPS)
- Smart and Connected Communities (S&CC)
- Robust Intelligence (RI)
- Information Integration and Informatics (III)
- Human-Centered Computing (HCC)
- Foundational Research in Robotics (FRR)
- Energy, Power, Control, and Networks (EPCN)
- Communications, Circuits, and Sensing-Systems (CCSS)



How to Apply

There are two parts to the application:

- On the NSF side, **U.S. PIs submit requests for supplemental funding to an existing project.**
- On the Indian side, the PIs apply to a TIH for funding for a new project or a supplement to an existing TIH-funded project.

The supplemental funding request should be organized to include:

- **Summary of the active research award**, spanning Intellectual Merit and Broader Impacts and how this award is related to the proposed work (about a page)
- **Summary of the proposed work** (same as submitted to the collaborating TIH)
- **Bio-sketch of the Indian lead partner** (one page)
- **Justification** of the need for the supplemental funds

All supplemental funding requests will be subject to NSF's merit review process, as described in the NSF [*Proposal and Award Policies and Procedures Guide*](#)



Directorate for Computer and Information Science and Engineering (CISE)

Division of Computer and Network Systems (CNS)

CNS invents new computing and networking technologies, while ensuring their security and privacy, and finds new ways to make use of current technologies.

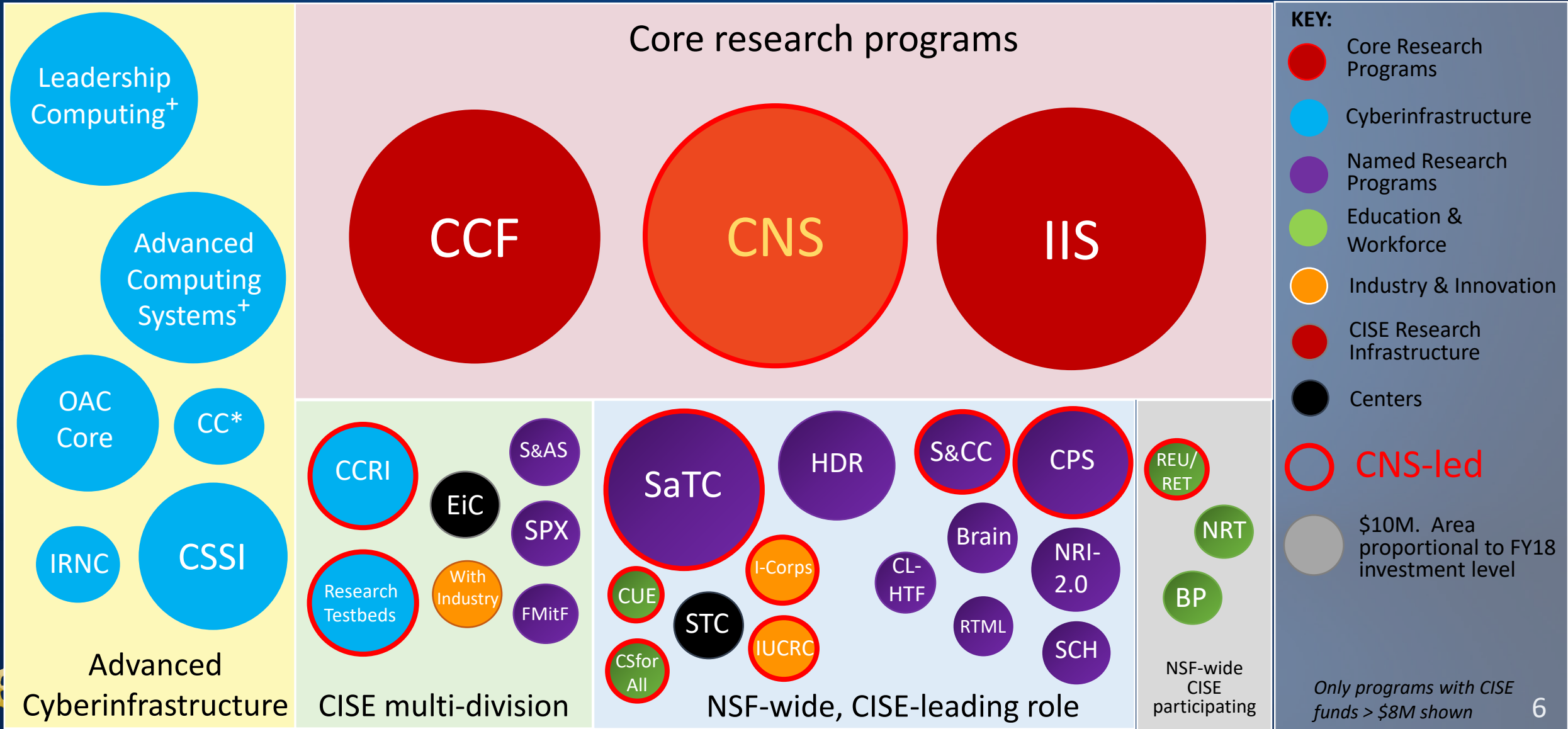
Division of Information and Intelligent Systems (IIS)

IIS studies the interrelated roles of people, computers and information to increase the ability to understand data, as well as mimic the hallmarks of intelligence in computational systems.

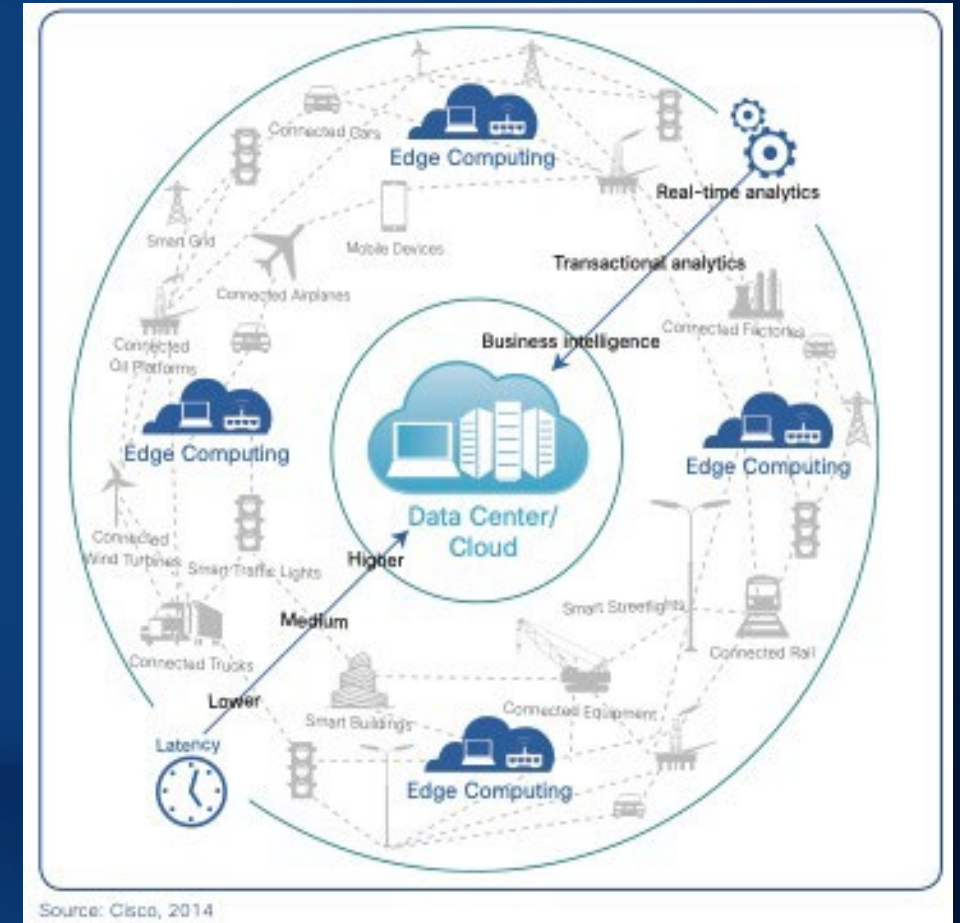
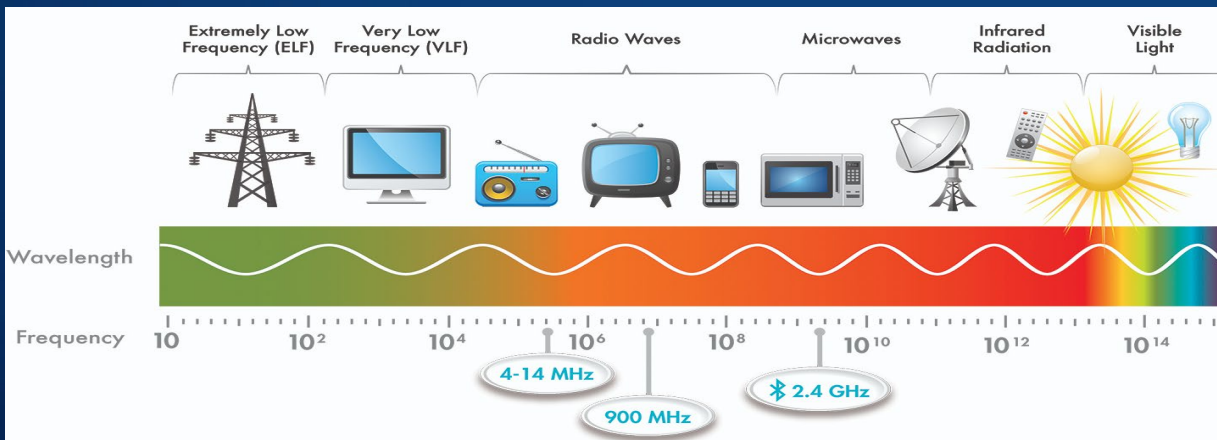
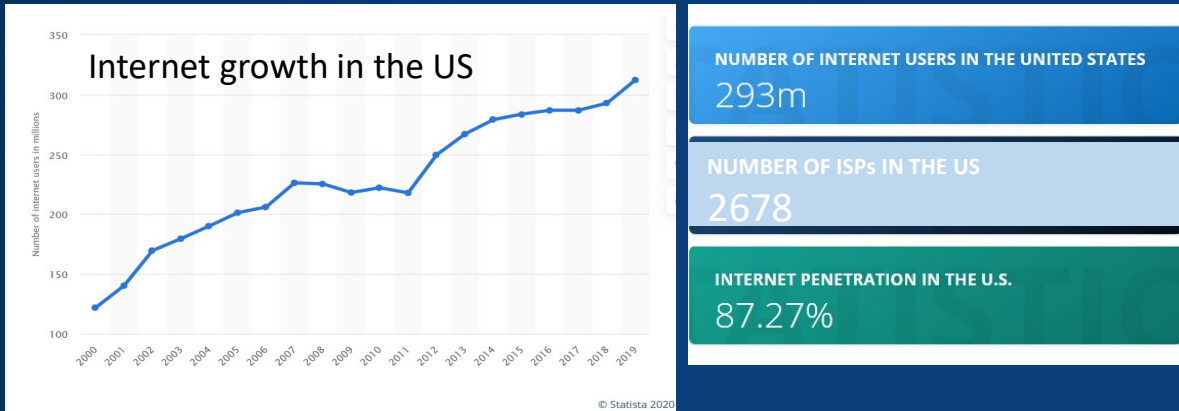
Additional divisions include Computing and Communication Foundations (CCF) and the Office of Advanced Cyberinfrastructure (OAC).



CNS Programs in CISE Context



Networking Technology and Systems (NeTS)

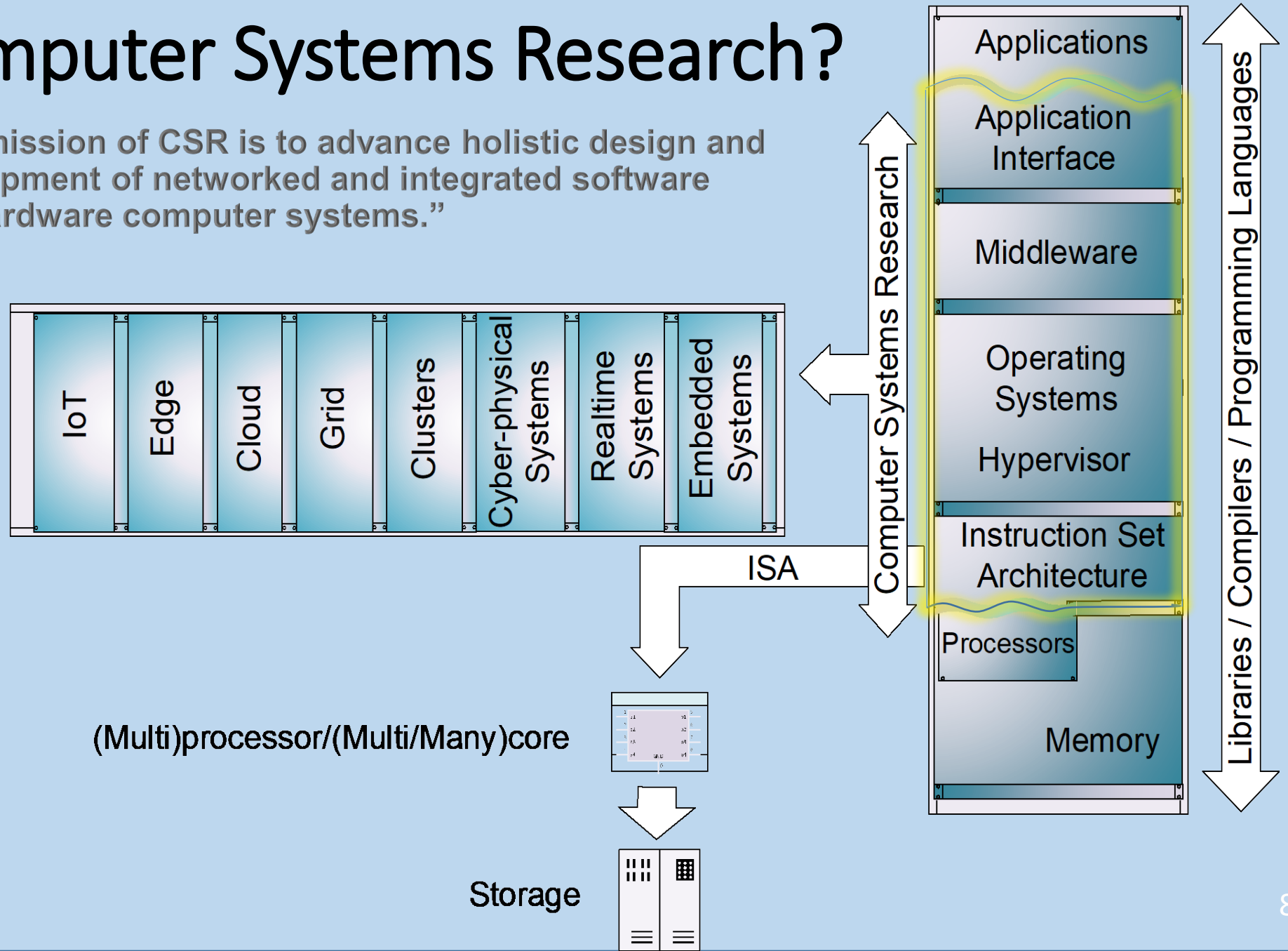


NSF's primary program for Network and future Internet architectures research



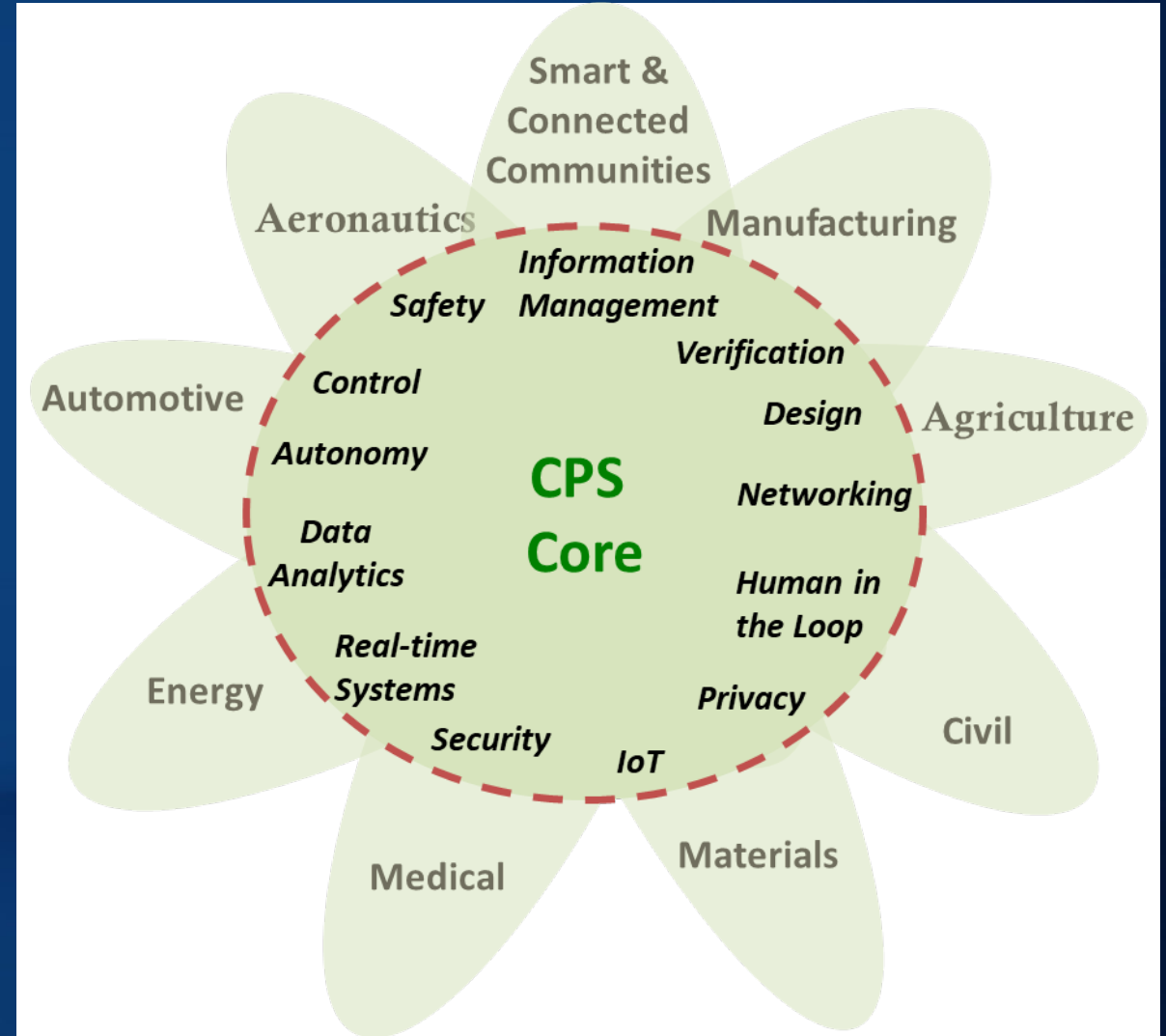
What is Computer Systems Research?

“The mission of CSR is to advance holistic design and development of networked and integrated software and hardware computer systems.”

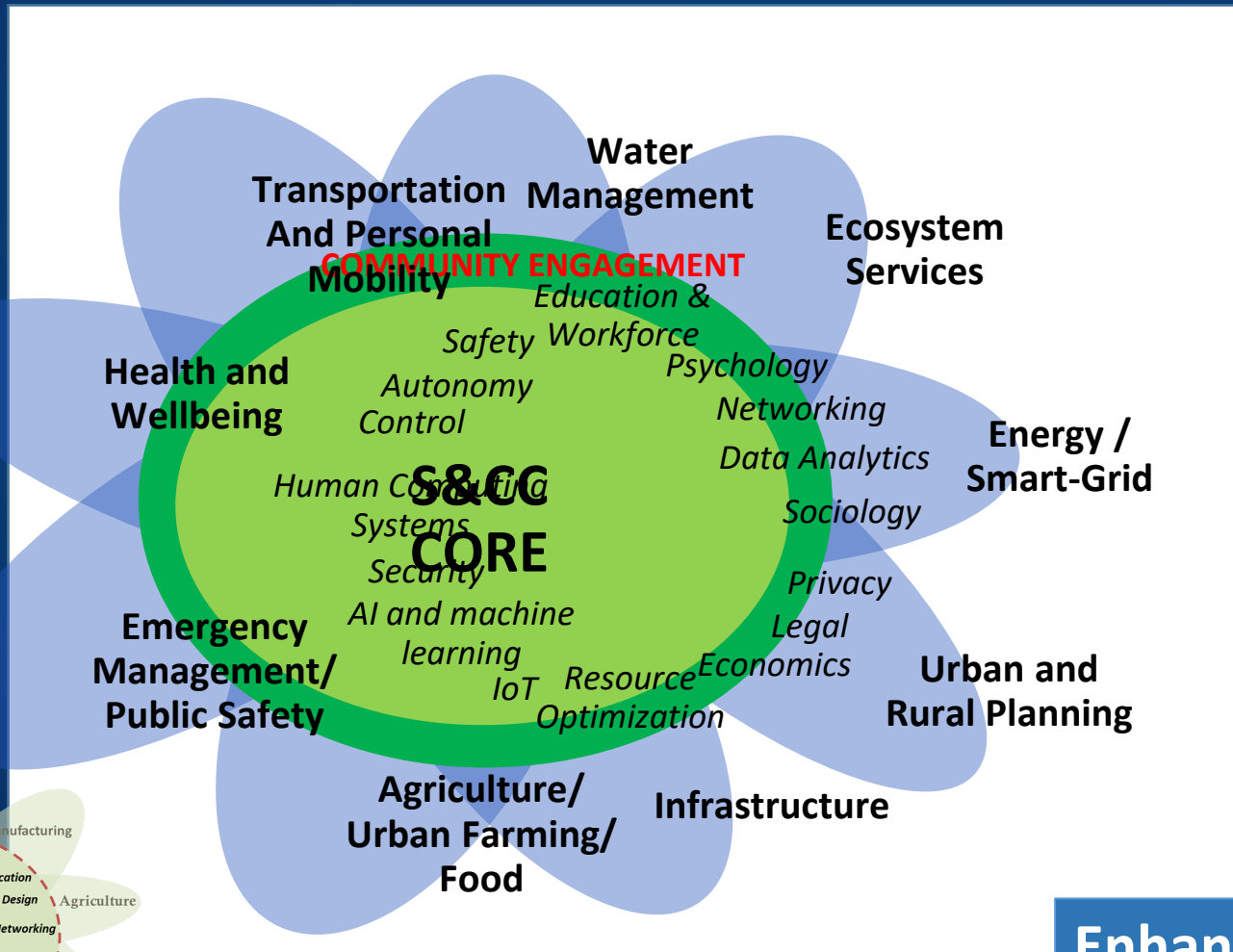


Cyber Physical Systems (CPS)

- Core system science of complex cyber-physical systems and transitions the technologies into engineering practice.
- CPS program seeks to reveal cross-cutting, fundamental scientific and engineering principles that underpin the integration of cyber and physical elements across all application domains
- Approximately 400 active awards

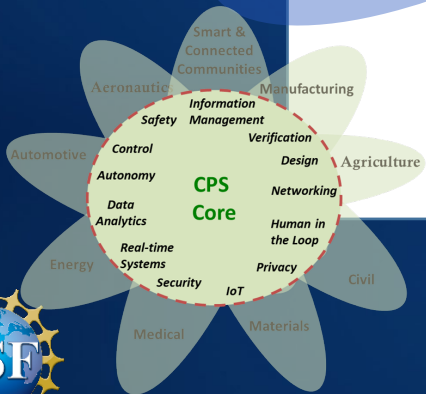


Smart & Connected Communities (S&CC)



A fundamental understanding of the complex, dynamic interactions between technology and society is essential for unlocking the potential benefits of smart and connected communities.

Enhances scientific and engineering knowledge in ways that improve the quality of life within communities.



Information and Intelligent Systems (IIS)

Core programs:

- Robust Intelligence (RI)
- Information Integration and Informatics (II)
- Human Centered Computing (HCC)



Robust Intelligence (RI)

- Foundational research to understand and develop systems that can sense, learn, reason, communicate, and act
- Topics:
 - Machine learning
 - Automated reasoning
 - Computer vision
 - Human language technologies
 - Knowledge networks
 - Integrated autonomous systems



Information Integration and Informatics (III)

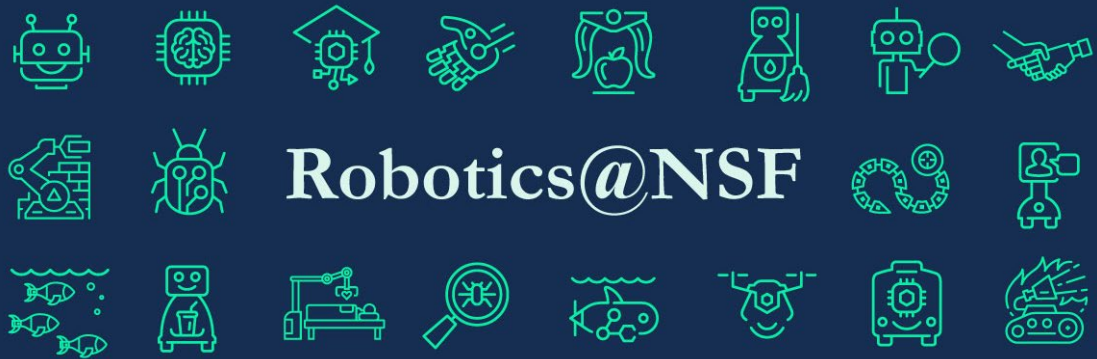
- Innovative research in data science
- Topics:
 - Databases and data management
 - Data life cycle
 - Large-scale analytics and data mining
 - Data visualization
 - Multimedia
 - Convergent applications of data science to science, engineering, and society



Human-Centered Computing (HCC)

- Research in human-computer interaction taken broadly
- Formerly entitled: Cyber-Human Systems
- Topics
 - Computer interfaces
 - Computer graphics
 - Computer-based communication and collaboration
 - Technology for creativity
 - Assistive and accessible technology
 - Social impacts of computer technology





Robotics@NSF

- Jointly managed by the Directorates for Engineering (ENG) and Computer and Information Science and Engineering (CISE)
- Accepts unsolicited proposals any time
- All proposals are handled as part of a single unified program, irrespective of the division that initially receives the proposal

NSF funding opportunities for robotics related research:
[nsf.gov/robotics](https://www.nsf.gov/robotics)

Foundational Research in Robotics (FRR - Robotics)

- Robotics is a deeply interdisciplinary field, and proposals are encouraged that explore the **full** range of fundamental engineering and computer science research challenges arising in robotics.
- All proposals must convincingly explain how a successful outcome will **enable transformative new robot functionality** or **substantially enhance existing robot functionality**.
- The proposal should clearly articulate how the intellectual contribution of the proposed work **addresses fundamental gaps in robotics**.



FRR: What is responsive?

Is there a **robot**?

- The focus of the project should be a robot or a class of robots as defined in the program description: “intelligence embodied in an engineered construct, with the ability to process information, sense, and move within or substantially alter its working environment.”

Will a robot gain a **new** or **significantly improved** capability?

- Over the course of project a robot or class of robots should gain new and useful abilities or significantly improve on existing abilities.

Is robotics **essential** to the *intellectual merit* of the proposal?

- Robotics should be the intellectual merit (not just broader impact) of the proposed work. Robotics should be essential to the project, and not just a convenient platform to demonstrate the research results. Choosing an application other than robotics for the project should significantly reduce its impact.



Energy, Power, Control, and Networks (EPCN)

- EPCN's goal is to encourage research on emerging technologies and applications including energy, transportation, robotics, and biomedical devices & systems.
- Topics
 - Control systems
 - Energy and power systems
 - Power electronics systems
 - Learning and adaptive systems



Communications, Circuits, and Sensing-Systems (CCSS)

- CCSS's goal is to create new complex and hybrid systems ranging from nano- to macro-scale with innovative engineering principles and solutions for a variety of applications including but not limited to healthcare, medicine, environmental and biological monitoring, communications, disaster mitigation, homeland security, intelligent transportation, manufacturing, energy, and smart buildings.
- Topics
 - RF Circuits and Antennas for Communications and Sensing
 - Communication Systems and Signal Processing
 - Dynamic Bio-Sensing Systems



For More Information

- Visit NSF.gov to read the complete Dear Colleague Letter
- Email the NSF-India program team at india-collaboration@nsf.gov
- Contact your NSF Program Officer or:
 - Alex Jones (CISE/CNS) (703) 292-8950
 - Erik Brunvand (CISE/CNS) (703) 292-2767
 - Balakrishnan Prabhakaran (CISE/IIS) (703) 292-4847
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 - Donald Wunsch (ENG/ECCS) (703) 292-7102
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 - Bridget Turaga (OD/OISE) (703) 292-7320

