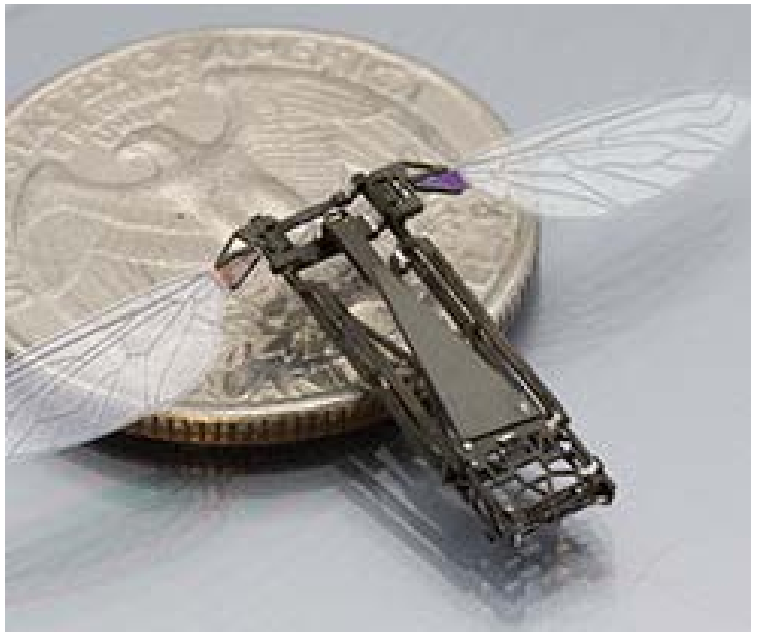
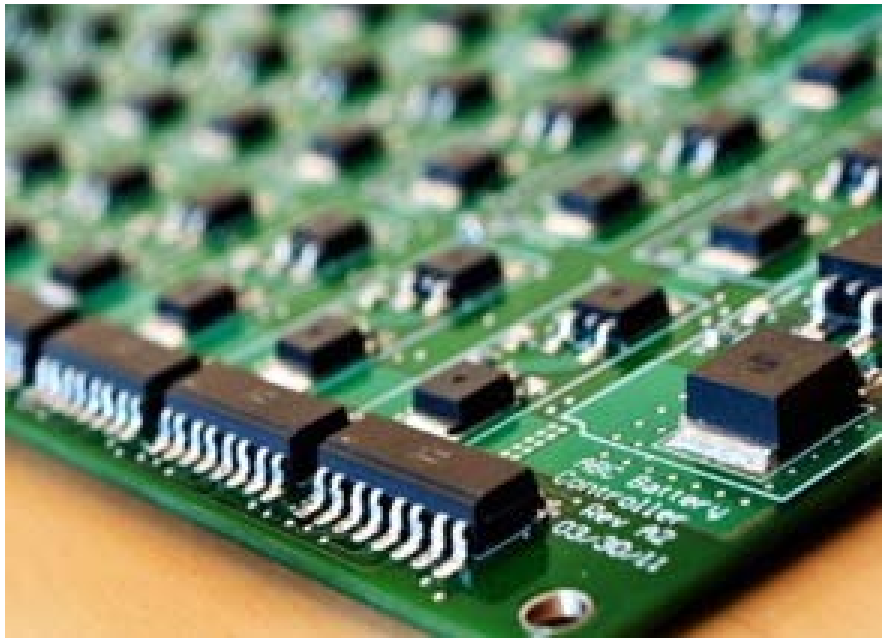




NSF/CISE: Welcome and Overview

Margaret Martonosi
Assistant Director, Computer and Information Science and Engineering (CISE)

MSI Convening
February 4, 2020

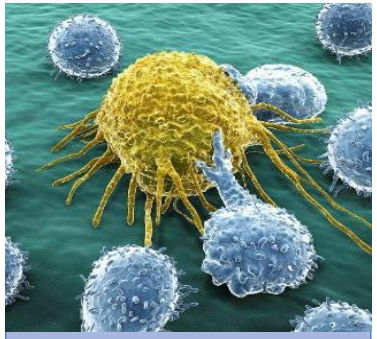
Thank You!

- Dr. Fay Cobb Payton, NSF
- Conference Planning Committee:
  - Kathy DeerInWater, American Indian Science and Engineering Society (AISES)
  - Ann Gates, University of Texas at El Paso
  - Jean Muhammad, Hampton University
- ASEE, especially Eric Wallace and Rocio Chavela
- NSF Program Officers and Staff
- You! Thank you for engaging with us in this way!

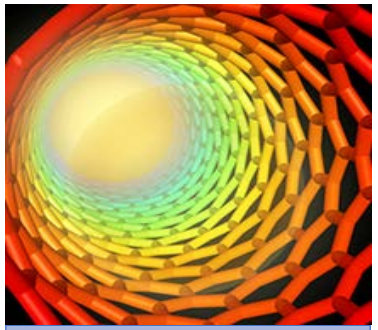
National Science Foundation's Mission

"To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..."

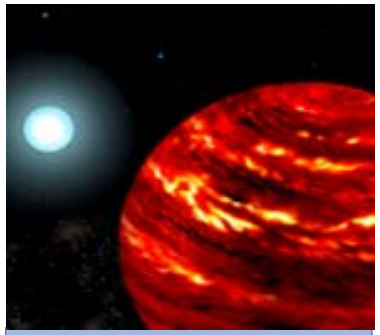
NSF Champions Research and Education across all Fields of Science and Engineering



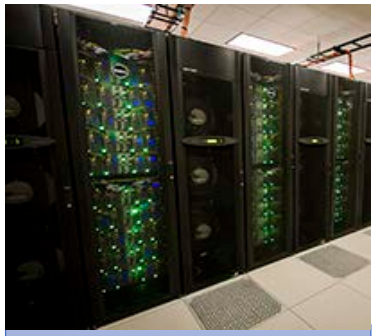
Biological Sciences



Engineering



Mathematical & Physical Sciences



Computer & Info Science & Engineering

Geosciences (including Polar Programs)

Integrative Activities

Education & Human Resources

Social, Behavioral & Economic Sciences

International Science & Engineering

NSF's 10 Big Ideas

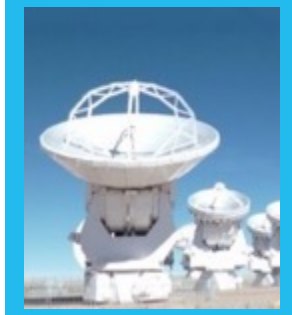
RESEARCH IDEAS

Harnessing Data for 21st Century Science and Engineering

Future of Work at the Human-Technology Frontier

Quantum Leap: Leading the Next Quantum Revolution

Windows on the Universe



Understanding the Rules of Life

Navigating the New Arctic

PROCESS IDEAS

Mid-scale Research Infrastructure

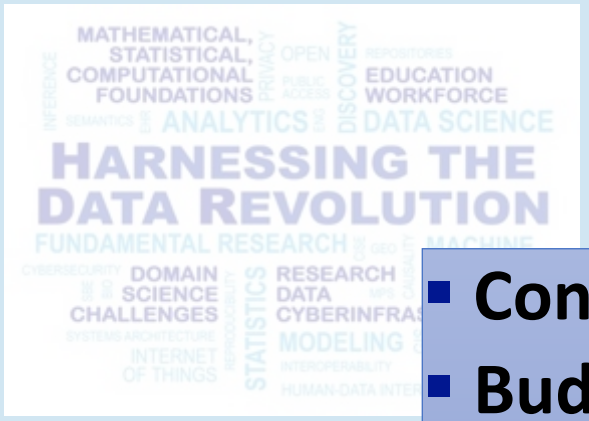
NSF-INCLUDES

NSF 2026

Growing Convergent Research

NSF's 10 Big Ideas

RESEARCH IDEAS



Harnessing Data for 21st Century Science and Engineering

Future of Work at the Human-Technology Frontier

Windows on the Universe

Understanding the Rules of Life

- **Convergent research:** many disciplines required
- **Budget model:** five years, $30M/Big Idea/year, "outside" directorates
- **CISE engagement in the Big Ideas:** This means you!
- ***New funding opportunities!***

PROCESS IDEAS

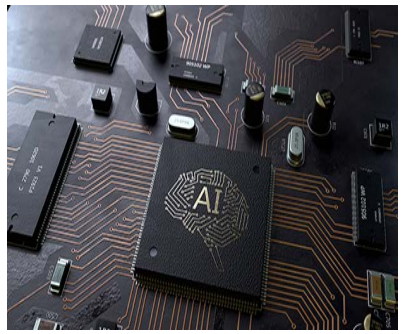
Mid-scale Research Infr

nvergent Research

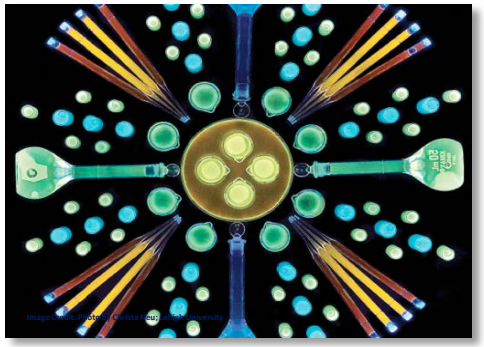
CISE Programs Address National Priorities

AI, Big Data, & Robotics

Cybersecurity



Manufacturing & Microelectronics



Quantum Information Sciences

Future Computing Systems

Smart Communities

Computer Science Education

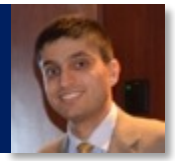
Advanced Wireless Research

CISE Organization: Divisions/Office

CISE Directorate

Margaret Martonosi, AD

Erwin Gianchandani, DAD



Office of Advanced Cyberinfrastructure (OAC)

Manish Parashar, OD

- Data
- Leadership and Advanced Computing
- Networking/ Cybersecurity
- Software
- Learning and Workforce

Computing and Communication Foundations (CCF)

Rance Cleaveland, DD

- Algorithmic Foundations
- Communication and Information Foundations
- Software and Hardware Foundations
- Foundations of Emerging Technologies

Computer and Network Systems (CNS)

Peter Arzberger, Acting DD

- Computer and Network Systems
- Education and Workforce Development

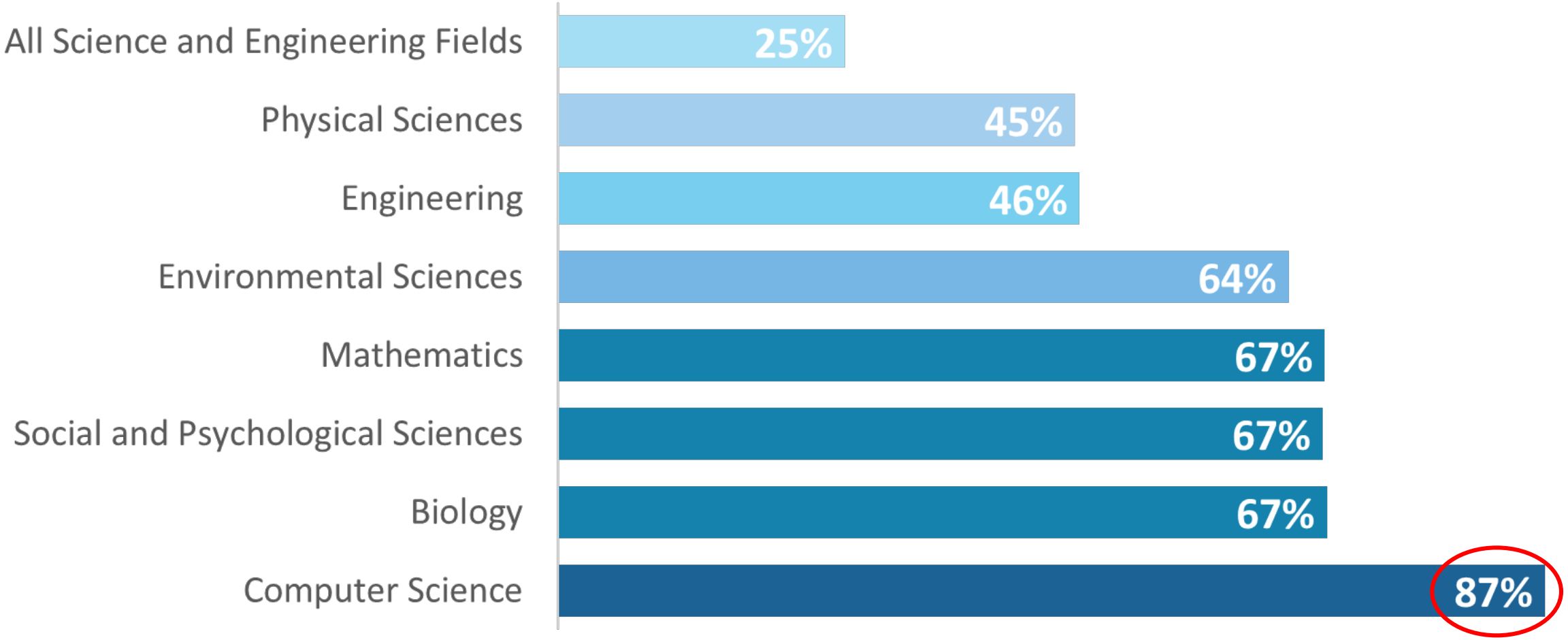
Information and Intelligent Systems (IIS)

Henry Kautz, DD

- Cyber Human Systems
- Information Integration and Informatics
- Robust Intelligence

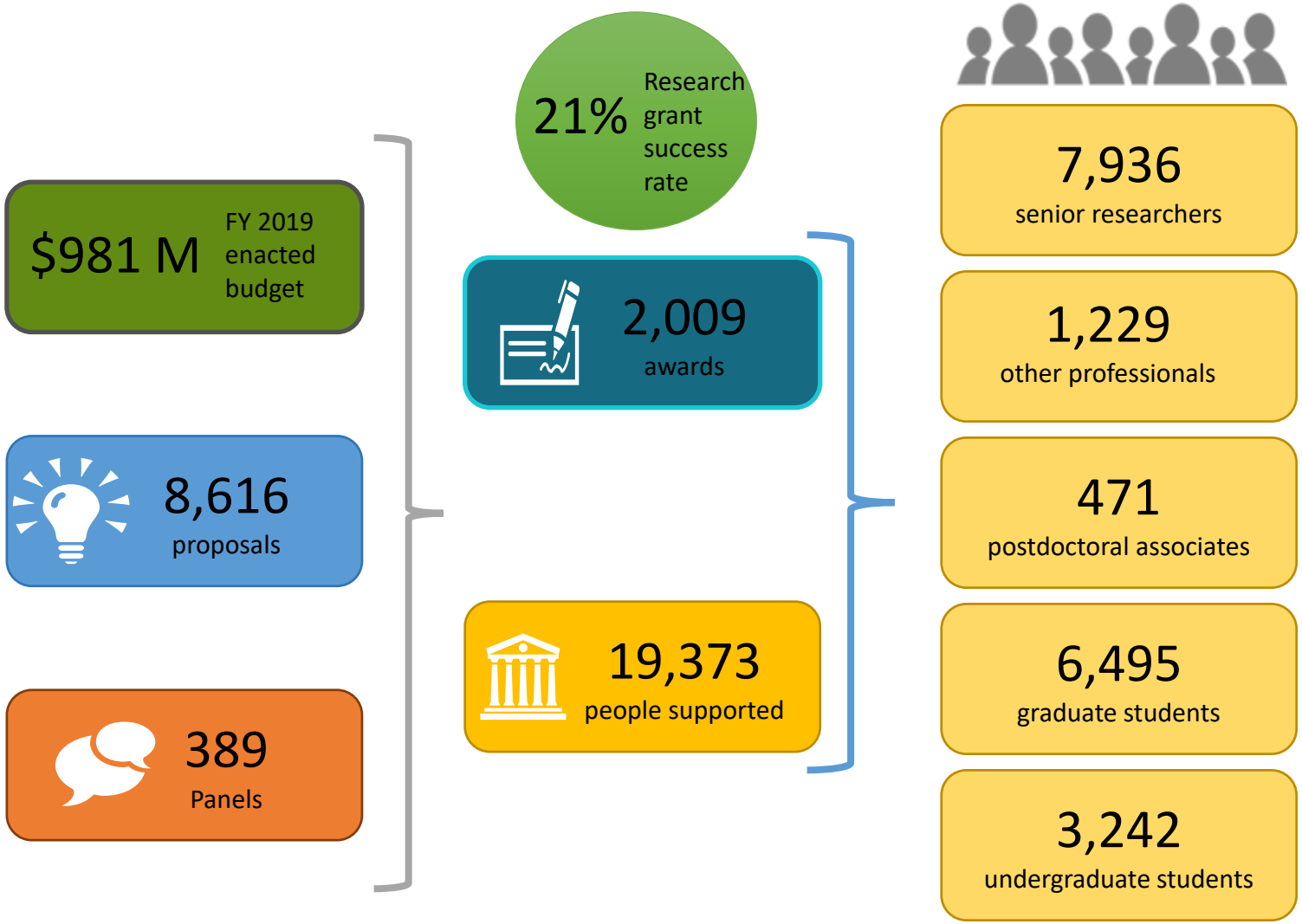
NSF supports all areas of fundamental research

NSF support as a percentage of total federal support for basic academic research

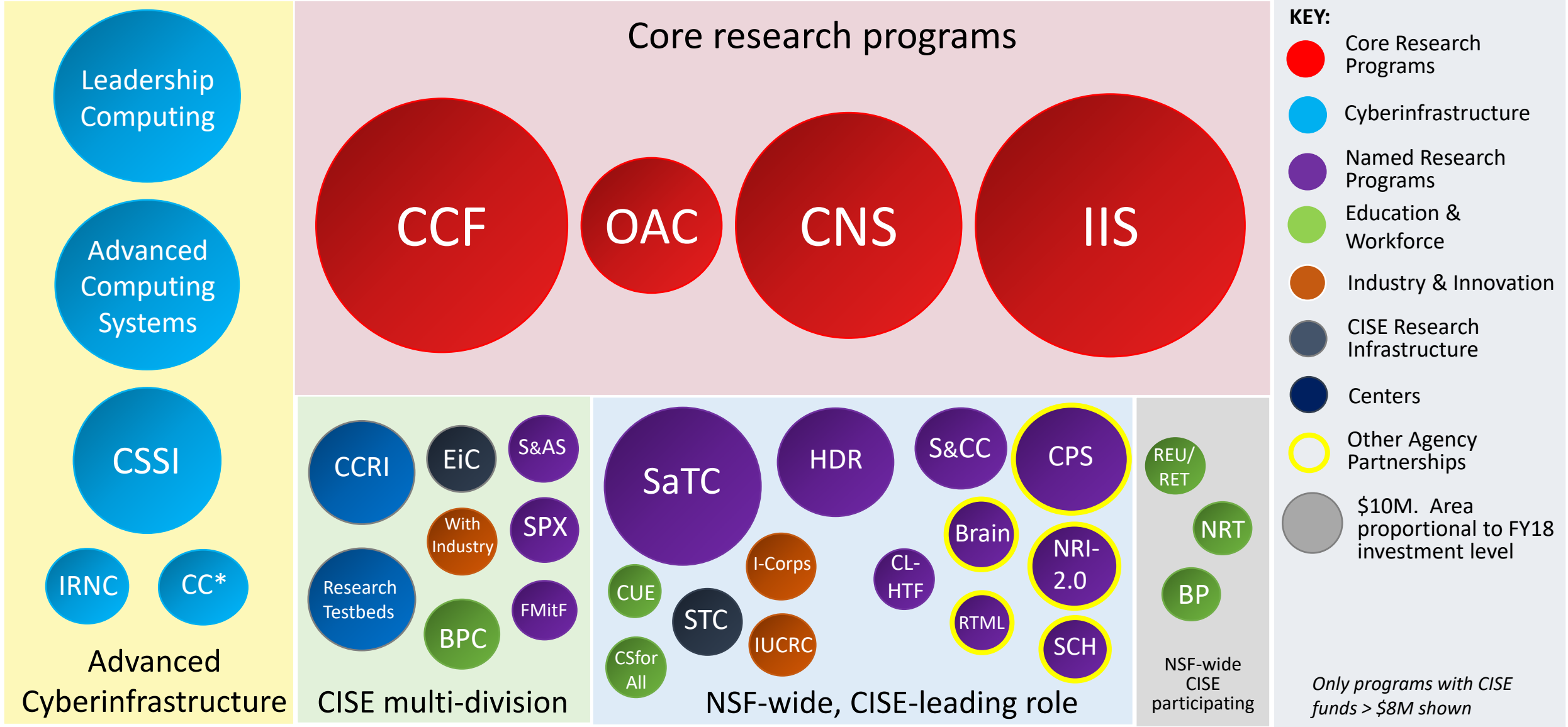


Source: NSF/NCSES, "Survey of Federal Funds for Research and Development." In FY 2020 NSF Budget Request to Congress.

CISE by the numbers: FY 2019



FY 2019 CISE programmatics at a glance



New in FY 2019

- AI and Society, with the Partnership on AI
  - $4.5M joint funding: CISE and SBE, with PAI, in FY 2019

PARTNERSHIP ON AI

amazon.com IBM facebook Microsoft DeepMind Google

PAI Founding Members

- NSF/DARPA Program on Real-Time Machine Learning (RTML)
  - $11M total, with CISE and ENG beginning in FY 2019

DARPA

- NSF/Amazon Program on Fairness in AI
  - $21M joint funding: CISE and SBE, with Amazon, beginning in FY 2020

amazon alexa

- DCL on FEAT for CISE: Fairness, Ethics, Accountability, and Transparency for CISE Research (NSF 19-016)

NSF CISE: Core Programs

- **Computing and Communications Foundations (CCF)**
  - Algorithmic Foundations
  - Communications and Information Foundations
  - Software and Hardware Foundations
  - Foundations of Emerging Technologies (new!)
- **Computing and Network Systems (CNS)**
  - Computer & Network Systems
  - Education and Workforce
- **Information and Intelligent Systems (IIS)**
  - Cyber Human Systems
  - Information Integration and Informatics
  - Robust Intelligence
- **Office of Advanced Cyberinfrastructure (OAC)**
  - Cyberinfrastructure for all the Sciences
  - Divisions of Data, Leadership and Advanced Computing, Networking/Cybersecurity, Software, Learning & Workforce

Upcoming Deadlines:

Medium: September 14, 2020 ▪ Large: September 23, 2020 ▪ Small: November 12, 2020

Computing education & workforce

2007
BPC-A
Broadening Participation in Computing Alliances

2010
CS10K
Training 10,000 K-12 CS teachers

2015
RED
REvolutionizing eng/cs Departments

2016
CSforAll

2019
CUE

Computer Science for All (CSforAll)

Access to rigorous, engaging CS education for all K-12 students

New College Board Advanced Placement® exam launched

Computing in Undergraduate Education

Integrating computing with other fields of knowledge, challenge areas

Cultivating “networked improvement communities”

Encouraging integrating the **study of ethics**

BPC Alliances funded by NSF CISE

- Long-term engagement in BPC activities at scale
- Career Mentoring Workshops
- Tapia Conference
- REU Programs
- Much more

Access Computing

national center for women & INFORMATION TECHNOLOGY

STARS COMPUTINGCORPS.ORG

ECEP

iaamcs INSTITUTE FOR AFRICAN-AMERICAN MENTORING IN COMPUTING SCIENCES

CRA-WP Computing Research Association Widening Participation

REAL-CS Researching Equity, Access, & Learning in CS Education

Research Funding for Early Career Faculty

Faculty Early Career Development Program (CAREER) Award

- Awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization.
- Next Proposal Deadline: July 27, 2020
- Workshop on Writing CAREER Proposals:
  - Workshop Date: April 6 at NSF.
  - Application Deadline: March 2
  - http://cisecareerworkshop.web.unc.edu/
  - Some travel funds available

CRII: Computer and Information Science and Engineering (CISE) Research Initiation Initiative

- CISE Initiative for additional early-career support
- Deadline: 2nd Wednesday in August
- https://www.nsf.gov/pubs/2019/nsf19579/nsf19579.htm
- Intended for before CAREER Proposal, particularly for faculty with no/limited startup funds.

We need you! How to Engage

Undergrad

- Research Experiences for Undergraduates (REU)
- Work on NSF-funded research

Graduate

- NSF Graduate Fellowships
- Work on NSF-funded research

Faculty

- PI and Co-PI on Core and Topical Research Programs
- Proposal Writing Workshops
- Attend meetings like these and offer input
- Be an NSF Panel Reviewer
- Be an NSF Rotator!

Thank You!

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  - Kathy DeerInWater, American Indian Science and Engineering Society (AISES)
  - Ann Gates, University of Texas at El Paso
  - Jean Muhammad, Hampton University
- ASEE, especially Eric Wallace and Rocio Chavela
- NSF Program Officers and Staff
- You! Thank you for engaging with us in this way!

Questions?
NSF