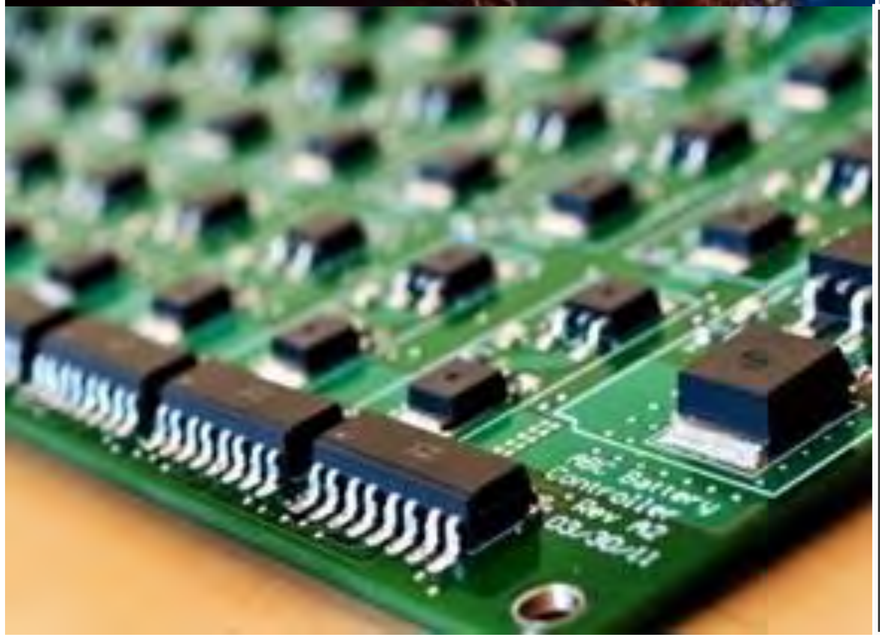
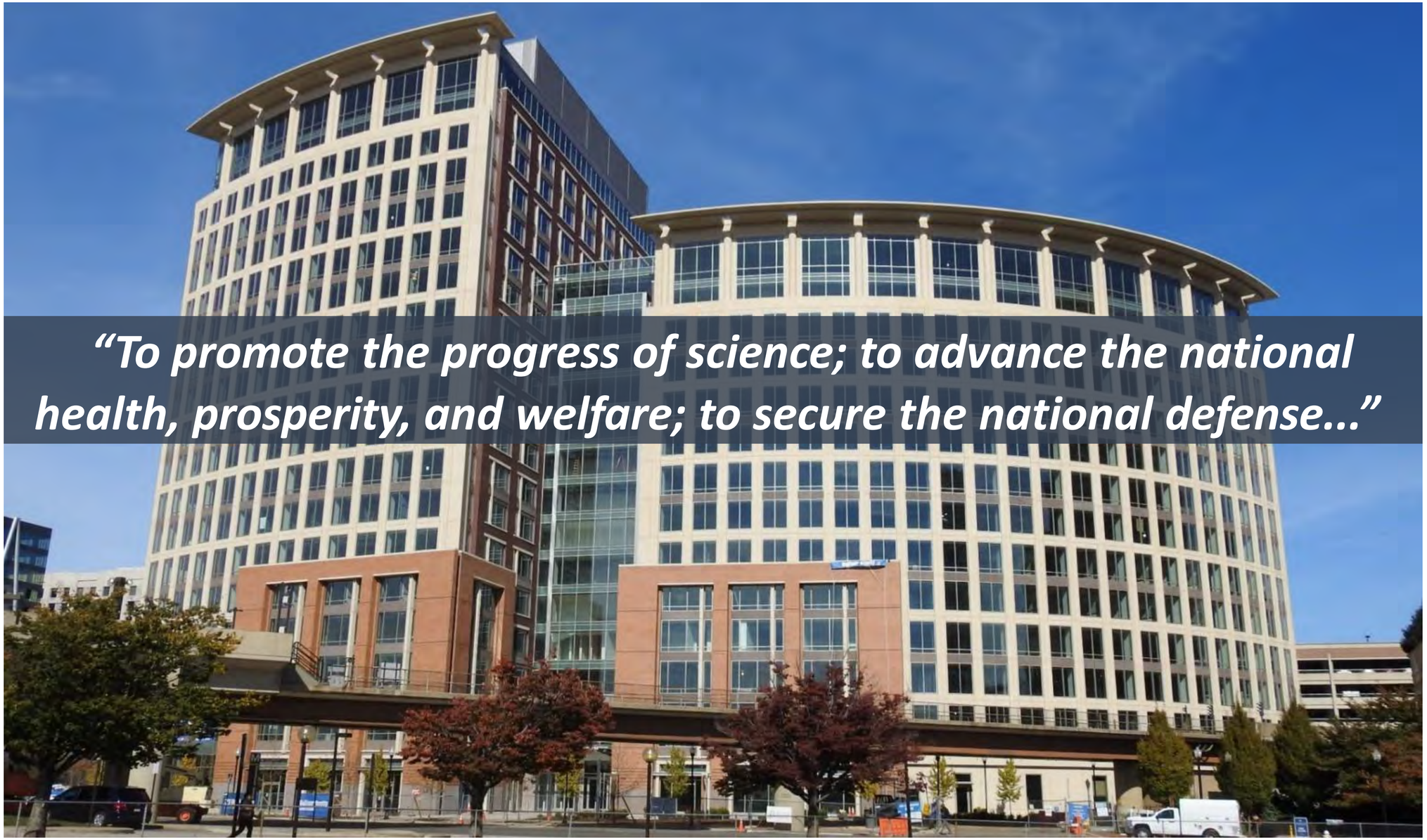


Computing and Information Science and Engineering (CISE)

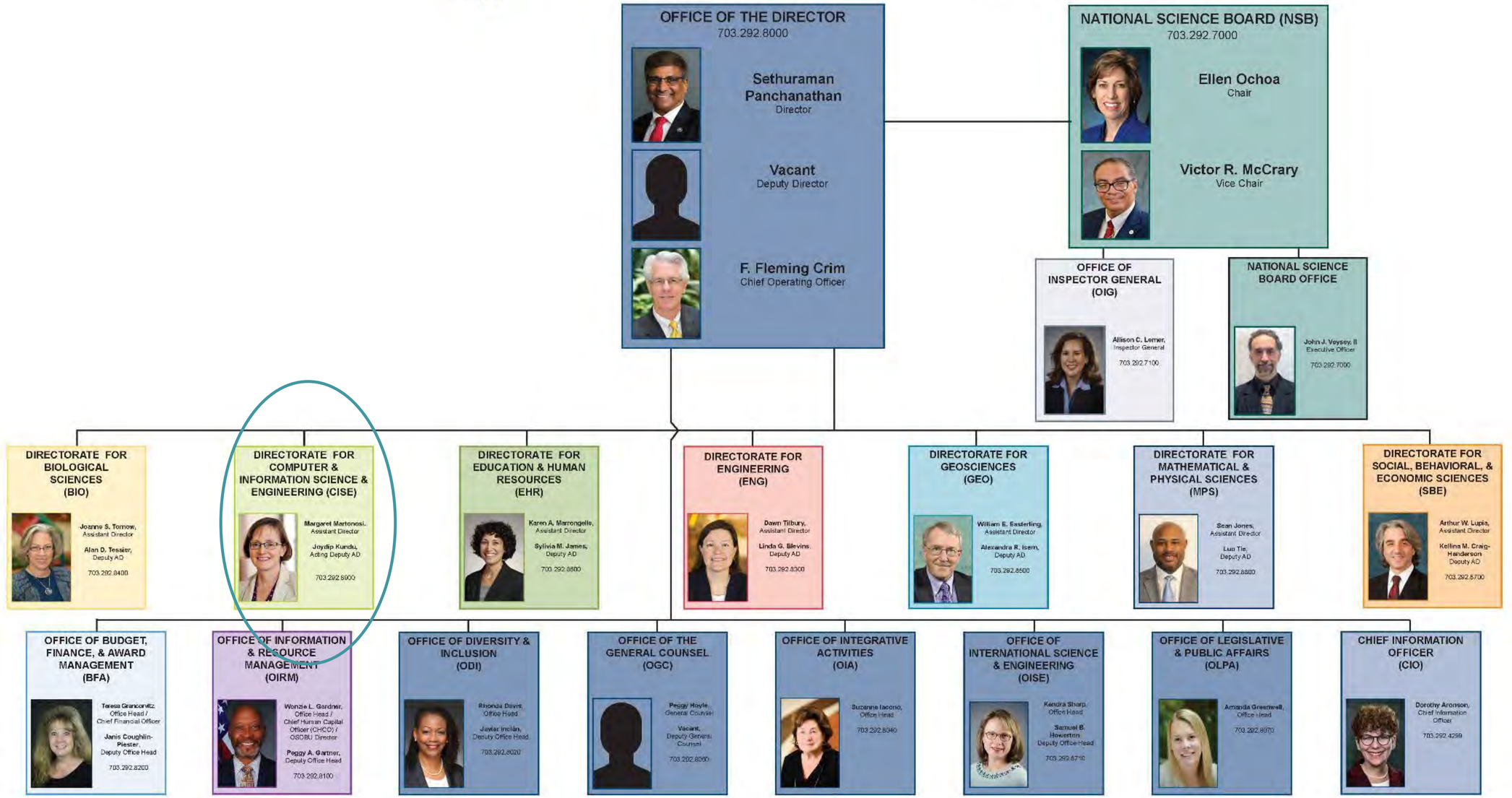
Presenter: Amarda Shehu, NSF

Date: October 4-8, 2021

THE MISSION OF THE NATIONAL SCIENCE FOUNDATION



NATIONAL SCIENCE FOUNDATION



National Science Foundation
2415 Eisenhower Avenue
Alexandria, Virginia 22314
TEL: 703.292.5111 | FIRS: 800.877.8339 | TDD: 800.281.8749

April 2021

NSF BY THE NUMBERS

93% of $8.3B
awards and grants for research projects and STEM education

$200M
to R&D through its small business program

$1.4B
to STEM education and workforce development

Funds research in all 50 U.S. states and fosters scientific collaboration in all continents

48,000
proposals reviewed

12,000
awards funded

386,000
people directly involved in NSF activities annually

42,000
graduate students funded

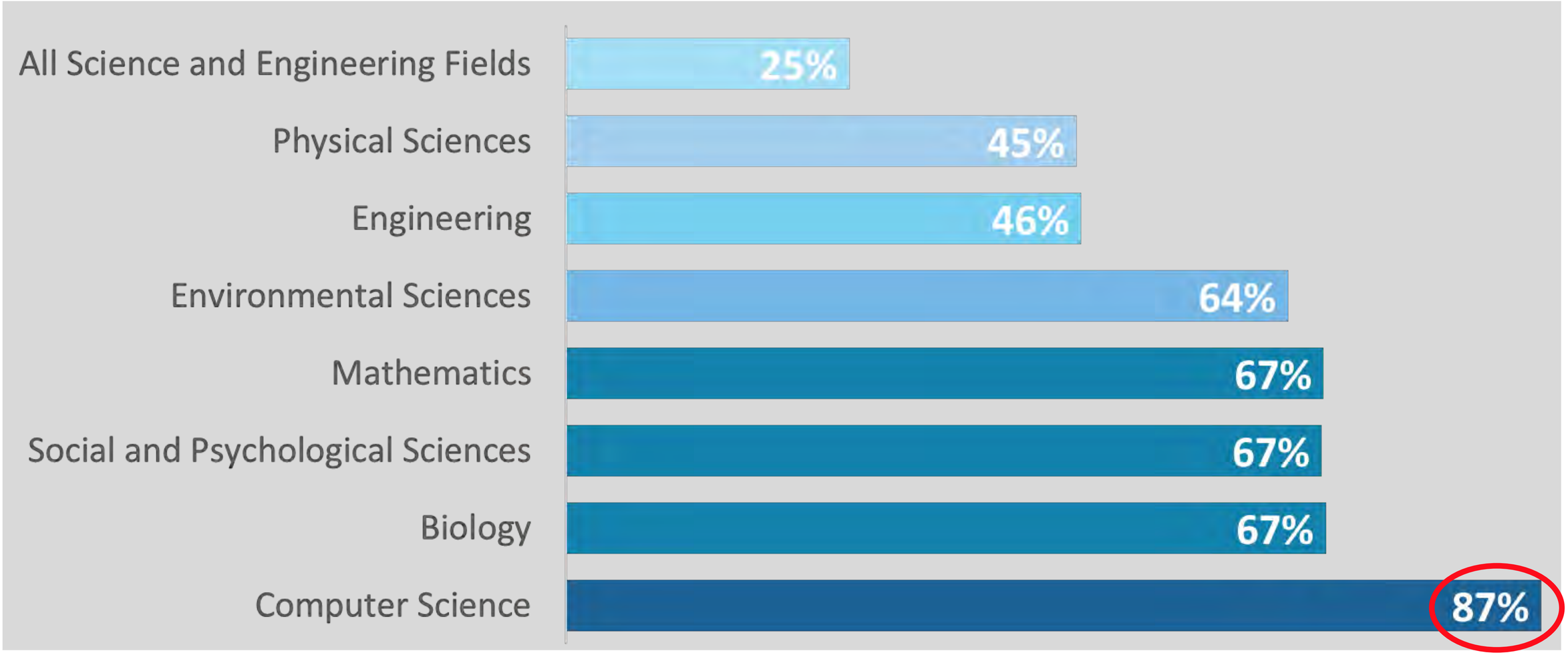
2,000
academic, private and public institutions funded

248
NSF-funded researchers received Nobel Prizes

25%
Of all federally funded academic fundamental research comes from NSF

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.

NSF'S GOLD STANDARD MERIT REVIEW PROCESS

More information at: https://www.nsf.gov/bfa/dias/policy/merit_review/
Video available at: http://go.usa.gov/ceSBJ

BUDGET

American Rescue Plan

$600M

for NSF to share with its community

Throughout this pandemic, people and institutions that make up the U.S. scientific research community have faced unprecedented challenges, all while being integral to our efforts to combat COVID-19. The American Rescue Plan is a historic piece of legislation that provides much needed relief to the research community. The U.S. National Science Foundation is committed to supporting the scientific community with this investment and is grateful to Congress and the Administration for the support they've provided.

Dr. Sethuraman "Panch" Panchanathan, NSF Director.

FY 2022 President's Budget Request

$10.7B

for NSF to:

- enhance fundamental research and development;
- address racial equity in science and engineering;
- address climate science and sustainability research;
- strengthen U.S. leadership in emerging technologies; and
- construct additional major research facilities.

Outline

CISE ORGANIZATION AND CORE PROGRAMS

Office of Advanced Cyberinfrastructure (OAC)

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

Manish Parashar
Office Director

Amy Friedlander
Deputy Office Director

Computing & Communication Foundations (CCF)

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

Walter Cleveland II,
Division Director

Philip Regalia, Acting
Deputy Division
Director

CISE Leadership

Margaret Martonosi,
Assistant Director

Joydip Kundu,
Deputy Assistant
Director

Gurdip Singh
Division Director

Henry Kautz,
Division Director

- Computer and Network Systems
- Education and Workforce Development

Computer & Network Systems (CNS)

Thyagarajan Nandagopal,
Acting Deputy Division
Director

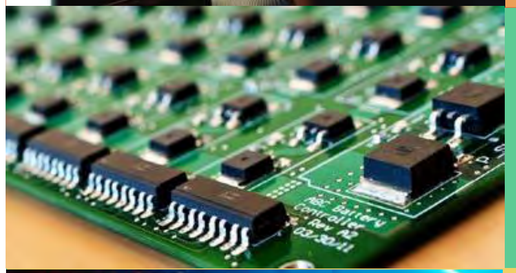
- Human-Centered Computing
- Information Integration and Informatics
- Robust Intelligence

Information & Intelligent Systems (IIS)

Wendy Nilsen,
Deputy Division
Director

CISE DIVISIONS

Office of Advanced Cyberinfrastructure supports and coordinates the development, acquisition, and provision of state-of-the-art cyberinfrastructure resources, tools and services essential to advancing science and engineering.



Computing and Communication Foundations advances computing and communication theory, algorithms for computer and computational sciences and architecture and design of computers and software.

Computer and Network Systems invent new computing and networking technologies and finds new ways to make use of current technologies.

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

CISE BY THE NUMBERS: FY 2020

$1,011 M FY 2020 enacted budget

7,932 proposals

432 Panels

25% success rate

1,971 awards

19,699 people supported

369 institutions supported

8,164 senior researchers

1,134 other professionals

561 postdoctoral associates

6,622 graduate students

3,218 undergraduate students

NSF funds > 85% of federally-funded academic CS research in the US.

(*Source: NCSES*)

CISE PROGRAMS ADRESS NATIONAL PRIORITIES

Image Credit: CCC and SIGACT CATCS

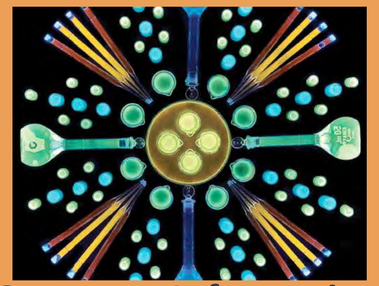
AI, Big Data & Robotics

Image Credit: ThinkStock

Cybersecurity

Image Credit: ThinkStock

Manufacturing & Microelectronics



Quantum Information Sciences

Future Computing Systems

Image Credit: US Ignite

Smart Communities

Image Credit: Calvin Lin, University of Texas, Austin

Computer Science Education

Advanced Wireless Research

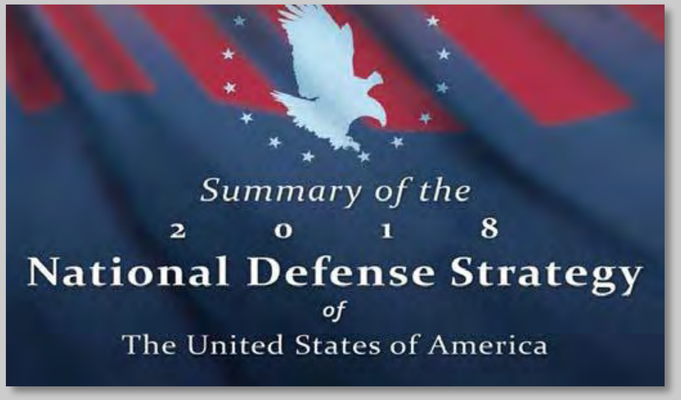
CISE PROGRAMS ARE ALIGNED WITH ADMINISTRATION AND CONGRESSIONAL PRIORITIES

FY 2021 R&D Budget Priorities Memo

Artificial Intelligence, Quantum Information Science, and Computing:

Prioritize basic and applied research investments consistent with the 2019 Executive Order on AI and the 2019 update of the National AI R&D Strategic Plan.

"... departments and agencies should work together to explore new applications and support R&D for high performance future computing paradigms, fabrication, devices, and architectures alongside sustainable and interoperable software; data maintenance and curation; and appropriate security."



National Quantum Initiative Act

Advances in computing, communications, information technologies, & cyberinfrastructure

CISE-funded projects have remarkable impact

Drive U.S. competitiveness

- IT accounts for 25% of economic growth since 1995
- Development of billion-dollar industries: networking, software, digital communications, computer graphics, AI and robotics, and more.

Outline

CISE Core Research Investments

- Strong commitment to core/fundamental research – *the heart of what we do*
  - Core research spending accounts for 50% or more of the overall CISE research budget
- Cast a broad net and let the best ideas surface
- Engage with our community to develop new research directions

FUNDING OPPORTUNITIES

CISE CI PROGRAMS

IIS

Information and Intelligent Systems

- Human-Centered Computing
- Information Integration and Informatics
- Robust Intelligence

CCF

Computer and Communication Foundations

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

CNS

Computer and Network Systems

- Computer and Network Systems
- Education and Workforce Development

OAC

Office of Advanced Cyberinfrastructure

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

Core Programs:
Small (no deadlines)
+ Medium.

Notes and Recent Changes:
CCF FET (new)
CNS unified core programs (formerly CSR + NeTS)
IIS: HCC (recent name change)
OAC: Core (new)

FUNDING OPPORTUNITIES

CISE TOPIC AREAS

OTHER CISE PROGRAMS

- CISE-MSI Research Expansion
- Expeditions in Computing
- Principles and Practices of Scalable Systems
- Formal Methods in the Field
- Designing Accountable Software Systems
- Big Data Hubs (community resource)

MULTI-DIRECTORATE PROGRAMS LED BY CISE

- Secure and Trustworthy Cyberspace
- Cyber-physical Systems
- National AI Research Institutes
- Smart and Connected Health
- Smart and Connected Communities
- Civic Innovation Challenge (CIVIC)
- National Robotics Initiative
- Fairness in AI with Amazon
- Research on Emerging Technologies for Teaching and Learning
- Collaborative Research on Computational Neuroscience.

EARLY CAREER

- CAREER
- CISE Research Initiation Initiative (CRII).

PROGRAMS LED BY OTHER DIRECTORATES OF INTEREST TO CISE

- Designing Materials to Revolutionize and Engineer Our Future
- Foundational Robotics
- Future Manufacturing
- Spectrum Innovation Initiative
- Sustainable Regional Systems
- Neural and Cognitive Systems
- STCs (Science & Tech Centers)
- ERCs (Eng Research Centers).

EDUCATION PROGRAMS

- Computer Science for All
- Computing in Undergraduate Education
- Broadening Participation in Computing Alliances

INFRASTRUCTURE

- Major research Instrumentation
- Mid-Scale Research Infrastructure – Size classes 1 ($6-20M) and 2 ($20-100M)
- CCRI – CISE Community Research Infrastructure.

NSF BIG IDEAS AND THEIR SOLICITATIONS

- Future of Work
- Harnessing the Data Revolution
- Data Science Corps
- Quantum Leap
- Quantum Leap Faculty Fellows.

ENTREPRENEURSHIP AND TRANSLATION

- Convergence Accelerator
- I-Corps, SBIR/STTR
- Industry/University Cooperative Research Centers (IUCRC)
- CISE InTrans supplements
- CISE Transition-to-Practice opportunities.

OAC: Cyberinfrastructure for all of S&E

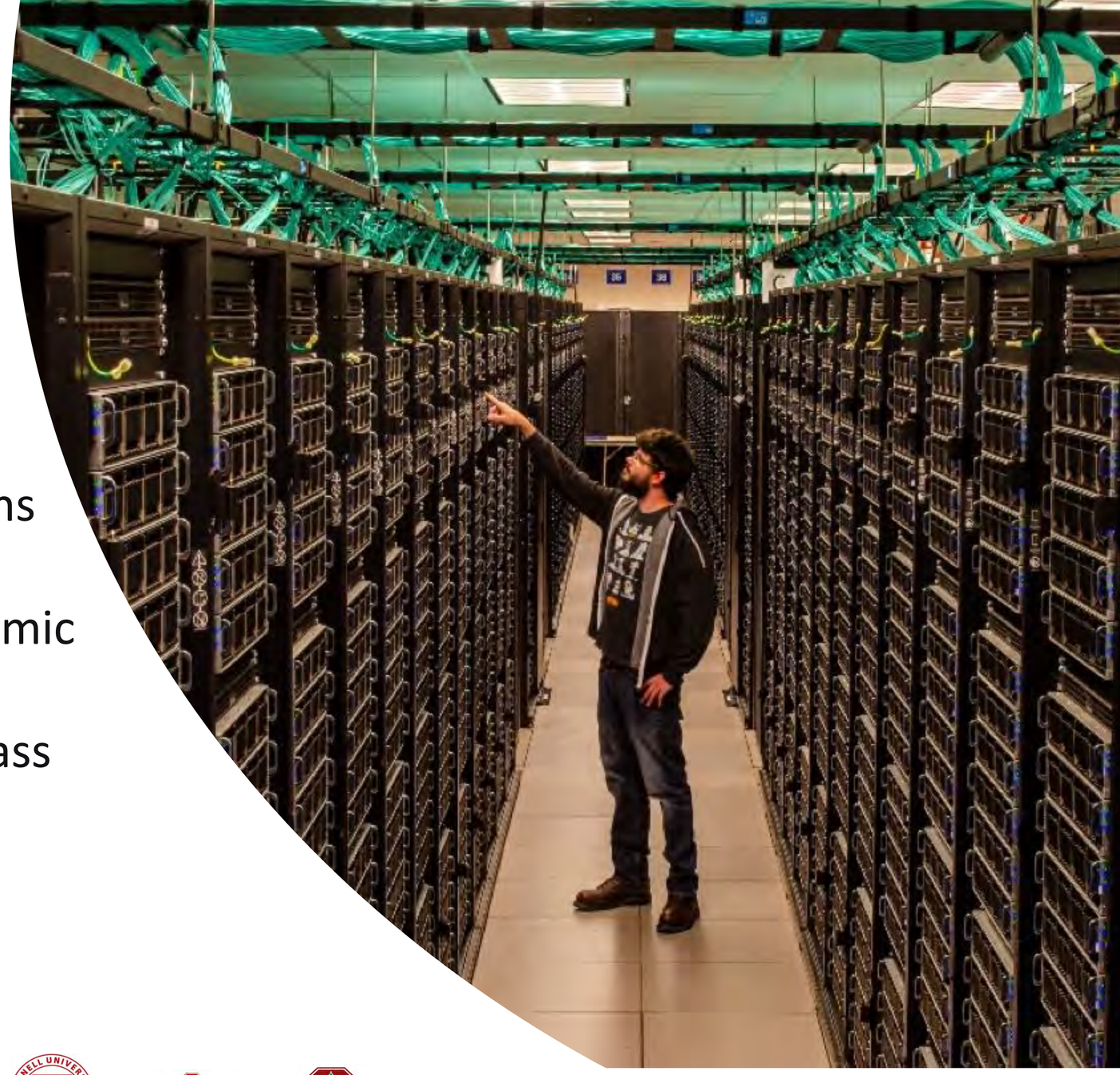
- Lead an expansive CI ecosystem driven by research priorities and the scientific process
- Leverage investments by universities, federal agencies, commercial sector
- Support a diversity of computational resources to meet the growing demands of modern science and engineering

OAC: Cyberinfrastructure for all of S&E

Cyberinfrastructure for Sustained Scientific Innovation (CSSI) - Data and Software: Elements and Frameworks

- Supports the CI ecosystem, spanning all levels of the data and software stacks and scales.
- CISE/OAC, BIO, EHR, ENG, GEO, MPS, and SBE
- *Proposal deadline was Oct 28, 2020*

OAC Investments: Leadership-class computing



Frontera supercomputing system

- Broad utility for all S&E applications
- World's 5th fastest supercomputer
  Largest CPU system on a US academic campus
- Complements other leadership-class computing investments in the US research ecosystem
- *Launched September 2019*

TACC TEXAS ADVANCED COMPUTING CENTER · Caltech · THE UNIVERSITY OF UTAH · A&M · CORNELL UNIVERSITY FOUNDED A.D. 1865 · THE OHIO STATE UNIVERSITY · PRINCETON UNIVERSITY · Georgia Tech · THE UNIVERSITY OF CHICAGO · UCDAVIS UNIVERSITY OF CALIFORNIA

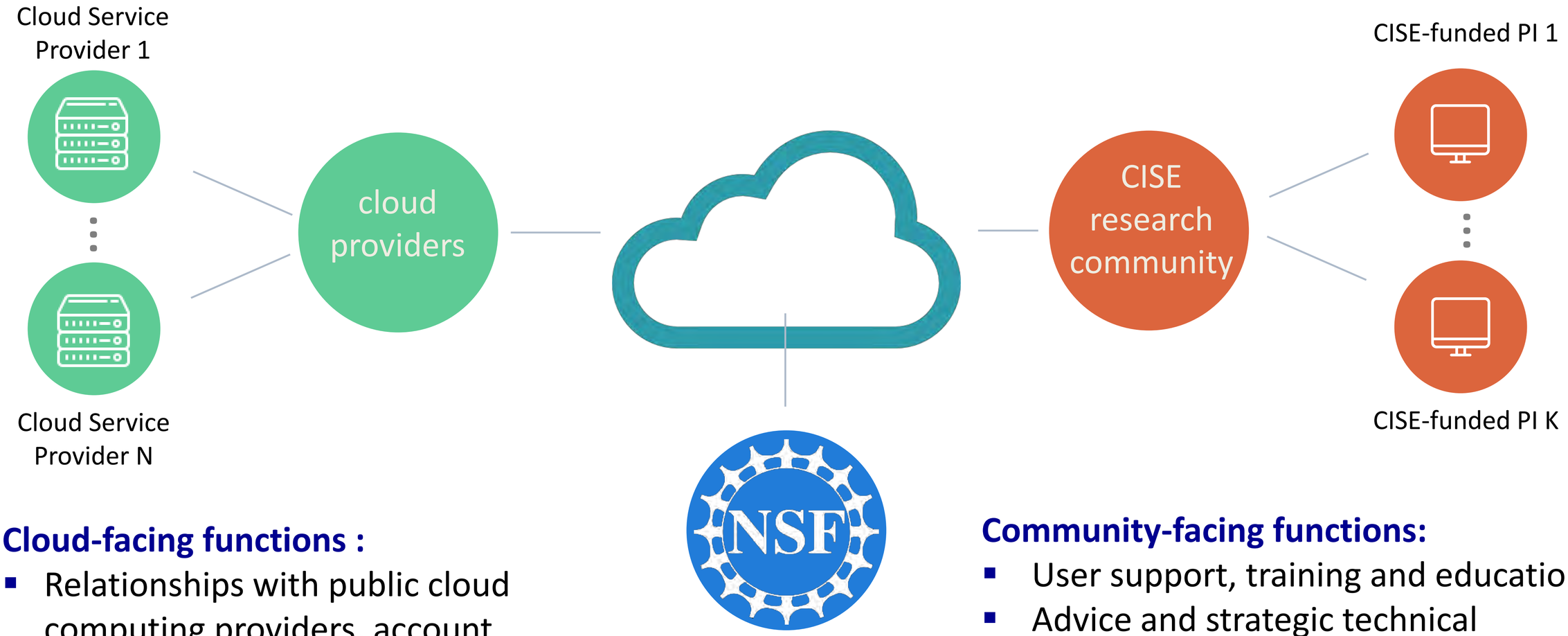
CISE Community Research Infrastructure Investments: CCRI

CCRI

- Planning Community Infrastructure
- Larger, longer awards for new infrastructure
  - Grand Ensemble: 5 years, $5M
  - Medium Ensemble: 3 years, $1.5M
- Emphasis on projects that benefit and involve the CISE community

- *Recently done:*
  - *Proposal deadline was January 28, 2021 (Letter of intent due December 15, 2020)*
- *Next:*
  - *Proposal deadline is January 27, 2022 (Letter of intent due December 14, 2021)*

CISE Research Infrastructure Investments: CloudBank



Cloud-facing functions :

- Relationships with public cloud computing providers, account management, resource allocations
- Strategic planning for public cloud use by CISE community

Community-facing functions:

- User support, training and education
- Advice and strategic technical guidance research and education projects

Computing education & workforce: Early-career faculty


Credit: *NSF*

Faculty Early Career Development (CAREER) Program

Integrating research and education efforts

One of NSF's most prestigious awards for faculty beginning their independent careers who exemplify the role of teacher-scholars.

CISE Research Initiation Initiative (CRII)

Jumpstarting research independence

Open to faculty in first two years of an independent academic position to recruit and mentor undergraduate and graduate students, enabling a subsequent stream of discoveries and innovations.


Credit: *ChieYu Lin*


Credit: NeTS Early Career Workshop

Proposal Writing Workshops, Aspiring PI Meetings, and Early-career Workshops

Strengthening research and education activities through community

Introduces early-career faculty to NSF, merit review process, and peers and senior researchers in their field.

Faculty Early Career Development (CAREER) Program

- NSF's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through:
  - Outstanding research
  - Excellent education
  - Integration of education and research within the context of the mission of their organizations
- Since its inception in 1996:
  - >200 programs have reviewed CAREER proposals
  - >7,000 awards
- PIs are allowed only one submission per competition and three attempts.
- *CISE CAREER Proposal Writing Workshops held each Spring*
- *Proposal deadline was July 26, 2021; upcoming deadline is July 25, 2022*

Computing Research Initiation Initiative (CRII)

Enabling early research independence

- Contributes to growth and development of future generations of scientists and engineers who will dedicate their careers to advancing CISE research and education
- Supports early-career academicians who specifically lack access to adequate organizational or other resources
- Provides opportunity for individuals who are in their first academic position post-PhD to recruit and mentor their first students
  - Budget: < $175K/24 months
  - Must include a total of at least 1.0 month of salary for the PI plus 24 months of full-time student support

Passed deadline: September 20, 2021 *Next deadline: September 19, 2022*

Third Monday in September, annually

Computing education & workforce: Graduate and Undergraduate Students

Graduate Research Fellowship Program (GRFP)

- Supports individuals early in their graduate training
- Has supported graduate students every year since 1952
- Foundation-wide program
- *CISE-related proposal deadline in October 2021*

CISE Graduate Fellowship Program (CSGrad4US)

- Supports recent CISE bachelor's degree recipients who have been working in industry who now want to return to graduate school
- Provides mentoring and a fellowship
- *Deadline: May 19, 2021*

Research Experiences for Undergraduates (REU)

REU Sites

- Typically in summer
- 8-10 students in a cohort environment
- *Proposal deadline was/is in August*

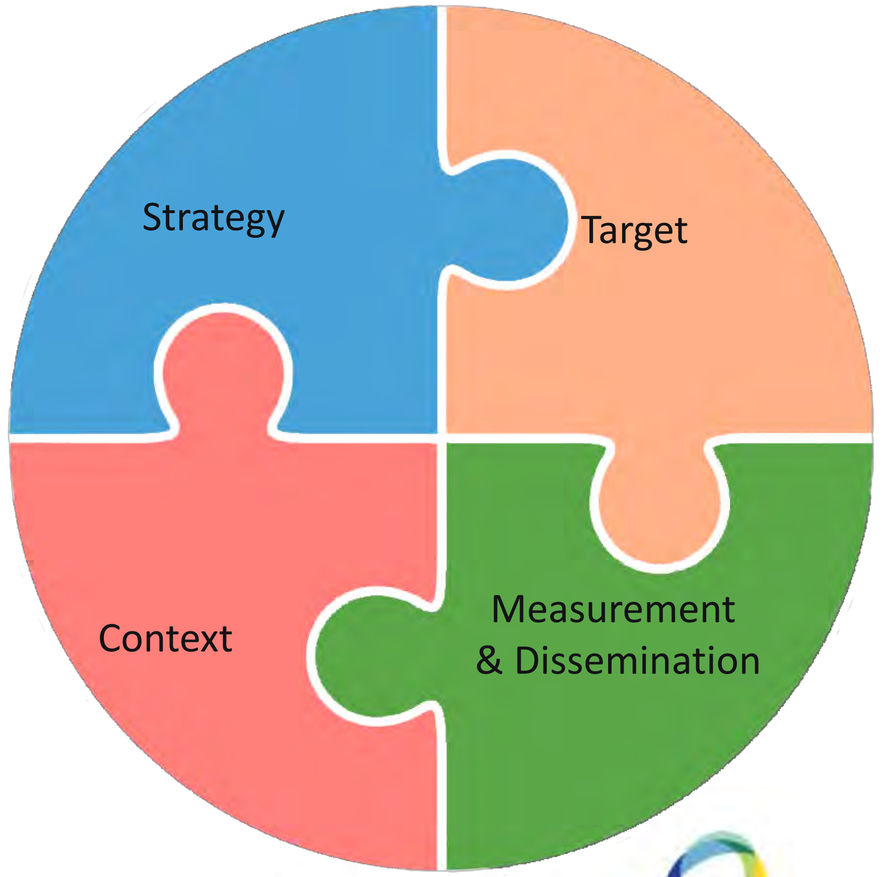
REU Supplements

- Support for 1-2 students to work on existing project
- *Best to submit request by March but no strict deadline*

Computing education & workforce: Broadening Participation in Computing (BPC)

Medium and Large projects in CORE and SaTC programs **must** have an approved BPC plan in place **by the time of award**

- BPC requires culture change in the computing community
  - increased exposure and engagement
- CISE now requires meaningful BPC activities in all Core research programs
  - Equip program officers and reviewers to evaluate BPC activities in proposals
- White paper of best practices and resources on BPCnet.org



BPCnet
RESOURCE PORTAL

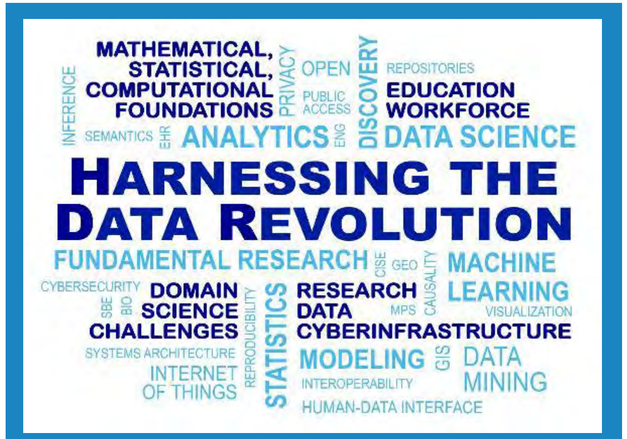
Computing education & workforce: Computer Science for All

CSforAll: Research and Research Practitioner Partnership

- Partnership between educators, researchers, and computer scientists
- Build community and sustain research-based efforts
- Supports evidence-based instructional materials, curricula, activities and assessments, and teacher professional development and support
- **Ultimate goal**: To provide access to computer science (CS) and computational thinking (CT) education to *all* U.S. students
- *Proposal deadline was Feb 10, 2021;*
- *Second Wednesday in Feb, annually thereafter*

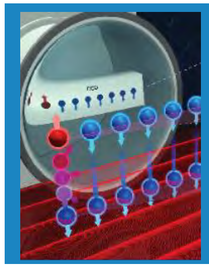
NSF's 10 Big Ideas

RESEARCH IDEAS



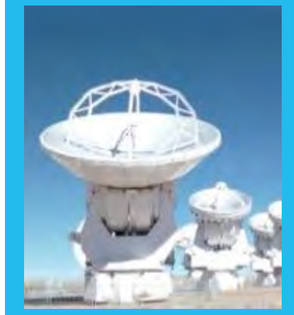
Harnessing Data for 21st Century Science and Engineering

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

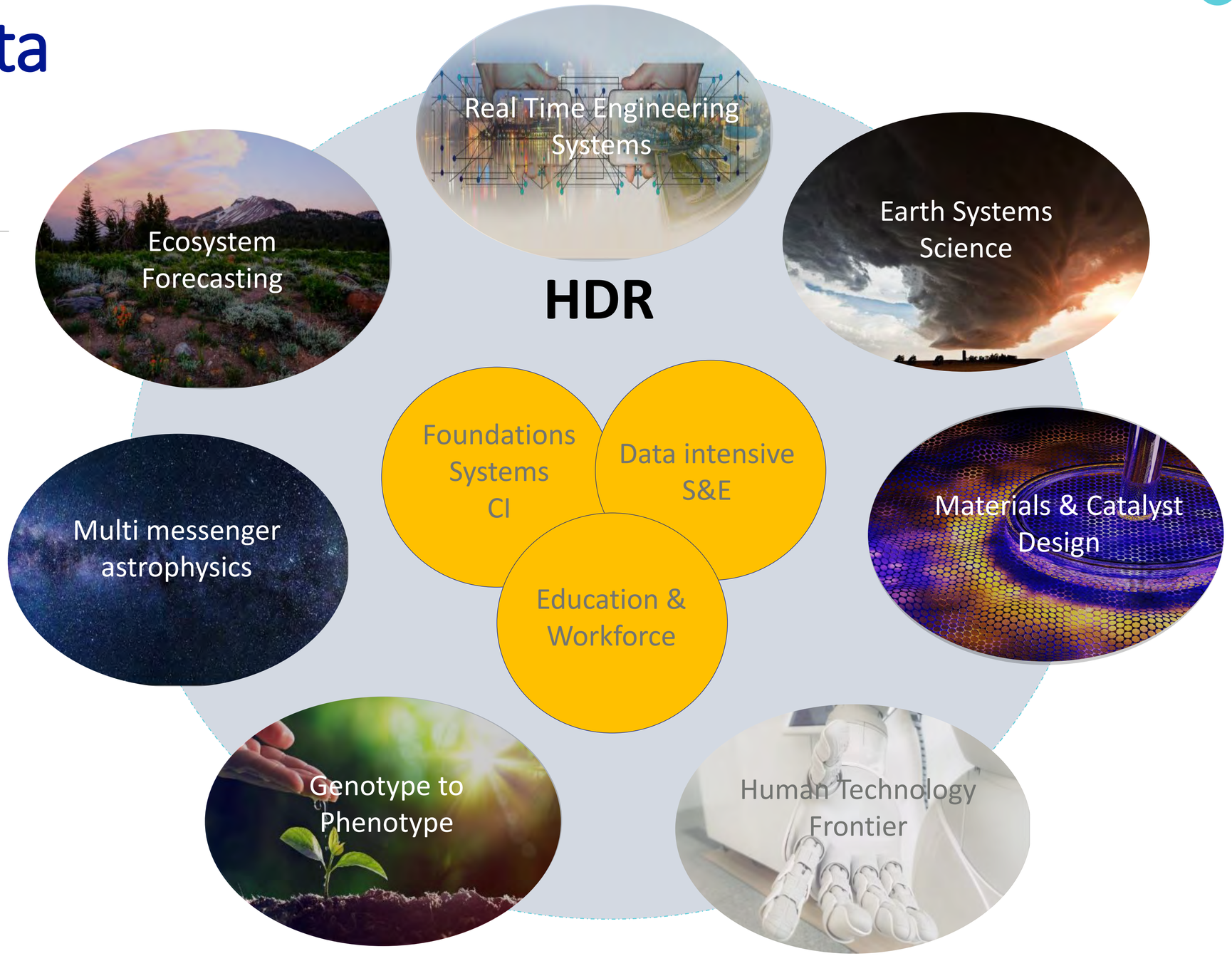
NSF-INCLUDES

NSF 2026

Growing Convergent Research

Harnessing the Data Revolution: Vision

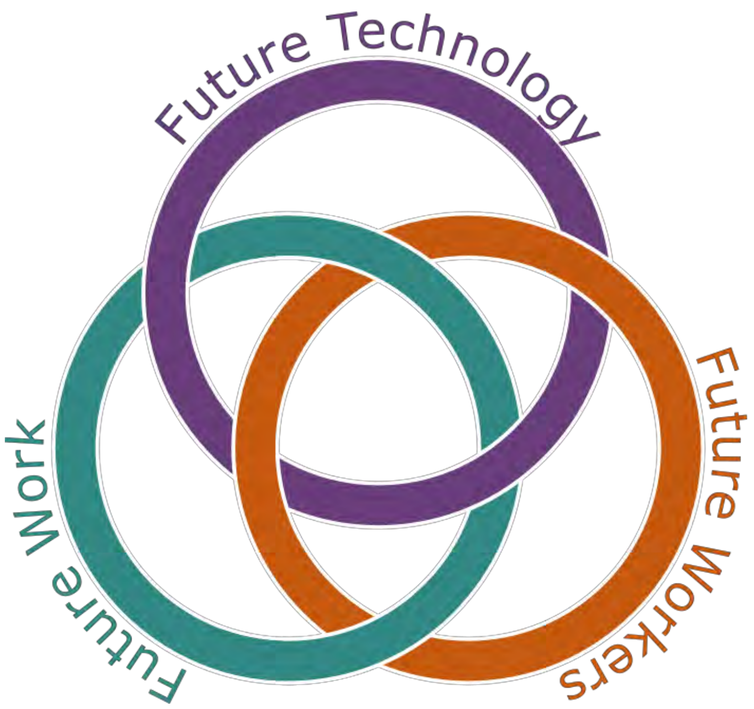
Enabling new modes of data-driven discovery to ask and answer fundamental questions at the frontiers of science and engineering



Future of Work at the Human-Technology Frontier (FW-HTF)

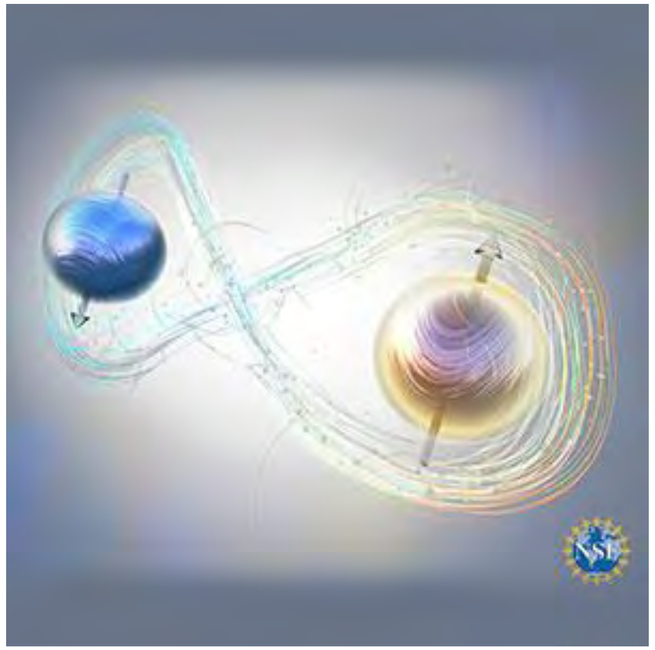
The overarching vision is

- to support multi-disciplinary research to sustain economic competitiveness,
- to promote worker well-being, lifelong and pervasive learning, and quality of life, and
- to illuminate the emerging social and economic context and drivers of innovations that are shaping the future of jobs and work.



Enabling Quantum Leap: Quantum Interconnect Challenges for Transformational Advances in Quantum Systems (QuIC-TAQS)

- Supports interdisciplinary teams that will explore highly innovative, original, and potentially transformative ideas for developing and applying quantum science, quantum computing, and quantum engineering in the specific area of quantum interconnects.
- Quantum interconnects are an integral part of all aspects of quantum information science
- Due dates:
  - Preliminary Proposal: April 12, 2021
  - Full Proposals: June 14, 2021



Proposals focused on interdisciplinary research that enhances the development of quantum interconnects (QuIC) that would allow the transfer of quantum states between different physical states and/or different physical systems

Mid-scale Research Infrastructure

Mid Scale Research Infrastructure- 1 (Mid-Scale RI-1)

- Cyberinfrastructure that addresses community and national-scale computational- and data-intensive science and engineering research
- **Design:** RI planning, design for future Mid-scale RI-1, Mid-scale RI-2 or MREFC-class investments (can ask < $6M)
- **Implementation:** new or upgraded RI in STEM ($6M- $20M)
  - *Preliminary proposal: Jan 07, 2021*
  - *Full proposal: April 23, 2021*

Mid-scale Research Infrastructure

Mid Scale Research Infrastructure- 2 (Mid-Scale RI-2)

- Innovative, potentially transformative, projects
- Strong component of student training in instrumentation and research infrastructure development
- **Advanced Design and Implementation:** $20M- $100M
  - *Letter of Intent: Feb 3, 2021 (required)*
  - *Preliminary: March 05, 2021 (required)*
  - *Full proposal: Sept 20, 2021*

Select CISE cross-cutting programs

- Artificial Intelligence (AI)
- Cyber-Physical Systems (CPS)
- National Robotics Initiative 3.0
- Secure and Trustworthy Cyberspace (SaTC)
- Smart and Connected Communities (S&CC)
- Smart and Connected Health (SCH)
- Resilient & Intelligent NextG Systems (RINGS)
- Designing Accountable Software Systems (DASS)

For a comprehensive list of CISE funding opportunities, visit:
http://www.nsf.gov/funding/pgm_list.jsp?org=CISE

Artificial Intelligence connects the Big Ideas

$120 M

Spent annually in fundamental AI research

$500 M

Spent annually in fundamental + translational AI research

Autonomy

Human-AI interaction

AI Infrastructure

Modeling

Machine Learning Components

Massive Data Management

Sensing / Data Acquisition

> AI is the universal connector that interweaves all of our Big Ideas; data science is changing the very nature of scientific inquiry, and AI's use of data has the potential to revolutionize everything we do in science.
>
> **-NSF Director, France Cordova**

Artificial Intelligence (AI)

Cross-directorate programs, such as:

- Collaborative Research in Computational Neuroscience (BIO, CISE, ENG, MPS, SBE, OISE, NIH, international)
- Cyber-Physical Systems (CISE, EHR, ENG, SBE, DHS, DOT, NIH, USDA)
- NSF CISE, EHR, ENG, and SBE with DoT, NASA, NIH, NIOSH, USDA
- Smart & Connected Communities (CISE, EHR, ENG, SBE)
- Smart and Connected Health (CISE, ENG, SBE, NIH)

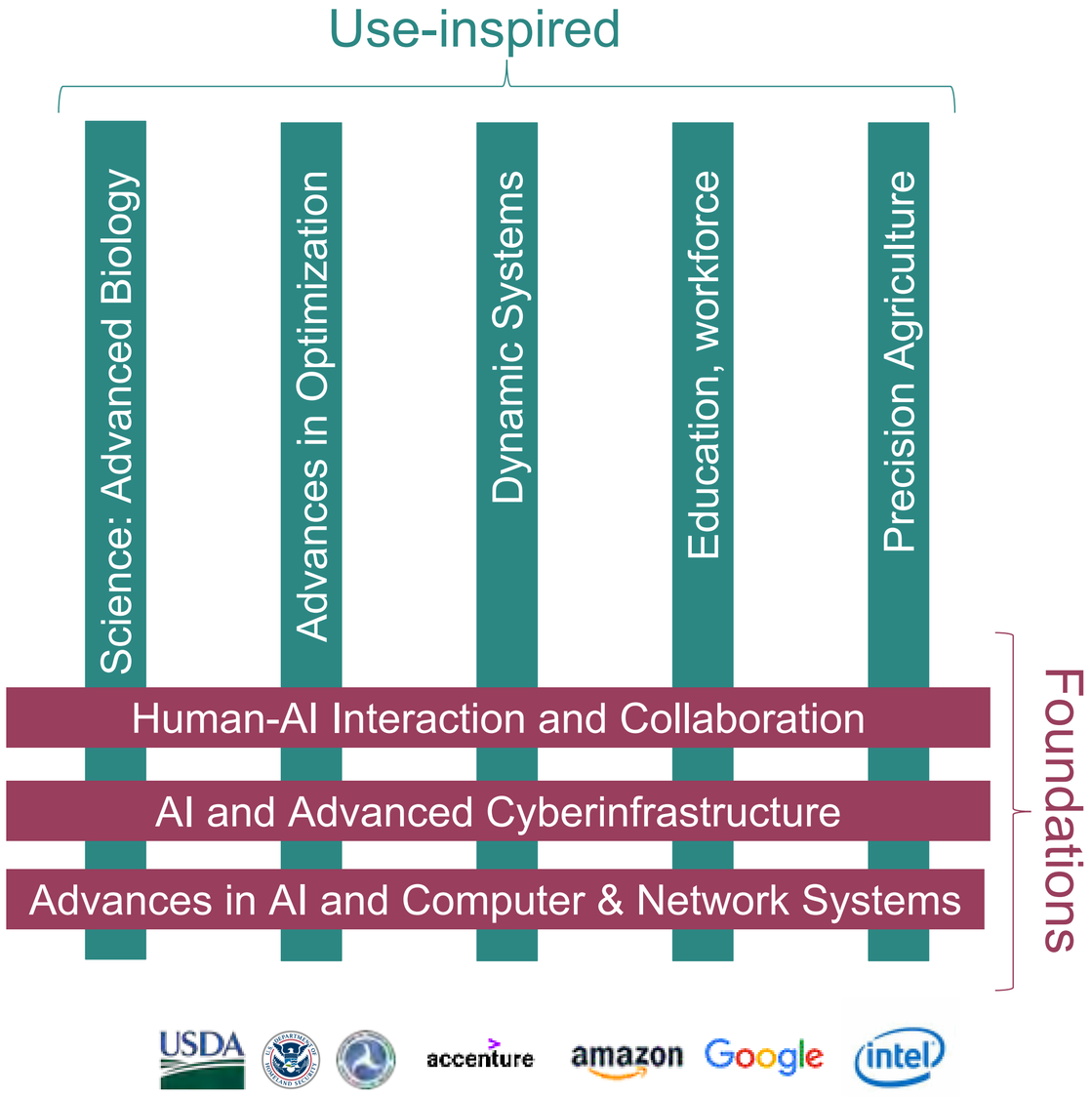
New in FY 2019 – FY 2021:

- AI and Society (CISE, SBE, Partnership on AI)
- Real-Time Machine Learning (CISE, ENG, DARPA)
- CISE FEAT DCL: Fairness, Ethics, Accountability, and Transparency (NSF 19-016)
- Fairness in AI (CISE, SBE, Amazon)
- AI Research Institutes (NSF-wide, DHS/S&T, DOT/FHWA, USDA/NIFA, VA)

Autonomy	Human-AI interaction
AI Infrastructure	
Modeling	
Machine Learning	
Massive Data Management	
Sensing / Data Acquisition	

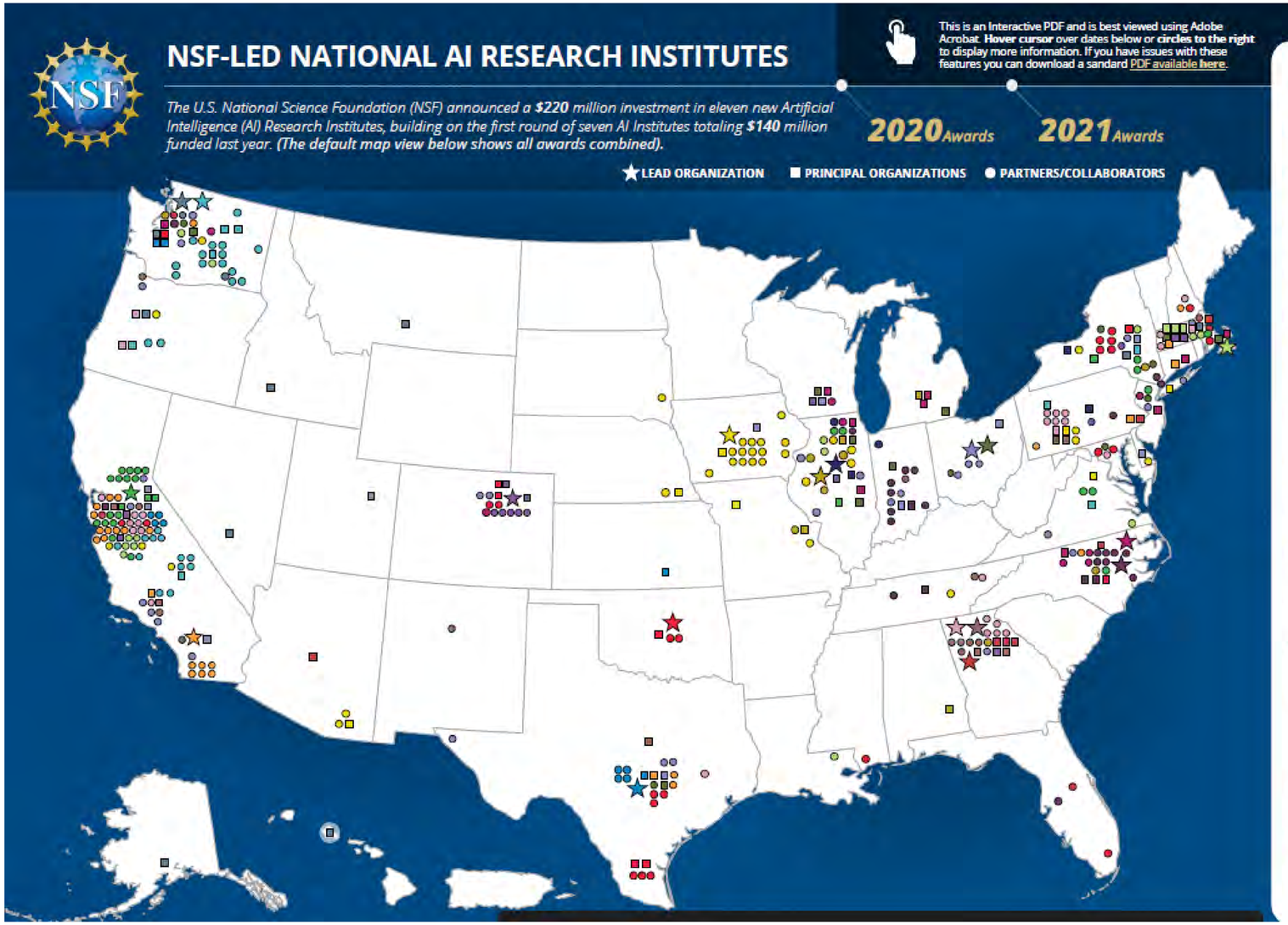
AI and the other IotF: *opportunities for cross-cutting, convergent research, catalyzing new Industries*

2021 AI Research Institutes



National hubs for universities, government, industry and nonprofits to advance AI research and education

- $20M per Institute over 5 years
- First round of awards announced Aug. 26, 2020
  - Launched seven new Institutes nationwide ($140 million)
- FY 2021 solicitation (NSF 20-604).
  - Deadline Dec 4, 2020
  - FY21 awarded



2021— 11 AI Institutes
Each @ $20M over 5 yrs
40 states -- 7 areas

- Human-AI Interaction and Collaboration
- AI for Advances in Optimization
- AI and Advanced Cyberinfrastructure
- AI in Computer and Network Systems
- AI in Dynamic Systems
- AI-Augmented Learning
- AI-Driven Innovation in Agriculture and the Food System.

https://www.nsf.gov/news/news_summ.jsp?cntn_id=303176

Cyber-Physical Systems (CPS)

Deeply integrating computation, communication, and control into physical systems

- Cyber-physical systems (CPS) are engineered systems that are built from, and depend upon, the seamless integration of computation and physical components.
- Aims to develop the core system science needed to engineer complex cyber-physical systems.
- Serves multiple key national priority sector areas.
- Includes *Transition to Practice (TTP)* option.
- Cross-Directorate and Cross-Agency Solicitation: NSF CISE and ENG with DHS, DOT/FHA, NIH, USDA.

Transportation

Energy

Healthcare

Critical Infrastructure

National Robotics Initiative 3.0: Ubiquitous Collaborative Robots (NRI-3.0)

Integrating the next generation of collaborative robots to assist humans

- Accelerate development and use of ubiquitous co-robots
- Four main research thrusts:
  - Scalability
  - Customizability
  - Lowering barriers to entry
  - Societal impact
- Strong coupling with industry and startups
- Cross-Directorate and Cross-Agency Solicitation:
  - NSF CISE, EHR, ENG, and SBE with DoT, NASA, NIH, NIOSH, USDA

Proposal deadline was April 19 – May 3, 2021,

Next: February 08, 2022 - February 22, 2022

February 8 - February 22, Annually Thereafter

Secure and Trustworthy Cyberspace (SaTC)

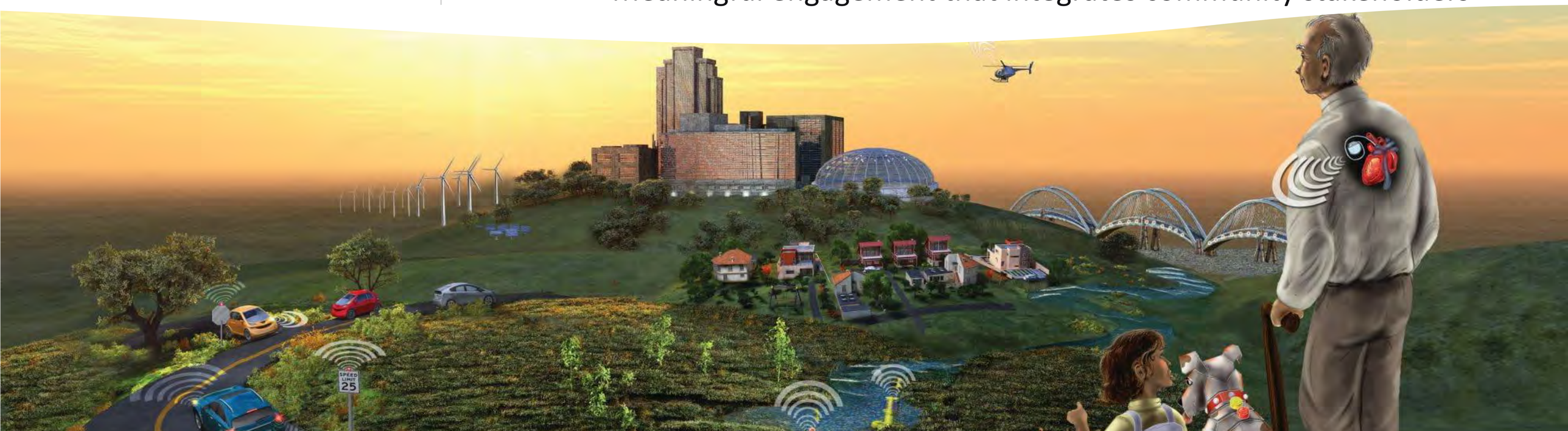
Securing our Nation's cyberspace

- Supports fundamental scientific advances and technologies to protect cyber-systems from malicious behavior, while preserving privacy and promoting usability
- Addresses cybersecurity from one of theses perspectives:
  - CORE – spans interest of CISE, ENG, MPS, and SBE
  - EDU – cybersecurity education
  - TTP – *Transition to Practice*
- Broadening Participation in Computing plans are strongly encouraged for Medium proposals, and approved plans are required before award
- Cross-Directorate Solicitation: CISE, EHR, ENG, MPS, and SBE
- *Full proposals accepted anytime (except for LARGE/FRONTIERS)*

Smart and Connected Communities (S&CC)

Improving quality of life, health, well-being, and learning in communities

- Synergistically integrating intelligent technologies with the natural and built environments
- Projects must include
  - Integrative research addressing technological and social dimensions of S&CC
  - Meaningful engagement that integrates community stakeholders



Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH)

Transforming healthcare knowledge, delivery, and quality of life through IT

- Supports next-generation multidisciplinary science that encourages breakthrough ideas in a variety of areas of value to health
  - Networking, pervasive computing, advanced analytics, sensor integration, privacy and security, modeling of socio-behavioral and cognitive processes and system and process modeling

- *Proposal deadlines:*
  - *February 16, 2021*
  - *November 10, 2021*
  - *November 10, 2022*

Image Credit: Cockrell School of Engineering

Resilient & Intelligent NextG Systems (RINGS)
Just Launched: Deadline July 29, 2021

Resilient Network Systems

- Full Stack Security
- Network Intelligence/Adaptability
- Autonomy
- Exploratory Resilience Components

Enabling Technologies

- RF and Mixed Signal Circuits, Antennas and Components
- Novel Spectrum Management Technologies
- Scalable Device-to-Edge-to-Cloud Continuum
- Merging Digital/Physical/Virtual Worlds

https://www.nsf.gov/pubs/2021/nsf21581/nsf21581.htm?WT.mc_id=USNSF_25&WT.mc_ev=click

Designing Accountable Software Systems (DASS)

To support foundational research aimed towards a deeper understanding and formalization of the bi-directional relationship between software systems and the complex social and legal contexts within which software systems must be designed and operate.

Supports collaborations between:

1. Researchers in software design- formal methods, programming languages, software engineering, requirements engineering and human-centered computing.
2. Researchers in law and the social, behavioral, and economic sciences, who study social systems and networks, culture, social norms and beliefs, rules, canons, precedents, legal code, and routine procedures that govern the conduct of people, organizations, and countries.

Was Due: April 19, 2021

Outline

CISE Overview

Selected Programmatics

Partnerships

NSF partners with many stakeholders

Three Primary Objectives:

- Deepen and grow research and innovation
- Make available research infrastructure
- Develop the workforce of the future

An NSF-led public-private partnership: Platforms for Advanced Wireless Research (PAWR)

$100M public-private investment to create four city-scale testing platforms to enable and accelerate fundamental wireless research going beyond 5G

- $50M CISE investment over 7 years
- $50M Industry Consortium investment from >25 networking vendors, device manufacturers, and wireless carriers

PAWR Project Office managed by: usignite Northeastern

Industry partnerships: value propositions

NSF

- **accelerating discovery and leveraging resources:** financial, expertise, infrastructure
- **accelerating translation** of discovery to deployment
- **growing workforce** capacity, including research
- **increasing NSF's visibility** to different audiences

Industry Partners

- access to **national research community**
- gold-standard **merit review process**
- **accelerated discovery and leveraged resources:** financial, expertise, infrastructure
- **accelerated translation** of discovery to deployment
- **future workforce** access
- **potential intellectual property** for technical benefit

An amazing time to be in CISE!

Ubiquity

Computing is *everywhere* – across all of science and engineering, and all of society

Engagement

Computing intertwines with many *communities*

Urgency

Computing is *rapidly expanding and evolving*. There is tremendous opportunity … ***now!***

Join CISE-ANNOUNCE email

join-cise-announce@lists.nsf.gov

- Send an email with no text in the subject or message body.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