A Bit of CNS

Division of Computer and Network Systems

http://www.nsf.gov/dir/index.jsp?org=CISE

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Computer and Network Systems (CNS)

http://www.nsf.gov/div/index.jsp?div=CNS

Supports research and education activities that invent new computing and networking technologies and that explore new ways to make use of existing technologies.

- *Computer Systems Research (CSR):* Transformative research on fundamental scientific and technological advances leading to the development of future generation computer systems (e.g., new architectures; distributed real-time embedded devices; pervasive, ubiquitous and mobile computing; file and storage systems; new programming models, abstraction, languages, compilers, and operating systems; reliable, fault-tolerant and secure hard/middle/software; …).

- *Networking Technology and Systems (NeTS):* Transformative research on fundamental scientific and technological advances leading to the understanding, development, engineering, and management of future-generation, high-performance computer networks.

Word Cloud of CNS Core Projects

Computing Education for the 21ˢᵗ Century (STEM-CP: CE21)

Enhancing computational competencies

COMPUTING EDUCATION

RESEARCH ON TEACHING & LEARNING

BROADENING PARTICIPATION

CE21
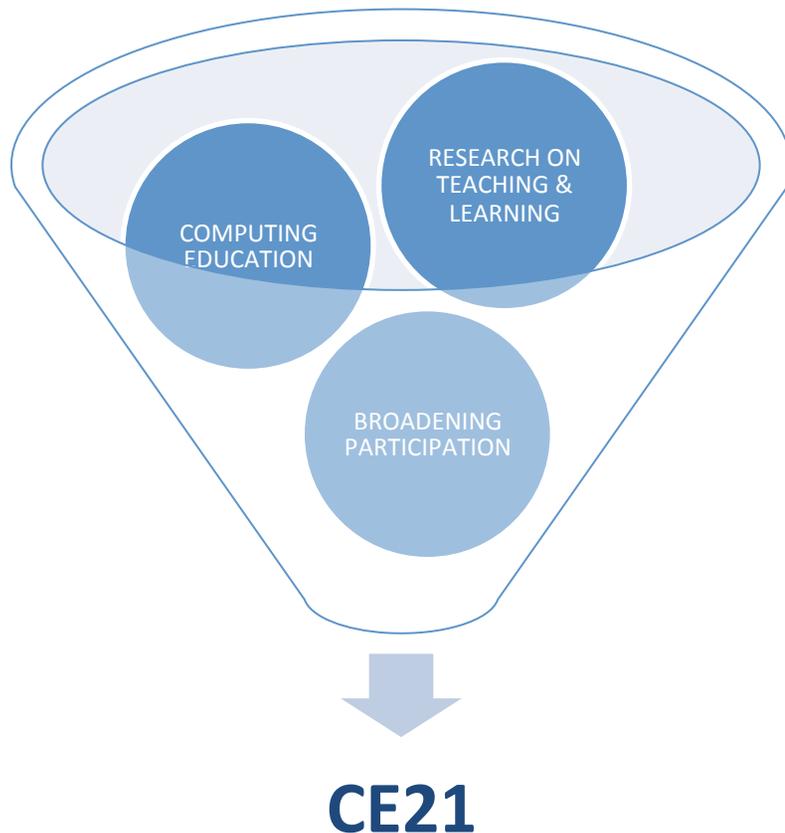
Goals:

- Increase number and diversity of K-14 students and teachers who develop and practice computational competencies.
- Increase number of postsecondary students who have background necessary to pursue degrees in computing and computationally-intensive fields.

Cross-Directorate Solicitation: CISE, EHR

NSF

Cyber-Physical Systems (CPS)

Deeply integrating computation, communication, and control into physical systems

- Aims to develop the core system science needed to engineer complex "smart" cyber-physical systems.
- Serves multiple key national priorities.
- Coordinated across NSF and with DHS and DOT.

Project Types:
- **Breakthrough Projects**
  up to $500,000
  over 3 years
- **Synergy Projects**
  $500,001 to $1,000,000
  over 3 to 4 years
- **Frontiers Projects**
  $1,000,001 to $7,000,000
  over 4 to 5 years

Transportation
- Faster and safer aircraft
- Improved use of airspace
- Safer, more efficient cars

Energy and Industrial Automation
- Homes and offices that are more energy efficient and cheaper to operate
- Distributed micro-generation for the grid

Healthcare and Biomedical
- Increased use of effective in-home care
- More capable devices for diagnosis
- New internal and external prosthetics

Critical Infrastructure
- More reliable power grid
- Highways that allow denser traffic with increased safety

Cross-Directorate Solicitation: CISE & ENG

Secure and Trustworthy Cyberspace (SaTC)

Securing our Nation's cyberspace

- Aims to support fundamental scientific advances and technologies to protect cyber-systems (including host machines, the Internet and other cyber-infrastructure) from malicious behavior, while preserving privacy and promoting usability.

- Proposals must address cybersecurity from one or more of three perspectives:
    - Trustworthy Computing Systems
    - Social, Behavioral and Economics
    - Education
    - Transition to Practice "supplements"

Image Credit: *ThinkStock*

Project Types:

Small	Medium	Frontier
up to $500,000 over 3 years	up to $1,200,000 over 4 years	up to $10,000,000 over 5 years

Cross-Directorate Solicitation: CISE, MPS, ENG, and SBE

Major Research Instrumentation

- The MRI program crosses all of NSF.
  - Managed by the Office of Integrative Activities (OIA).
  - Anticipated budget of $90M.
  - Normally due fourth Thursday in January
- It is a great program for investigators, but it presents its own challenges for CISE PIs:
  - What constitutes an *instrument*?
  - Overlap with the CISE *Computing Research Infrastructure* (CRI) program.
  - Difficulties in competing within universities and across the foundation.

MRI Goals

Proposals to MRI must conform to the primary goals:
– The acquisition of shared major state-of-the-art instrumentation

or

– Fostering the development of the next generation of major instrumentation

and

– Enabling the integration of research within education.

In addition, it may address additional program goals, which include:
1. Providing research instrumentation that makes use of, advances, and/or expands the Nation's cyber-infrastructure and/or high performance computing capability.
2. Promoting substantive and meaningful partnerships for instrument development between the academic and private sectors.

What is an Instrument for CISE?

- Systems of security and monitoring devices.
- Linguistically annotated electronic language and vision corpora.
- Spectrum and protocol analyzers.
- Teams of robots.
- Clusters of graphic processing units.
- Software libraries and tools.
- Networks of wireless and mobile networks, including software-defined radio devices and advanced solid-state power control devices.
- Motion capture systems for digitally recording the movement of people or other moving artifacts.
- FPGA-based systems.
- Data clusters.
- Instrumentation for Bioinformatics, Biocomputing and Bioengineering.
- Integrated systems of sensors, data repositories and visualization capabilities.
- …