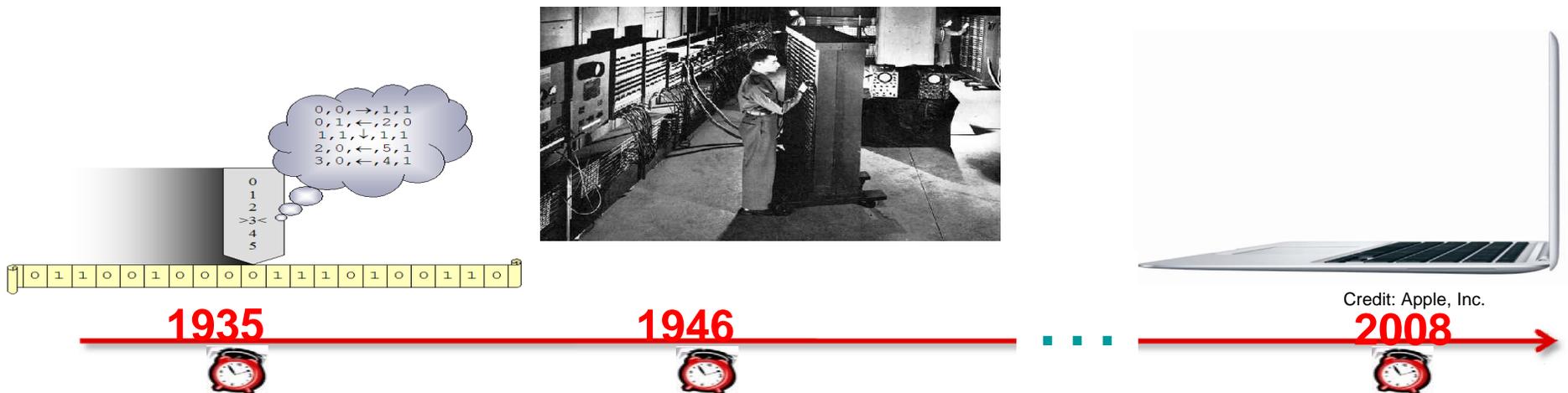




Computer and Information Science and Engineering Directorate

OVERVIEW

Computing (R)Evolution





Presentation Outline

- Computer and Information Science and Engineering (CISE) Overview
 - Mission, Impact, Organization
- CISE Funding Opportunities
 - Core Programs
 - CISE Cross-Cutting Programs
 - NSF Cross-Cutting Programs
 - Cross-Agency-Cutting Programs
- Highlights and Community Involvement
- Concluding Remarks



CISE Mission

- To promote understanding of the principles and uses of advanced computing, communications, and information systems in service to society
- To enable the United States to remain competitive in computing, communications, and information science and engineering
- To contribute to universal, transparent and affordable participation in all information-based society



Aspects and Impact of Computing (R)Evolution

Some Examples
of what CISE research enables ...

Connecting the world
Ubiquitous Information Access & Integration
Sensor Monitoring, ..., Embedded Devices



Drivers of Computing



- 7A's**
- Anytime
 - Anywhere
 - Affordable
 - Access to
 - Anything by
 - Anyone
 - Authorized.

Society

Science

Technology

- What is computable?
- $P = NP?$
- (How) can we build complex systems simply?
- What is intelligence?
- What is information?



J. Wing, "Five Deep Questions in Computing," CACM January 2008



Ubiquitous Information Access & Integration

Clickworkers
Collaborative Filtering
Collaborative Intelligence
Collective Intelligence
Crowdsourcing
Human-Based Computation
Recommender Systems
Reputation Systems
Social Commerce
Swarm Intelligence
Wikinomics
Wisdom of the Crowds

YAHOO!

Google™

Ask.com



eBay

NETFLIX

amazon.com



SECOND LIFE

WORLD
WARCRAFT



From Monitoring Sensors Everywhere

TO... Embedded Medical Devices



Sonoma Redwood Forest



Hudson River Valley

Credit: Arthur Sanderson at RPI

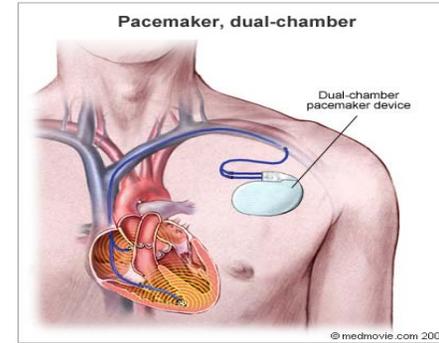


smart buildings

Kindly donated by Stewart Johnston



smart bridges



pacemaker



infusion pump



The NSF Strategic Plan and CISE



NSF Strategic Plan (2006-2011 - NSF06-648)

Discovery

Advancing the frontiers of knowledge

Learning

Science and engineering workforce and scientific literacy

Research Infrastructure

Advanced instrumentation and facilities

Stewardship

Supporting excellence in science and engineering research and education



CISE Programmatic Philosophy

- **CISE** is about **advancing the computing frontier**
within the context of **the NSF Mission**
- Supporting **good ideas** submitted by **creative people** in broad **range of academic institutions and organizations**
- It's about "high risk" long term impact
 - ▶ Impact may be far in the future.
 - ▶ Impact is long-lasting (it's about new knowledge).
 - ▶ Impact can create new economies and change societal behavior



Transformative Research

NEW in NSF Review Criterion:

To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?



Say "No" to incrementalism!



CISE Organization and Programmatic Activities

Core
and

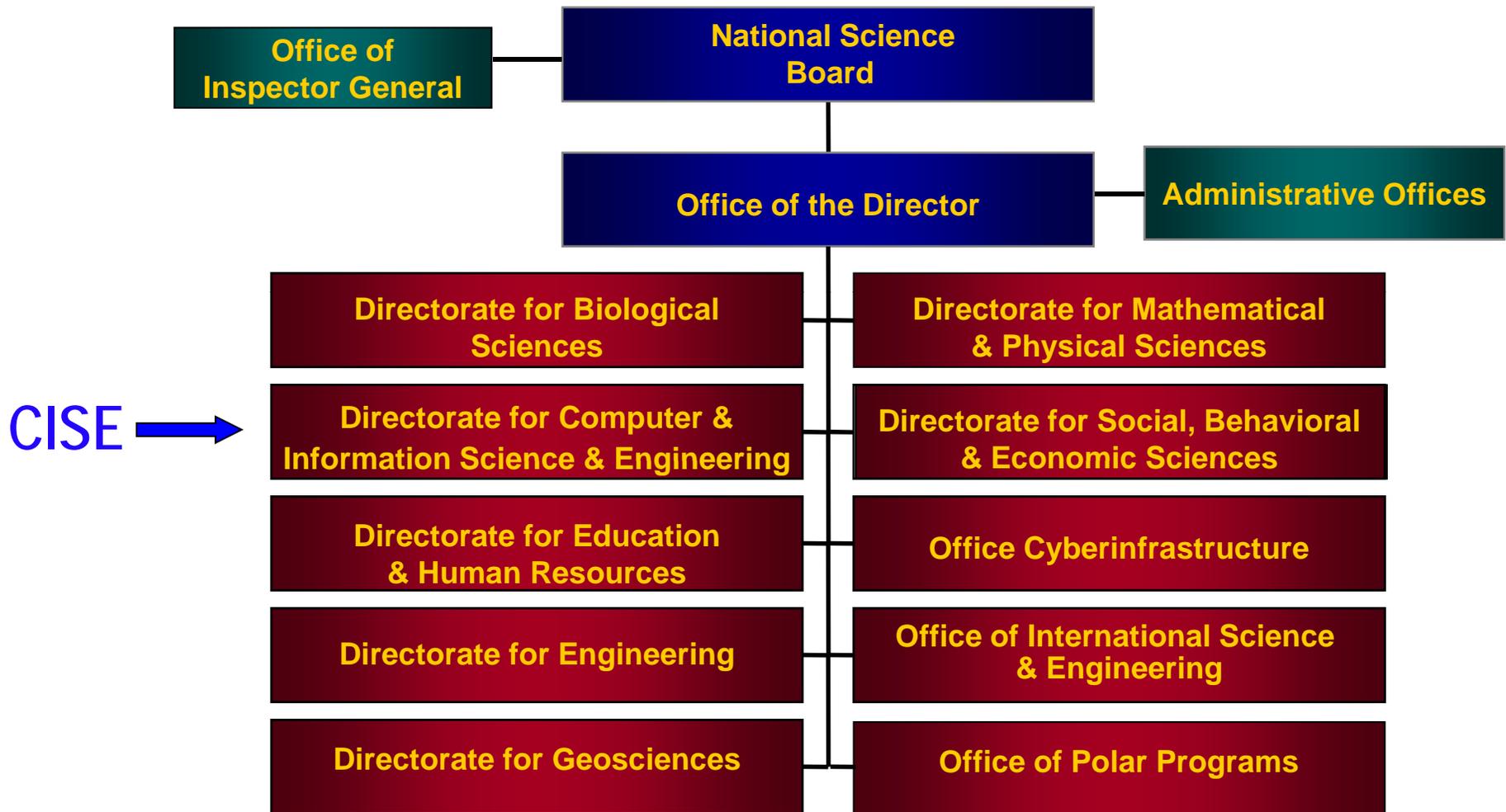
Cross-cutting Programs

(Within CISE and with other organizations)

*CISE Contribution to NSF's Strategic Goals
Discovery: Advance the Frontiers of Computing*

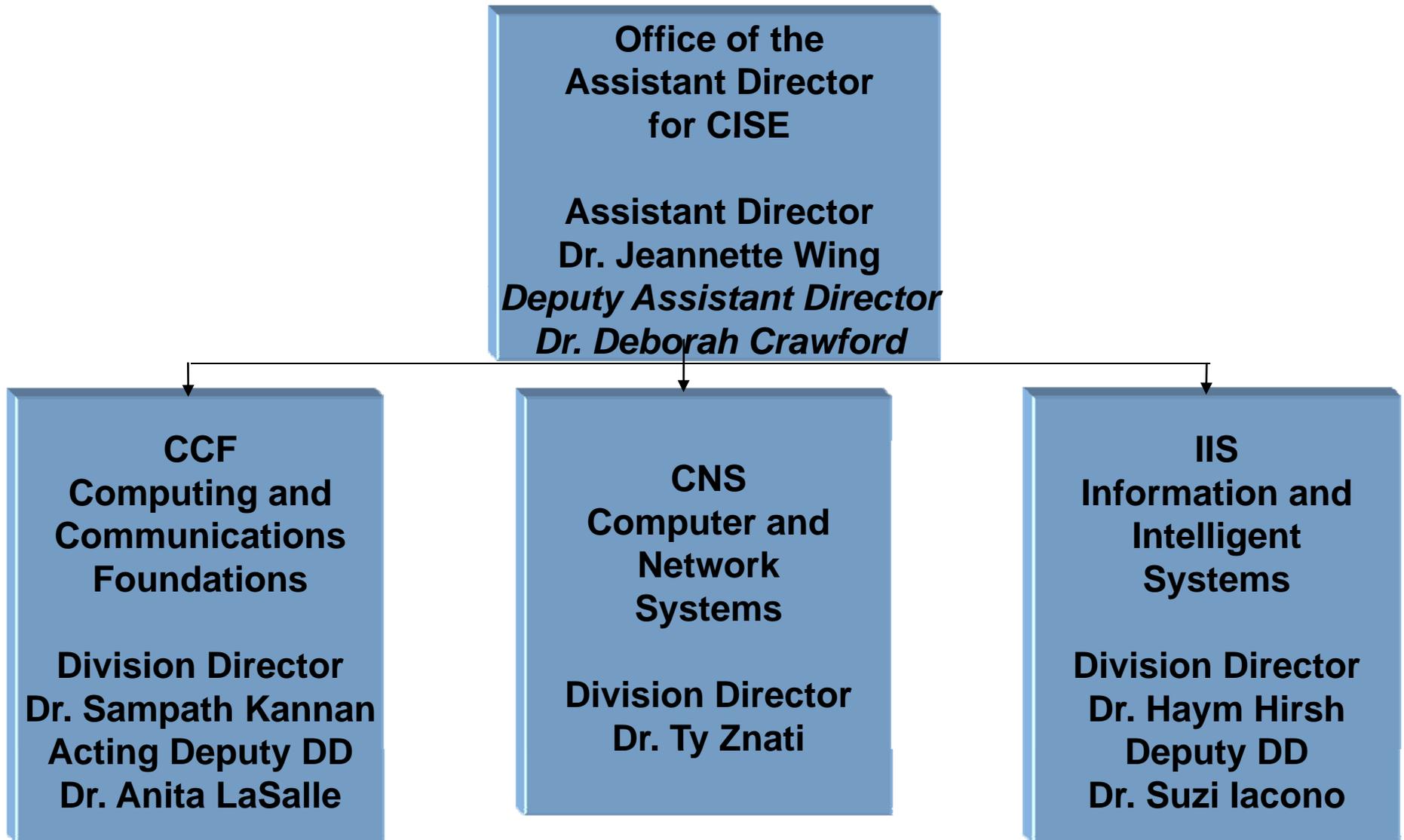


National Science Foundation





CISE Organizational Chart





CISE Core Research Programs

CCF
Computing and
Communications
Foundations

CNS
Computer and
Network
Systems

IIS
Information and
Intelligent
Systems

Core Programs

- Algorithmic Foundations
- Communications and Information Foundations
- Software and Hardware Foundations

- Computer Systems Research
- Networking Technology and Systems

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

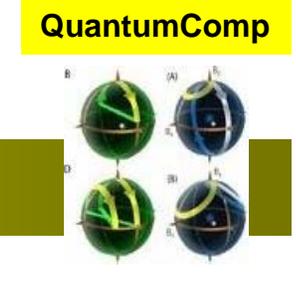
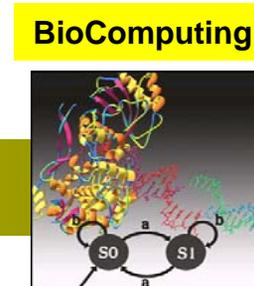
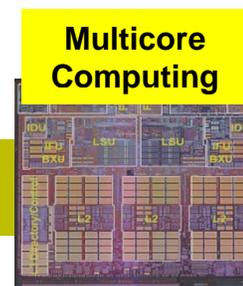
~ 70-75% of CISE Budget in these Core Programs



Computing and Communications Foundation (CCF) Mission

- Supports research and education projects that explore the foundations of computing and communication devices and their usage.
- Seeks advances in computing and communication theory, algorithms for computer and computational sciences, and architecture and design of computers and software.
- Investigates revolutionary computing models and technologies based on emerging scientific ideas
- Integrates research and education activities to prepare future generations of computer science and engineering workers

Moore's Law Ending!... Emerging:





CCF Core Programs

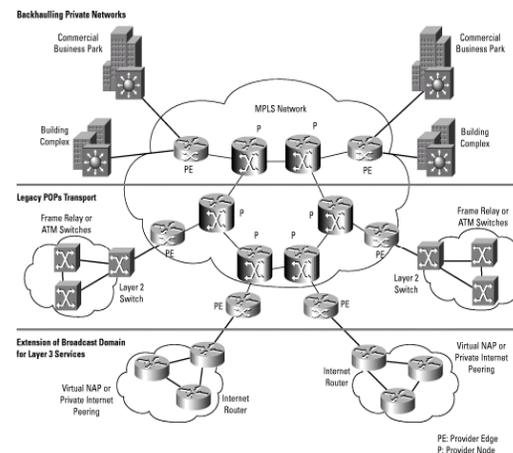
- Three programmatic areas
 - Algorithmic Foundations
 - Communications and Information Foundations
 - Software and Hardware Foundations
- Program Solicitation: NSF 09-555
- CCF also participates in CISE cross-cutting programs



Computer and Network Systems Division (CNS)

Mission

- Supports research and education activities that invent new computing and networking technologies and that explore new ways to make use of existing technologies.
- Seeks to develop a better understanding of the fundamental properties of computer and network systems
- Seeks to create better abstractions and tools for designing, building, analyzing, and measuring future systems.
- Supports the computing infrastructure that is required for experimental computer science.





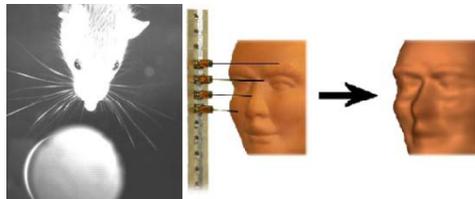
CNS Core Programs

- Two programmatic areas
 - Computer Systems Research
 - Networking Technology and Systems
- Program Solicitation: NSF 09-556
- CNS also participates in CISE cross-cutting programs



Information and Intelligent Systems Division (IIS) Mission

Studies the inter-related roles of people, computers, and information, and supports research and education activities that 1) develop new knowledge about the role of people in the design and use of information technology; 2) increase our capability to create, manage, and understand data and information in circumstances ranging from personal computers to globally-distributed systems; and 3) advance our understanding of how computational systems can exhibit the hallmarks of intelligence.





IIS Core Programs

- Three programmatic areas
 - Human-Centered Computing
 - Information Integration and Informatics
 - Robust Intelligence
- Program Solicitation: NSF 09-557
- IIS also participates in CISE cross-cutting programs



Discovery Research Programs



Discovery Core Programs

- Program Solicitations

- CCF: NSF 09-555
- CNS: NSF 09-556
- IIS: NSF 09-557

“Coordinated Solicitation”



- Project Types:

- Medium and Large



- team awards of larger funding levels and longer durations (\$1.2 million total and \$3 million total)
- multi-investigator collaborative projects
- Small: one or two investigator projects (\$500k total)
- CISE-wide Submission Windows:
 - Medium: Aug. 1-30 (annually)
 - Large: Nov. 1 - 28 (annually)
 - Small: Dec. 1 - 17 (annually)
- PI Limit: participate in no more than 2 “core” proposals/year



Objectives of CISE Cross-Cutting Programs

- Cut across CISE Divisions
- Program Directors from all divisions participate
- Complement the divisional core programs or address scientific and national priorities
- Funding opportunity may be long-term or may be expected for specific durations
- Emphasis may change yearly or over time



Discovery CISE-wide Programs (FY'09 and FY'10)

CISE Cross-Cutting Programs **NSF09-558**

emerging areas that benefit from intellectual contributions of researchers with expertise in a number of CISE fields or sub-field

Topics

- Data-Intensive Computing (~\$10 million/year)
- Network Science and Engineering (~\$20 million/year)
- Trustworthy Computing (~\$45 million/year)

Proposal Submission Windows

- Medium Projects: August 1-30, annually
- Large Projects: November 1- 28, annually
- Small Projects : December 1-17 annually

PI Limit:

- Participate in no more than 2 proposals/year



Additional CISE-wide Programs

- Expeditions in Computing
- Broadening Participation in Computing (BPC)
- Computer Research Infrastructure (CRI)
- Future Internet Architectures (FIA)



Discovery Expeditions In Computing

NSF 08-568



Goals:

- Catalyze far-reaching research explorations motivated by deep scientific questions
- Inspire current and future generations of Americans, especially those from under-represented groups
- Stimulate significant research and education outcomes that promise scientific, economic and/or other societal benefits

Preliminary Proposal Due Date (required): September 10, annually

Full Proposal Deadline: February 10, annually

\$10M, 5-year awards

2007 Expeditions Awards (4 projects awarded):

http://www.nsf.gov/cise/funding/2007_expeditions_awards.pdf

- Understand, Cope with, and Benefit From Intractability
- Computational Sustainability
- Open Programmable Mobile Internet 2020
- Molecular Programming

2008 Expeditions Awards (3 projects awarded):

http://www.nsf.gov/cise/funding/2008_expeditions_awds.doc

- RoboBees
- Customizable Domain Specific Computing
- Formal Analysis of Complex Systems



Discovery Cross-Cutting Programs

-- *CISE & Beyond* --

- Social-Computational Systems -- *New Solicitation* --
- Cyber-Enabled Discovery and Innovation (CDI)
- Cyber-Physical Systems (CPS)
- Multicore Chip Design and Architecture
- Accelerating Discovery in Science and Engineering through Petascale Simulations and Analysis (PetaApps)
- Creative IT
- Community-Based Data Interoperability Networks (INTEROP)
- Sustainable Digital Data Preservation and Access Network Partners (DataNet)
- Science and Technology Centers (STC): Integrative Partnerships
- High-End Computing University Research Activity (HECURA)
- Foundations of Data and Visual Analytics (FODAVA)
- Collaborative Research for Computational Neuroscience (CRCNS)
- Domestic Nuclear Detection Office/National Science Foundation
- Academic Research Initiative (ARI)
- EPSCoR Research Infrastructure Improvement Grant Program



Social-Computational Systems (SoCS)

NSF 09-559

- SoCS is a joint effort between CISE and SBE directorates
 - Research should advance both the computer/information sciences as well as the social/cognitive sciences
 - It is strongly encouraged for the research team to include both computer/information scientists and social/cognitive scientists
- SoCS seeks to reveal new understandings about the properties that systems of people and computers together manifest, and to develop a practical understanding of the purposeful design of such systems
 - of interest are what new capabilities and new emergent behaviors, as well what are the unanticipated consequences and fundamental limits of such systems
- SoCS will support research on human-computer partnerships that range in scale from a single person and computer to an Internet-scale array of machines and people
- Award size: annual budgets up to \$250,000 and durations of up to 3 years
- Proposal deadline is **August 31, 2010**
 - An individual may participate in at most one SoCS proposal as PI, co-PI or Senior Personnel



Cyber-Physical Systems (CPS)

NSF 10-515

- The program address research challenges in *Foundations, Methods and Tools, and Components, Run-time Substrates, and Systems*
 - *Foundations - new scientific and engineering principles, algorithms, models, and theories for the analysis and design of cyber-physical systems*
 - *Methods and Tools - bridge the gaps between approaches to the cyber and physical elements of systems, including development of new programming languages, and algorithms for reasoning about and formally verifying properties of complex integrations of cyber and physical resources*
 - *Components, Run-Time Substrates and Systems - new hardware and software in context of grand challenge applications*

Proposal Deadline: March 11, 2010

(Second Thursday in March, Annually Thereafter)

Annual Budget: ~\$30 million



Discovery Programs

EAGER and RAPID replace SGERs

- As of January 5, 2009, the Small Grants for Exploratory Research (SGER) program replaced by *Grants for Rapid Response Research (RAPID)*-
 - supports quick-response research on natural or anthropogenic disasters and similar unanticipated events
 - Up to \$200K and one year duration
 - project descriptions are expected to be brief (two to five pages) and include clear statements as to why the proposed research is of an urgent nature
- *EARly-concept Grants for Exploratory Research (EAGER)*-
 - supports high-risk, exploratory and potentially transformative research.
 - Up to \$300K and two years duration.
 - project description is expected to be brief (five to eight pages) and include clear statements as to why this project is appropriate for EAGER funding
- More details in Grant Proposal Guide (10-1)



CISE- related Learning Programs



CISE-relevant Learning Programs

- Broadening Participation in Computing (BPC)
- REU Sites & Supplements
- Graduate Research Fellowships
- Integrative Graduate Education & Research Training (IGERT)

Other CISE-related programs for K-12 education

- "10,000 Teachers in 10,000 Schools" CISE-driven project
- RET Supplements
- **Graduate STEM Fellows In K-12 Education (GK-12) - New Solicitation - NSF 09-549**



CISE-related Research Infrastructure Programs



CISE Research Infrastructure Programs

- CISE Research Infrastructure (CRI)
- GENI Project Office calls for proposals

Also NSF-wide Program:

- Major Research Infrastructure (MRI-R²)



Computing Research Infrastructure

NSF 08-570

- The CRI program supports two classes of awards
 - **Institutional Infrastructure** for the creation or enhancement of computing research infrastructure *at the awardee and collaborating institutions.*
 - **Community Infrastructure** for the planning for computing research infrastructure, or the creation of new computing infrastructure, or the enhancement of existing computing research infrastructure *for broadly-based communities of researchers and educators that extend well beyond the awardee institutions.*
and support the operation of such infrastructure, ensuring that awardee institutions are well-positioned to provide a high quality of service to community researchers and educators
- Deadlines:
 - First Wednesday in August, annually



Other Continuing Cross-Foundation Programs

- **Faculty Early Career Development (CAREER)**
NSF 08-557; CISE Deadline: July 20, 2010
- **Integrative Graduate Education and Research Traineeship (IGERT)**
NSF 10-523; Preliminary Proposals: March 29, 2010;
Full Proposals: September 30, 2010
- **NSF Graduate STEM Fellows in K-12 Education (GK-12) - NSF 09-549;**
(Refer to solicitation for deadline/other details)
- **Research Experiences for Undergraduates (REU and REU Sites): NSF09-598;**
Deadlines: Refer to solicitation for deadlines
- **Research in Undergraduate Institutions (RUI)**
NSF 00-144; Deadline: Proposals Accepted Anytime

(cont'd)



Other Continuing Cross-Foundation Programs

(cont'd)

- **Increasing the Participation and Advancement of Women in Academic Science and Engineering careers (ADVANCE) - NSF 09-504**
(Refer to solicitation for deadline/other details)
- **Office of International Science and Engineering Programs**
 - Targeted opportunities, workshops, supplements;
e.g.:
 - Partnerships for International Research and Education (PIRE) NSF 09-505;
Bi-Annual Solicitation;
(Refer to solicitation for deadline/other details)
 - International Research Fellowship Program (IRFP);
NSF 06-582 Deadline: September 14, 2010

(cont'd)



Other Continuing Cross-Foundation Programs

(cont'd)

- **Major Research Instrumentation Program (MRI-R²)**
NSF 09-561 (Refer to solicitation for deadline/other details)
- **Industry/University Cooperative Research Centers Program (I/UCRC)**²
NSF 09-565 (Refer to solicitation for deadline/other details)
- **Fundamental Research Program for Industry/University Cooperative Research Centers (FRP)**
NSF 10-507 (Refer to solicitation for deadline/other details)
- **Science and Technology Centers (STC): Integrative Partnerships**
NSF 08-580 (Refer to solicitation for deadline/other details)
- **Grant Opportunities for Academic Liaison with Industry (GOALI)**
NSF 09-516; (refer to solicitations for deadlines;
Supplement requests accepted anytime - contact PO)
- **Small Business Programs: Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR):** NSF 08-548 and NSF 08-608 (respectively)



PIRE Solicitation (OISE)

- Bi-Annual Solicitation - see PIRE website
- Program Solicitation for the Partnerships for International Research and Education (PIRE), NSF 09-505
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf09505
- Related presentation is quite informative, and it's available online
(<http://www.inside.nsf.gov/od/oise/oise-overview.ppt>).



Proposal and Funding Statistics



CISE Budget and Budget Outlook

- FY 2008 Budget = \$535M, \$8M increase over FY 2007
- FY 2009 Budget Appropriation = \$574M, a 7.3% increase over FY 2008
- ARRA funds allocated to CISE: \$235M in FY2009
- FY2010 Budget Request = \$633M
- **American Competitiveness Initiative** calls for NSF funding to double over next 10 years
- **America Competes Act** authorizes additional NSF funding, setting pace for doubling of the NSF Research and Related Activities account over the next 7 years

NSF provides 87% of all Federal support for basic research in computer science

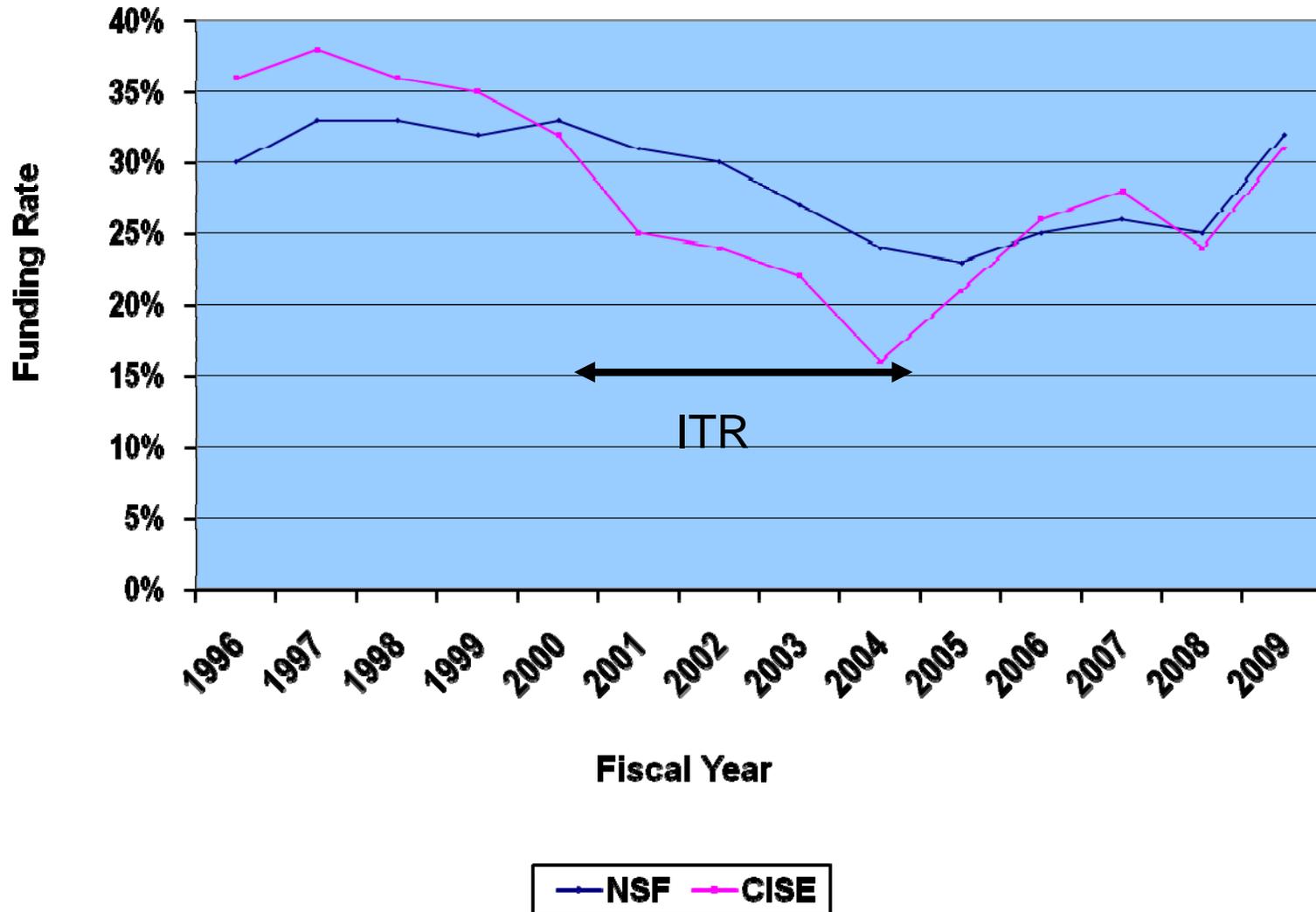


FY 2009 Proposal Statistics NSF and CISE

Statistic	NSF	CISE
No. of Proposal Actions	45,218	5,661
No. of Reviews	241,464	28,645
No. of Reviewers	41,914	3,178
No. of Awards	14,641	1,735
Funding Rate (Research Only)	32% (28%)	31% (28%)

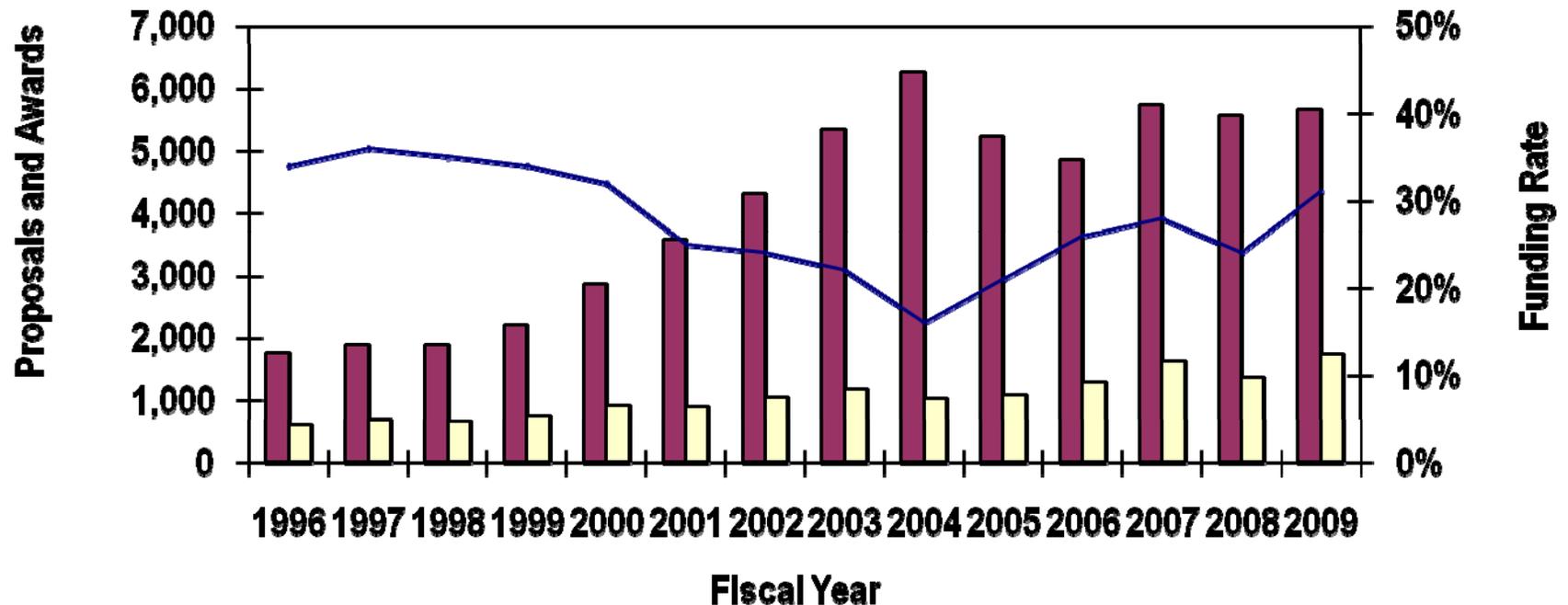


NSF and CISE Funding Rate Trends





Funding Rates for All CISE Proposals





Community Involvement

Highlights

Concluding Remarks



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Events Calendar See All

Calendar

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TSA now



Subscribe to CISE Distribution List

CISE has implemented a mail distribution list to notify the Computer and Information Science and Engineering community of items we think may be of interest. The postings will be infrequent and brief and will typically point to further information on our website. This may duplicate some of the items contained in NSF Custom News Service but will also contain items not always available there:

Announcements, vacancy notices, CISE webcasts of interest, meeting notices and news items.

To subscribe: send a message to: join-cise-announce@lists.nsf.gov with no text in the subject or message body.

If you no longer wish to be included on the distribution list, you can elect to be removed from the list at any time. Instructions for unsubscribing will be included at the end of each list message.

http://www.nsf.gov/cise/news/mail_lists.jsp



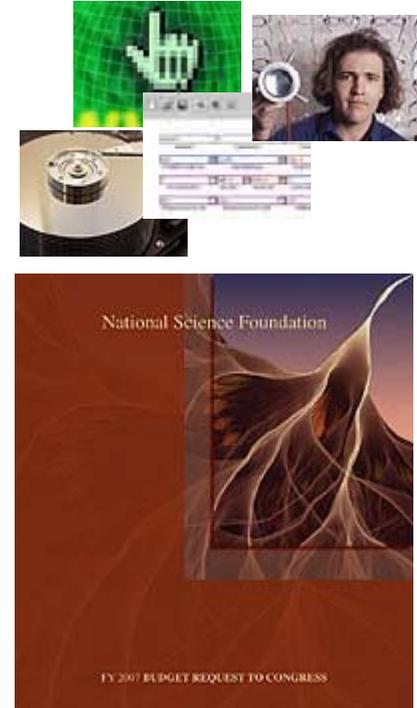
Get Involved

- Send your best ideas to NSF: consistent with program focus and goals
- **Volunteer to be a reviewer and panelist**
- Get to know your Program Directors
- Keep us informed of your accomplishments
- Work within your institutions to support collaborative, interdisciplinary research
- Call our attention to things that need improvement
- Suggest transition strategies from basic research to prototyping and production
- Participate in NSF-funded events, workshops, etc.
- Plan to serve as a program officer ("rotator") or division director
- Consider participating in the Computing Community Consortium: www.cra.org/cc



NSF/CISE Repository of Highlights

- Succinct, interesting vignettes
 - Show a result, a discovery
 - in layperson's language
 - including graphics if possible
- NSF shares Highlights publicly
 - Budget requests
 - Performance reports
 - Public relations
- Convince the US public that research **is worth paying for!!!**





Summary Points

- CISE-funded research and education outcomes *essential* to national competitiveness
- Focus on grand vision, big ideas
- We seek potentially transformative research
 - Fundamental questions in computing
 - Potential for significant, enduring impact
 - Plausible, but high risk projects
- Multi-disciplinary, NSF-wide investments such as CDI

"We will... wield technology's wonders to raise health care's quality... harness the sun and the winds and the soil to fuel our cars and run our factories... we will transform our schools and colleges and universities to meet the demands of a new age ..."

*President Obama,
Inaugural Address
January 20, 2009*

**...and CISE can play
a BIG role in this.....**



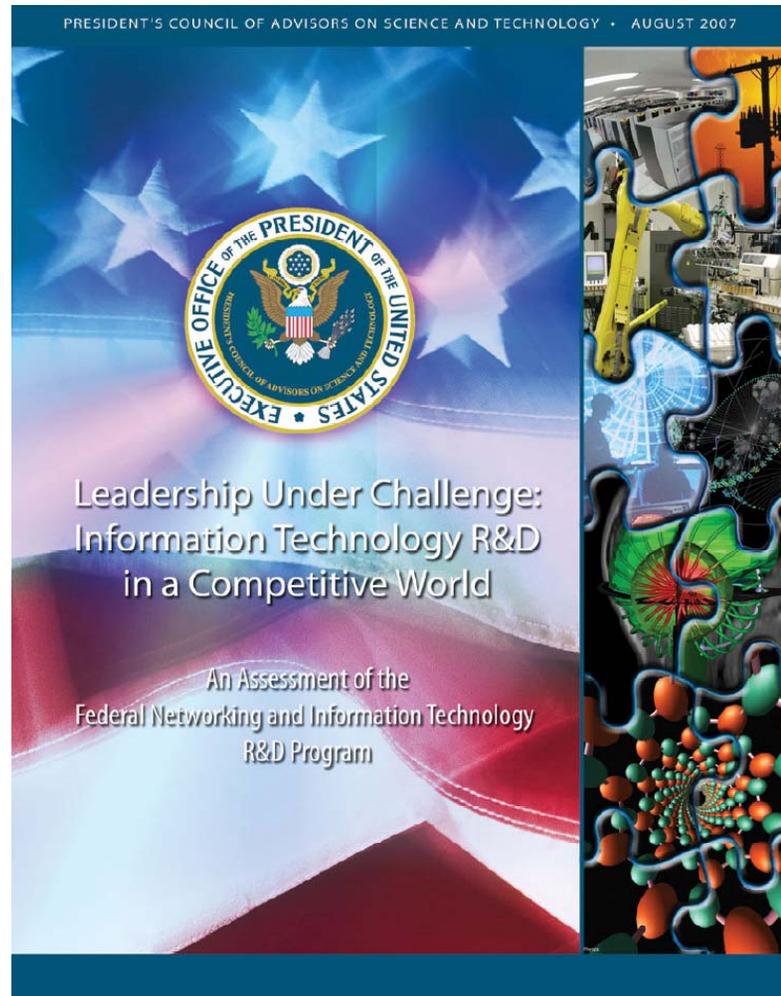
Back-up Slides

DETAILS ON PROGRAMS



U.S. Broader Research Agenda and Priorities

Dan Reed and George Scalise, editors
August 2007



Credit: http://www.ostp.gov/pdf/nitrd_review.pdf



CISE New Cross-Cutting Program:

"CISE Cross-Cutting Programs: FY2009 and FY2010"

Updated solicitation: NSF09-558

Three focus areas

- Data-Intensive Computing
- Network Science and Engineering
- Trustworthy Computing

(cont'd)



Data-Intensive Computing

(a component of NSF 09-558)

- Rethinking how we store, retrieve, explore, analyze, and communicate enormous digital datasets
- Computation is data-intensive
- Demands a fundamentally different set of principles, e.g., based on parallelism
- Requires real-time responsiveness and high degrees of fault-tolerance

Note: the CISE CluE (Cluster Exploratories) Program has been incorporated in this component

(cont'd)



Data-Intensive Computing (*cont'd*)

- Challenges to be addressed:
 - How can we best program data-intensive computing platforms to exploit massive parallelism
 - What new programming abstractions can exploit these capabilities?
 - How can new designs support appropriate power consumption, human maintainability, and economic feasibility?
 - How must this computing paradigm evolve to best support new data-intensive applications?



Network Science and Engineering (NetSE)

(a component of NSF09-558)

- Considers computer networks as complex, global socio-technical infrastructure
- Encourages researchers to reason about the dynamics and behavior of current and future large-scale networks and the interdependence among the physical, informational and communications technologies
- Promotes research in radical design in network architectures by building on the predecessor FIND Program
- Seeks to improve or enable existing or new classes of applications, such as multi-player games, virtual worlds, augmented reality and tele-presence.



Trustworthy Computing

(a component of NSF09-558)

{ Builds on its predecessor program - Cyber Trust }

- Supports research and education activities that explore novel frameworks, theories, and approaches toward realizing a trustworthy computing future
- Seeks new knowledge about scientific foundations of trustworthiness - reliability, security, privacy and usability -- to inform trustworthy technologies
- Encourages researchers to explore the integration of hardware, networking protocols, systems software and applications through new security architectures.
- Seeks to explore trade-offs between security and privacy
- Encourages proposals in the area of usability



CISE PATHways (CPATH) to Revitalized Education in Computing (NSF 09-528-archived)

- The CPATH vision is:
 - *a U.S. workforce with the computing competencies and skills crucial to the Nation's health, security and prosperity in the 21st century.*
 - *advancing the field of computing and its impact - to transform undergraduate computing education on a national scale,*
 - *meet the challenges and opportunities of a world where computing is essential to U. S. leadership.*
 - *Program archived, no new deadline - CISE plans to release a new solicitation focused on education in computing in both secondary and higher education in the summer of 2010.*

(cont'd)



CPATH Program *(cont'd)*

- CPATH will support three *types* of projects in two major track categories:
 - Community Building Track
 - Community Building (CB) Grants
 - Institutional Transformation Track:
 - Conceptual Development and Planning (CDP) Grants
 - Transformative Implementation (TI) Grants
- Program archived, no new deadline - CISE plans to release a new solicitation focused on education in computing in both secondary and higher education in the summer of 2010.



Broadening Participation in Computing (BPC) - NSF 09-534

- The BPC program aims to significantly increase the number of U.S. citizens and permanent residents receiving post secondary degrees in the computing disciplines; emphasis on students from communities with longstanding under-representation in computing: women, persons with disabilities, and minorities
- The program seeks to engage the computing community in developing and implementing innovative methods to improve recruitment and retention of these students at the undergraduate and graduate levels. The program also aims to develop effective strategies for encouraging individuals to pursue academic careers in computing and become these role models

(cont'd)



Broadening Participation in Computing

BPC *(cont'd)*

- Three program components:
 - Alliances: Broad Alliances across institutions and organizations
 - Alliance Extensions: Successful BPC Alliances, can seek additional funding
 - Demonstration Projects: Pilots of innovative projects
- Proposal Deadline: May 12, 2010
(Second Wednesday in May, Annually Thereafter)



Computing Research Infrastructure (CRI) - NSF 08-570

- The CRI program supports two classes of awards: **Institutional Infrastructure and Community Infrastructure**
 - **Institutional Infrastructure** for the creation of new computing research infrastructure or the enhancement of existing computing research infrastructure to enable world-class research and education opportunities *at the awardee and collaborating institutions.*

(cont'd)



Computing Research Infrastructure (CRI) *(cont'd)*

- **Community Infrastructure** for the planning for computing research infrastructure, or the creation of new computing infrastructure, or the enhancement of existing computing research infrastructure to enable world-class research and education opportunities *for broadly-based communities of researchers and educators that extend well beyond the awardee institutions.*
and support the operation of such infrastructure, ensuring that awardee institutions are well-positioned to provide a high quality of service to community researchers and educators
- Refer to CRI FAQ page for emphasis/changes
- Deadlines: August 04, 2010
(1st Wednesday in August, Annually Thereafter)



Cross-Cutting Programs - *CISE & Beyond*



Cyber-Enabled Discovery and Innovation (CDI) NSF 10-506

- NSF-wide Program
- Create revolutionary science and engineering research outcomes made possible by innovations and advances in computational thinking.
- Seeks ambitious, transformative, multidisciplinary research proposals within or across the following thematic areas:
 - From Data to Knowledge
 - Understanding Complexity in Natural, Built, and Social Systems
 - Building Virtual Organizations

**Bold Five-Year
Initiative**



Deadlines (see solicitation for details):

**Full Proposal Deadline: Feb 4 and Feb 5, 2010
(refer to solicitation for deadline details)**



Cyber-Physical Systems (CPS) (NSF 10-515)

- The term cyber-physical systems refers to the tight conjoining of and coordination between computational and physical resources
- The program address research challenges in *Foundations, Methods and Tools, and Components, Run-time Substrates, and Systems*
 - *Foundations research will develop new scientific and engineering principles, algorithms, models, and theories for the analysis and design of cyber-physical systems*
 - *Research on Methods and Tools will bridge the gaps between approaches to the cyber and physical elements of systems*

Proposal Deadline: Full Proposal March 31, 2010



Community-Based Data Interoperability Networks (INTEROP) - NSF 07-565

- The program supports the formation of community-based Data Interoperability Networks
 - This includes community efforts to provide for broad interoperability through the development of mechanisms such as robust data and metadata conventions, ontologies, and taxonomies.
 - community workshops, web resources such as community interaction sites, and task groups.
 - Support is provided for Data Interoperability Networks that will be responsible for consensus-building activities and for providing the expertise necessary to turn the consensus into technical standards with associated implementation tools and resources.
 - information sciences, software development, and ontology and taxonomy design and implementation.
- Proposal Target Date : No new deadlines posted presently (TBD)



Sustainable Digital Data Preservation and Access Network Partners (DataNet)

The goal of the solicitation is to - NSF 07-601

- catalyze the development of a system of science and engineering data collections that is open, extensible and evolvable
 - support creation of a small set of full-scale exemplars of these new types of organizations (dubbed 'DataNet Partners' or 'Partners')
 - serve as the basis for rational investment in digital preservation and access by diverse sectors of society at the local, regional, national, and international levels
 - preserve digital information for periods of decades to centuries; must operate in a swift, disruptive current of technological change
 - projects both risk-averse and risk capable
-
- No new deadlines posted presently (TBD)



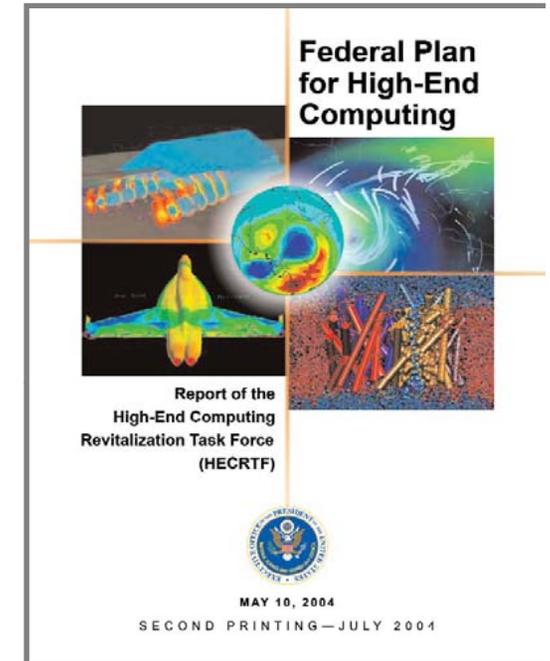
Science and Technology Centers (STC): Integrative Partnerships - NSF 08-580

- NSF-wide Program
- supports innovative, potentially transformative, complex research and education projects that require large-scale, long-term awards
- STCs conduct world-class research through partnerships among academic institutions, national laboratories, industrial organizations, and/or other public/private entities, and via international collaborations
- provide a means to undertake important investigations at the interfaces of disciplines and/or fresh approaches within disciplines.
- STC investments support the NSF vision of advancing discovery, innovation and education
- Preliminary Proposal (required) Deadline: October 14, 2008
- Full Proposal Deadline: April 30, 2009 (by invitation only)
- No new deadlines posted presently (TBD)



High-End Computing University Research Activity (HECURA)

- HECURA FY 2006 Budget 14.5M
 - **Input/Output capabilities**
 - **File Systems**
 - **Storage Systems**
- HECURA FY 2008 Budget 10M NSF 08-531
 - **HEC Programming Models**
 - **HEC Languages**
 - **HEC Compilers**
- HECURA FY 2009 Budget 10M
 - **Input/Output capabilities**
 - **File Systems**
 - **Storage Systems**



Past Deadline April 15, 2009
No other deadlines posted

<http://www.nsf.gov/pubs/2009/nsf09530/nsf09530.html>



Foundations of Data and Visual Analytics (FODAVA) - NSF 09-525

- Partnership between NSF and DHS
- capitalize on knowledge and expertise in the fields of mathematics, computational science, and intelligent systems
 - Produce new data representations and transformations to enable data stakeholders to detect the expected and discover the unexpected in massive data sets
 - Develop new mathematical and computational algorithms and techniques are sought that will fundamentally improve our ability to transform large, often streaming data sets into representations that better support visualization and analytic reasoning

Proposal deadline: **January 20, 2010**

See also: related Computer Graphics&Viz IIS Core Program



Collaborative Research for Computational Neuroscience (CRCNS) - NSF 08-514

- NSF-NIH cosponsored program
- Computational neuroscience provides a theoretical foundation and a rich set of technical approaches for understanding the functions of complex neurobiological systems, building on the theory, methods, and findings of computer science, neuroscience, and numerous other disciplines.
- The CRCNS program support innovative interdisciplinary collaborative research to make significant advances in the understanding of nervous system function, mechanisms underlying nervous system disorders, and computational strategies used by the nervous system.

(cont'd)



Collaborative Research for Computational Neuroscience (CRCNS) *(cont'd)*

- Two classes of proposals will be considered in response to this solicitation:
 - **Research proposals** describing new collaborative research projects, and
 - **Data sharing proposals** to enable sharing of data and other resources.
- No new deadlines posted presently (TBD)



Academic Research Initiative (ARI) DNOD/NSF - NSF 08-534

- Partnership between Domestic Nuclear Detection Office (DNDO/DNS) and NSF, coordinating with and leveraging on research currently underway in other areas of the federal government, e.g DHS, DOE, DoD, and others each fund active research into developing nuclear detection technology and systems.
- Seeks to advance fundamental knowledge for nuclear detection
 - Key objective for any research into nuclear detection is to distinguish threats from non-threats in a realistic environment, thereby resulting in a detection system that has minimal-to-no false alarms
 - Topics include sensor and non-intrusive interrogation technologies, stand-off detection, signal processing, and autonomous system technologies
- Deadlines: April 01, 2009 (First Wednesday in April, Annually Thereafter, through 2011)



GENI: Exploring Networks of the Future

- **GENI Vision:** A suite of infrastructure to support transformational network science and engineering
- **BBN Technologies Corp, the GENI Project Office, is responsible for system engineering and integration as well as coordinating the work of the community via:**
 - GENI solicitations for development and prototyping projects
 - GENI Engineering Conferences
 - GENI working groups
 - GENI wiki
- **Community is making initial but rapid progress:**
 - Open, transparent, community-based planning and prototyping
 - Many leading US researchers are driving the design
 - Strong linkages between academia and industry
 - Rapid prototyping is encouraging researchers to work together for a greater goal
- **Future Plans:**
 - Start a number of early trial experiments in network science and engineering
 - Rapidly build out "research-enabled" campus, regional, and backbone infrastructure
 - Improve security architecture, instrumentation, and experiment workflow



Examples of CISE Contributions to The NSF Strategic Plan



CISE Contributions to NSF's Strategic Goal (1):

Discovery: Advance the Frontiers of Computing

- Core CISE programs
- Programs that serve specific goals or communities
 - CAREER (for new faculty)
 - Research Experiences for Undergraduates (REU)
 - Research in Undergraduate Institutions (RUI)
(for faculty at undergraduate institutions)
 - Grant Opportunities for Academic Liaison with Industry (GOALI)

(cont'd)



(cont'd) CISE Contributions to

Discovery: Advance the Frontiers of Computing

- Multidisciplinary program solicitations (examples)
 - Cyber-Enabled Discovery and Innovation (CDI) - began in FY'08
 - Collaborative Research for Computational Neuroscience (CRCNS)
 - Community-Based Data Interoperability Networks (INTEROP)
- Center-like programs (funding of several \$M/year/project for 5-10 years)
 - Expeditions in Computing
 - Science and Technology Centers
 - Engineering Research Centers



CISE Contributions to NSF's Strategic Goal (2):

Learning: Build a highly competent and diversified computing workforce for the 21st century

- CISE-specific
 - CISE PATHways (CPATH) to Revitalized Education in Computing
 - Broadening Participation in Computing (BPC)
- NSF-wide programs
 - Research Experiences for Undergrads (REU) Sites and Supplements
 - Integrative Graduate Education & Training (IGERT)
 - Graduate Research Fellowships
 - Graduate Teaching Fellows in K-12 Education (GK-12)



CISE Contributions to NSF's Strategic Goal (3):

Innovation:

CISE Infrastructure: Support development and acquisition of research instruments that enable high quality computing research

- CISE Specific:
 - Computing Research Infrastructure (CRI)
- CISE cosponsoring:
 - Sustainable Digital Data Preservation and Access Network Partners (DataNet)
- NSF-wide Programs:
 - Major Research Instrumentation (MRI-R²)