



Government Agency Partnerships

Lawrence S. Goldberg
Acting Division Director, ECCS
lgoldber@nsf.gov

ENG Advisory Committee
April 22-23, 2009

Types of Partnership Activities

- ❑ Working Groups
- ❑ Assessment Activities
- ❑ Informal Contacts
- ❑ Co-Funding of Individual Awards
- ❑ Workshops
- ❑ MOUs
- ❑ Joint Solicitations, Programs

Types of Partnership Activities

- ❑ Working Groups
- ❑ Assessment Activities
- ❑ Informal Contacts
- ❑ Co-Funding of Individual Awards
- ❑ Workshops
- ❑ MOUs
- ❑ Joint Solicitations, Programs

National Nanotechnology Initiative (NNI) Interagency Partnership

- ❑ In 1996, ENG established an informal Working Group with DoD, NASA, DoE, NIST, and NIH:
 - » to unify principles, processes, and applications at the nanoscale across disciplines and relevance areas
- ❑ In 1998 the White House NSTC established the Interagency WG on Nanotechnology (IWGN)
- ❑ In 2000, expanded to a formal NSTC/Nanoscale S, E, &T (NSET) Subcommittee to implement and coordinate the NNI led by NSF
- ❑ In Jan 2001, the National Nanotechnology Coordinating Office (NNCO) was established as a secretariat
 - » The office is located and administratively managed at NSF and is funded by the main NSET participating agencies
- ❑ At NSF, NNI was organized as a cross-directorate activity led by ENG
- ❑ Since Dec 2003, Congress has provided long-term authorization for NNI
- ❑ The NNI Partnership includes 25 agencies with \$1.5B funds in FY2009
- ❑ Evaluation of NNI is conducted on a regular basis by PCAST, OMB, OSTP, Congress, National Academies, and NGOs

Working Groups

- ❑ ENG: National Nanotechnology Initiative (NNI) Interagency Working Group/Partnership, w/25 federal agencies
- ❑ CBET: Metabolic Engineering Working Group (MEWG), w/DoE, EPA, NASA, NIST, NIH, DoD, USDA
- ❑ CBET: Multiagency Tissue Engineering Science (MATES), w/USDA, DoC (NIST), DHHS (NIH, FDA, CMS, VA), DoD (DARPA, Army, NRL), NASA, DoE, OSTP - coordination, workshops, conferences
- ❑ CBET: Economic Empowerment of Women in Iraq, w/DoS, DoD, USAID
- ❑ CBET: NSTC Energy and Environment Interagency Working Group
- ❑ CBET: Biomass Conversion Interagency Working Group
- ❑ CBET: WATERS Network, w/ EPA, USGS

Working Groups (Cont)

- ❑ CMMI: National Earthquake Hazards Reduction Program (NEHRP), w/NIST, FEMA, USGS
- ❑ CMMI: Net-Zero Energy, High Performance Green Buildings, w/OSTP/NSTC Subcommittee on Buildings Technology R&D
- ❑ CMMI: Interagency Modeling and Analysis Group, w/NIH
- ❑ CMMI: Simulation-based Engineering and Science, w/NIH, DoE, NASA, DoD, DoC
- ❑ ECCS: Interagency Advanced Power Group (IAPG), w/ARO, ONR, AFOSR, NASA, DoE
- ❑ ECCS, CBET: US-European Commission Task Force on BioTechnology

Types of Partnership Activities

- Working Groups
- Assessment Activities**
- Informal Contacts
- Co-Funding of Individual Awards
- Workshops
- MOUs
- Joint Solicitations, Programs

WTEC International Assessment: R&D in Catalysis by Nanostructured Materials

- ❑ WTEC study focused on solid catalysts and how nanoscale structures associated with them affected their reactivity
 - » Sponsored by NSF (CBET), DoE, AFOSR, DTRA
- ❑ Panel of experts visited over 40 institutions and companies in East Asia and Western Europe to explore:
 - » Active research projects in those institutions and companies
 - » Physical infrastructure used for the projects, and funding schemes that enable the research
 - » Collaborative interactions among universities, national labs, and corporate research centers
- ❑ A Bibliometric Analysis of research in catalysis by nanostructure materials published from 1996 to 2005 was part of the study
 - » This serves well as a quantitative measure of research impact
- ❑ Report can help scientists and policymakers effectively plan and coordinate future efforts in this important research field

Assessment Activities

World Technology Evaluation Center (WTEC) Studies:

- ❑ CBET: Tissue Engineering; Biosensing; Systems Biology
- ❑ CBET: Brain Computer Interfaces, w/NIH, TATRC, NIDR (FY06)
- ❑ CBET: Catalysis by Nanostructured Materials, w/DoE, AFOSR, DTRA (Defense Threat Reduction Agency) (FY08)
- ❑ CMMI/CBET: International Assessment of Simulation-Based Engineering and Science, w/ DoD, DoE, NASA, NIH, NIBIB, NLM, NIST (FY08)
- ❑ ECCS: Spin Electronics, Europe, w/DARPA, OSD, NIST, ONR (FY01)
- ❑ ECCS: Hybrid Flexible Electronics, Europe, w/NIST, ONR (FY09)

Other Studies:

- ❑ CBET: ABT Contractor, impact assessment of Tissue Engineering
- ❑ CBET: National Academies study on Building Cyberinfrastructure for Combustion Research, w/MultiAgency Coordinating Committee
- ❑ ECCS: Proposed National Academies study on Photonics for 21st Century Competitiveness, w/DARPA, DoE, NIH, DHS

Types of Partnership Activities

- Working Groups
- Assessment Activities
- Informal Contacts**
- Co-Funding of Individual Awards
- Workshops
- MOUs
- Joint Solicitations, Programs

Informal Contacts

- ❑ CBET: Identify areas of collaboration to advance understanding, prevention, detection and treatment of various cancers, w/NIH
- ❑ CMMI: Input in developing research in civil infrastructure for their Technology Innovation Program, w/NIST
- ❑ CMMI: Coordination of research on green buildings, w/EPA NCER – National Center for Environmental Research
- ❑ CMMI: Proposed NSF-NIST Partnership in Fire Research, w/NIST
- ❑ ECCS: Discussions on Green Photonics and Electronics joint activity, w/DARPA, European Union
- ❑ ECCS: Discussions on Micro/Nano Systems Technologies, w/DARPA
- ❑ ECCS: Discussions on Millimeter-Wave Technology for Broadband Wireless Access, w/DARPA
- ❑ EEC: Discussion of support for REU sites in Geothermal area, w/DoE

Types of Partnership Activities

- Working Groups
- Assessment Activities
- Informal Contacts
- Co-Funding of Individual Awards
- Workshops
- MOUs
- Joint Solicitations, Programs

Co-Funding of Industry/University Cooperative Research Centers (I/UCRCs)

- ❑ Program Managers in other Federal Agencies will often provide additional funding for individual NSF awards on topics of interest to their program activities
- ❑ Funds are often sent to NSF through Interagency Transfers
- ❑ These additional resources can help to broaden the scope and depth of the NSF awarded research activities
- ❑ The I/UCRC program has almost 50 active centers in diverse fields of engineering research that are primarily supported by center member companies with a small investment from the NSF
- ❑ The I/UCRCs have attracted a total of over \$4M from 7 federal agencies: \$2.7M from DoD, \$0.9M from DoE, \$0.3M from NASA, and lesser amounts from DoT, GSA, FBI

Co-Funding of Awards

- ❑ CMMI: Area of Advance High-Strength Steels, w/DoE and Auto Steel Partnership – through a Dear Colleague Letter
- ❑ CMMI: Area of Polymer Composite Processing and Manufacturing, w/DoE
- ❑ CMMI: Long Term Bridge Performance, w/Federal Highway Admin.
- ❑ CMMI: Nanotechnology in Timber Products, w/USDA
- ❑ EEC: ERC for Collaborative Adaptive Sensing of the Atmosphere (CASA), w/ NOAA
- ❑ IIP: Industry/University Cooperative Research Centers (I/UCRC), w/DoD, NASA, DoE, NSA, DoT, GSA, FBI
- ❑ IIP: Partnerships for Innovation (PFI), w/ DoT, DoI, DoC, ED, NASA

Types of Partnership Activities

- ❑ Working Groups
- ❑ Assessment Activities
- ❑ Informal Contacts
- ❑ Co-Funding of Individual Awards
- ❑ **Workshops**
- ❑ MOUs
- ❑ Joint Solicitations, Programs

NSF/DoE Workshop on Advanced High Strength Steels (AHSS)

- ❑ Two-day workshop with 60 scientists and engineers:
 - » Identify fundamental research issues in development of AHSS field
 - » Recommend ways to address the outstanding issues
 - » Establish a vision for adapting such materials in the automotive industry
- ❑ Sponsored by NSF (CMMI, DMR); DoE - Office of FreedomCAR and Vehicle Technologies; and the Auto Steel Partnership, an industrial partnership with auto and steel companies
- ❑ Workshop report formed the basis for establishing priority funding in the field by recommending:
 - » Sustained effort involving single investigator work
 - » Larger cooperative efforts involve academia, steel and automotive companies and government labs
- ❑ Key outcome was a joint \$3M research initiative funded in FY07 by NSF, DoE, and the Auto Steel Partnership

Workshops

- ❑ CBET: WATERS Network Workshop, W/EPA (FY08)
- ❑ CBET: Water Research Workshop, w/EPA, NIST, DoE (FY08)
- ❑ CBET: Grantees Conference on Explosives and Related Threats, w/DHS (FY 08)
- ❑ CBET: Infrastructure Needs of Systems Biology, w/US-European Commission Task Force on BioTechnology (FY09)
- ❑ CMMI: National Academies Workshop on Healthcare Delivery, w/NIH (FY06)
- ❑ CMMI: New Frontiers in Dynamic Systems, w/AFOSR, ARO, ONR, NIH, USDA (FY07)
- ❑ CMMI: Prioritized Research for Reducing the Seismic Hazards of Existing Buildings, w/NEHRP agencies – FEMA, NIST, USGS (FY07)
- ❑ CMMI: Advanced High Strength Steel: Fundamental Research Issues, w/DoE (FY07)

Workshops (Cont)

- ❑ CMMI: Workshop on Creating a Hazard Vulnerability Observatory, w/USGS (FY08)
- ❑ CMMI: Roadmap on Additive Manufacturing, w/ONR (FY09)
- ❑ ECCS: Wearable and Implantable Devices and Systems for Health Monitoring and Diagnostics, w/USDA, FDA, NIBIB/NIH (FY07)
- ❑ ECCS: Workshop on Advanced Power Conditioning for Alternate Energy Systems, w/NIST, DoE, Army (FY08)
- ❑ ECCS: Drug Discovery Approach to Breakthroughs in Batteries, w/DoE, DARPA, General Motors (FY08)
- ❑ ECCS: US-EC Workshop on Nanobiotechnology, w/US-EC Task Force on BioTechnology (FY08)
- ❑ ECCS: National Workshop on Future Cyber-Physical Energy Systems, w/NSA, NITRD, NIST, ONR, NRC (FY09)
- ❑ EEC: GI Bill Planning Workshop, w/VA (FY09)

Types of Partnership Activities

- ❑ Working Groups
- ❑ Assessment Activities
- ❑ Informal Contacts
- ❑ Co-Funding of Individual Awards
- ❑ Workshops
- ❑ **MOUs**
- ❑ Joint Solicitations, Programs

NSF/DoE Partnership in Basic Plasma Science and Engineering

- ❑ Initial Memorandum of Understanding (MOU) signed in Dec 1996 for 5 years, renewed and current
 - » ENG, MPS, GEO
 - » Department of Energy – Office of Energy Research
- ❑ States the agreed-to provisions under which the joint activity will proceed



Photo at MOU signing at NSF
L Goldberg (ECS/ENG)
N Anne Davis (DoE) – Signatory
V Ayres (ECS/ENG)
Barry Schneider (PHY/MPS)

- ❑ Joint solicitation with DoE every 3 years, continues today
 - » now led by Physics and CBET

Memoranda of Understanding (MOU)

- ❑ Partnership in Basic Plasma Science and Engineering, w/DoE (1996-)
- ❑ National Nanotechnology Coordination Office, w/DoD, DoE, NASA, NIH, NIST (2001-)
- ❑ Bioengineering and Bioinformatics Summer Institutes Program, w/NIH NIBIB (2002-)
- ❑ Sandia National Laboratory, w/DoE (2002-)
- ❑ Scholar in Residence at FDA, w/FDA (2004-)
- ❑ Interagency Modeling and Analysis Group (IMAG), w/NIH, NASA, DoE, DoD (2004-)
- ❑ Development and Delivery of Medical Technology Innovation, w/DHHS (2005-)
- ❑ Academic Research Initiative (ARI), w/DHS Domestic Nuclear Detection Office (2007-)
- ❑ Bioengineering Approaches to Energy Balance and Obesity, w/DoE (2008-)

Types of Partnership Activities

- ❑ Working Groups
- ❑ Assessment Activities
- ❑ Informal Contacts
- ❑ Co-Funding of Individual Awards
- ❑ Workshops
- ❑ MOUs
- ❑ Joint Solicitations, Programs

Domestic Nuclear Detection Office/National Science Foundation Academic Research Initiative (ARI)

- ❑ In FY07, the Domestic Nuclear Detection Office (DNDO) within DHS began investing, in partnership with NSF, in frontier research at academic institutions
- ❑ Transformational research focused on detection systems, individual sensors, or other research potentially relevant to:
 - » detection of nuclear weapons, special nuclear material, radiation dispersal devices, and related threats
- ❑ ENG is lead (CBET in FY07, ECCS in FY08, CMMI in FY09), with participation by CISE, MPS, OCI, EHR, and OISE
- ❑ Anticipate funding \$58M from FY07-11. All funds from DNDO; proposal review and award process administered by NSF
 - » First year of award is funded by NSF with DNDO funds; subsequent years funded directly by DNDO
- ❑ In FY08, \$3.1M in funds for 9 awards at ~13% success rate

Photonics Technology Access Program (PTAP)

- Grant awarded in FY02 to Optoelectronics Industry Development Association (OIDA) by NSF (ECSS, CISE) and DARPA – \$4.0M/3Yrs
 - Extended with DARPA supplement funding in FY05
 - Renewed for final 2 years in FY06 with DARPA and NSF support
- OIDA served broker role – to provide U.S. faculty researchers access to pre-commercial photonics devices and components from industry
 - intended to stimulate academic-industry cooperation
 - drive new systems-level applications in the photonics field
- Covered a broad range of important photonics application areas
 - telecomm, healthcare, sensors, computers, education...
- Competitive solicitations issued by OIDA 2-3 times a year
 - Brief proposals; often prepared by graduate students
 - 331 proposals received from 80 universities – large and small
 - 210 projects selected, typical costs were a few \$K - \$50K each
 - \$3.4 million in funds expended on requests

Joint Solicitations, Programs

- ❑ ENG/PHY/GEO: NSF/DoE Partnership in Basic Plasma Science and Engineering, w/DoE (FY97- , every 3 years)
- ❑ ENG/NSF: Domestic Nuclear Detection Office/NSF Academic Research Initiative (ARI), w/DHS (FY08-12, every year)
- ❑ CBET: Metabolic Engineering Working Group (MEWG), w/DoE, EPA, NASA, NIST, NIH, DoD, USDA (FY98- , every 3 years)
- ❑ CBET: Collaborative Research on Computational Neuroscience, w/NIH (FY02- , every 2 years)
- ❑ CBET: Interagency Opportunities in Multi-Scale Modeling in Biomedical, Biological, and Behavioral Systems, w/ NIH, NASA, DoE (FY04)
- ❑ CBET: Bioengineering Approaches to Energy Balance and Obesity, w/NIH (FY05)
- ❑ CBET: NSF/FDA Scholar in Residence at FDA, w/FDA (FY03-06)
- ❑ CMMI: Advanced High Strength Steels, w/DoE (FY08)

Joint Solicitations, Programs (Cont)

- ❑ CMMI: Communicating Hurricane Information, w/NOAA (FY08)
- ❑ CMMI: Disaster Resilient Rural Communities, w/USDA (FY09)
- ❑ ECCS: NSF/NIH Scholar in Residence at NIH, w/NIH (FY98-FY01)
- ❑ **ECCS: Photonics Technology Access Program, w/DARPA (FY02-08)**
- ❑ ECCS: Ultra-High Capacity Optical Communications and Networking, w/DARPA (FY01 and FY03)
- ❑ ECCS: Partnership in Electric Power Network Efficiency and Security (EPNES) I and II, w/ONR (FY02 and FY03)
- ❑ ECCS: Enabling Technologies for Space Solar Power, w/NASA (FY02)
- ❑ ECCS: Technological Challenges in Organic Electronics, Photonics and Magnetics, w/DARPA and AFOSR (FY04)
- ❑ ECCS: Technological Challenges in Hybrid Communications Systems, w/ONR (FY06)
- ❑ EEC: Bioengineering and Bioinformatics Summer Institutes Program, w/NIH NIBIB, (FY03, every 3 years)