ENG Advisory Committee

Topics

- Meeting Overview and Staff Introductions
- ENG Update
- NSF and NSB Activities
- National, NSF and ENG Trends
ENG Advisory Committee

Meeting Topics

- Directorate Update
- EFRI Update
- Diversity and Broadening Participation
- ENG Division Plans
- NAE Project: Grand Challenges for Engineering
- NAE Project: Understanding and Improving K-12 Engineering Education in the United States
- Engineering PhD Education
ENG Advisory Committee

Meeting Topics

- Break out groups
  - Engineering PhD Education
  - Engineering Grand Challenges
- Update on Cyberinfrastructure Activities
- IIP COV Report
- NAE Project: Developing Effective Messages for Improving Public Understanding of Engineering
- Meet with Deputy Director
New Staff Introductions

➔ Office of the Assistant Director
  • Shirah Pope, Secretary to the Assistant Director
  • Beverly Baker, Secretary to the Deputy Assistant Director (on detail)

➔ Chemical, Bioengineering, Environmental, and Transport Systems
  • Rosemary Wesson, Program Director, Energy and Sustainability
  • William Young, Program Assistant
New Staff Introductions

电气、通信和网络系统
- Dagmar Niebur, 项目主任，电力、控制和自适应网络，德雷塞尔大学
- Yogesh Gianchandani, 项目主任，集成、混合和复杂系统，密歇根大学

工业创新与合作伙伴关系
- William Haines, 项目经理，电子，西格尔技术，明尼阿波利斯，MN
- Cheryl Albus, 项目主任，先进材料和制造
- Patrick Ravanera, 行政官员
ENG Organization Update
ENG Diversity and Outreach

Goals

- Excellence and innovation through diversity
- To enable the integration and success of a diverse engineering workforce, both inside and outside NSF
- To make the demographics in engineering disciplines representative of the US census
  - The challenge is preparing for the demographics of the future
  - K-12 outreach simply cannot be separated from any research or diversity initiative
Supports engineering research with the goal of promoting sustainable engineered systems that support human well-being and that also are compatible with sustaining natural (environmental) systems, which provide ecological services vital for human survival.

Two submission windows each year – first closed on March 1, 2007 for FY07.

48 received and under review.

Areas of submissions include:

- Green Engineering (~50%)
- Ecological Engineering (~25%)
- Industrial Ecology (~15%)
- Earth Systems Engineering (~5%)
- Other
Energy for Sustainability

CBET

- Supports fundamental research and education in the areas of
  * Energy production, conversion, and storage, and
  * Focused on energy sources that are environmentally friendly and renewable.
- Two submission windows each year – first closed on March 1, 2007 for FY07.
- Over 200 received and under review.
- Areas of submissions include:
  * Fuel Cells (~30%)
  * Solar-related (~15%)
  * Biofuels (~15%)
  * Others – hydrogen-related, renewable energy sources, wind, etc.
Cybersystems
ECCS

- Supports fundamental research that integrates physical devices with distributed sensing and actuation, communications, storage, computation and control of complex systems that enables visualization, analysis and reconfiguration for reliable and agile infrastructures for domain-specific applications.
- Two submission windows each year - September 7 through October 7 and January 7 through February 7.
- 78 unsolicited proposals received in FY 2007.
- Areas of submissions include: Hybrid and integrative networks, Integrated signal processing for high-performance computing and networking, and New algorithms and architectures for secure and robust computing.
Emerging Frontiers in Research and Innovation

Office Director
Sohi Rastegar

ENG Programs and Divisions Define Topics & Teams

FY 07:
Auto-Reconfigurable Engineered Systems (ARES)

COORDINATOR:
Abhi Deshmukh, CMMI
Scott Midkiff, ECCS

TEAM MEMBERS:
Mario Rotea, CMMI
Maria Burka, CBET
Bruce Hamilton, CBET

FY 07:
Cellular and Biomolecular Engineering (CBE)

COORDINATORS:
Jimmy Hsia, CMMI
Fred Heineken, CBET

TEAM MEMBERS:
Lenore Clesceri, CBET
Lynn Preston, EEC
Robert Wellek, CBET
NSF and NSB Activities
NSB CONCERN: “Transformative research frequently does not fit comfortably within the scope of project-focused, innovative, step-by-step research or even major centers, nor does it tend to fare well wherever a review system is dominated by experts highly invested in current paradigms or during times of especially limited budgets that promote aversion to risk.”

NSB PROPOSED SOLUTION: “That NSF develop a distinct, Foundation-wide Transformative Research Initiative (TRI) distinguishable by its potential impact on prevailing paradigms and by the potential to create new fields of science, to develop new technologies, and to open new frontiers.”
NSB DEFINITION: “Transformative research is defined as research driven by ideas that stand a reasonable chance of radically changing our understanding of an important existing scientific or engineering concept or leading to the creation of a new paradigm or field of science or engineering. Such research also is characterized by its challenge to current understanding or its pathway to new frontiers.”
Where are you most likely to seek funding for a transformative research idea?

<table>
<thead>
<tr>
<th>RESPONSE</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF</td>
<td>44.7%</td>
</tr>
<tr>
<td>Combination of Multiple Funding Sources</td>
<td>19.1%</td>
</tr>
<tr>
<td>Other Federal Agencies - DOD, HHS, NASA, etc.</td>
<td>12.6%</td>
</tr>
<tr>
<td>N/A</td>
<td>7.9%</td>
</tr>
<tr>
<td>Private Foundations</td>
<td>7.4%</td>
</tr>
<tr>
<td>My Institution</td>
<td>5.1%</td>
</tr>
<tr>
<td>Industry</td>
<td>1.7%</td>
</tr>
<tr>
<td>Other</td>
<td>0.9%</td>
</tr>
<tr>
<td>State or Local Government</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
Transformative Research

IPAMM Survey

I feel that NSF welcomes transformative research proposals.
I feel that NSF *funds* transformative research proposals.
Transformative Research

NSF Examples

- Small Grant for Exploratory Research (SGER)
- Nanoscale Exploratory Research (NER)
- Accomplishment-based awards
- Directorate level offices - BIO’s Emerging Frontiers (EF) Division, ENG’s Office for Emerging Frontiers in Research and Innovation (EFRI) and MPS’s Office of Multidisciplinary Activities (OMA)
- Directorates support of transformative research through internal reserved incentive funds - SBE Innovative Program Development Reserve (IPDR)
NSB has sponsored two workshops at MIT and Georgia Tech focused on Engineering Education. NSB is currently preparing their report. Considered wide-ranging topics including:

- Undergraduate retention,
- Educational experiences, and
- Public perceptions.

Some items related to NSF include:

- Existing programs: REU, RET, IGERT, GK-12, ADVANCE,
- Encouraging interdisciplinary engineering education, and
- Pathway issues.
NSF Strategic Planning
NSF Strategic Goals – 2006-2011

- Discovery: Advancing the frontiers of knowledge
- Learning: Cultivate and expand and world-class, broadly inclusive engineering workforce
- Research Infrastructure: Fill the gaps in advanced instrumentation, facilities, and cyberinfrastructure
- Stewardship: Enhance the capability and responsiveness of the organization
National, NSF and ENG Trends
External Reports

- The National Academies’ *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* recommends enhancements in
  - K-12 education
  - Research
  - Higher Education
  - Economic policy
- *The Engineer of 2020* (NAE, 2004) and *Educating the Engineer of 2020* (NAE, 2005) asks “… how to enrich and broaden engineering education so that those technically grounded graduates will be better prepared to work in a constantly changing global economy.”
External Reports

- *Engineering Research and America’s Future* (NAE, 2005): Committee to Assess the Capacity of the U.S. Engineering Research Enterprise
  - Recommends increased research support for engineering and physical sciences
  - Seeks enhanced partnership, infrastructure and workforce activities

  - Recommends increased support for workforce, research investments and infrastructure
  - Stresses importance of frontier and interdisciplinary research
The centerpiece of American Competitiveness Initiative (ACI) is to double the federal investment in key agencies that support basic research in physical sciences and engineering.

Over the next 10 years, the Federal agencies impacted are NSF, DOE Science, and NIST.

ACI includes three broad components:
- Research in physical sciences and engineering (including 12 specific goals with 7 related to NSF)
- Research and Development tax incentives
- Education and workforce
American Competitiveness Initiative
FY 2007 – FY 2016

Source: OSTP, Feb. 2006
ACI-Driven NSF Budget Projections

FY 2006 through FY 2016 budgets are estimates based on White House data.
<table>
<thead>
<tr>
<th>Directorate</th>
<th>FY 2006 Actual</th>
<th>FY 2007 Request</th>
<th>FY 2008 Request</th>
<th>FY 2008 Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO</td>
<td>$580.90</td>
<td>$607.85</td>
<td>$633.00</td>
<td>$52.10</td>
</tr>
<tr>
<td>CISE</td>
<td>$496.35</td>
<td>526.69</td>
<td>574.00</td>
<td>77.65</td>
</tr>
<tr>
<td>ENG (less SBIR/STTR)</td>
<td>$486.01</td>
<td>519.67</td>
<td>566.89</td>
<td>80.50</td>
</tr>
<tr>
<td>SBIR/STTR</td>
<td>$99.45</td>
<td>108.88</td>
<td>116.41</td>
<td>17.34</td>
</tr>
<tr>
<td>GEO</td>
<td>$703.95</td>
<td>744.85</td>
<td>792.00</td>
<td>88.05</td>
</tr>
<tr>
<td>MPS</td>
<td>$1,086.61</td>
<td>1,150.30</td>
<td>1,253.00</td>
<td>166.39</td>
</tr>
<tr>
<td>SBE</td>
<td>$201.23</td>
<td>213.76</td>
<td>222.00</td>
<td>20.78</td>
</tr>
<tr>
<td>OCI</td>
<td>$127.14</td>
<td>182.42</td>
<td>200.00</td>
<td>72.86</td>
</tr>
<tr>
<td>OISE</td>
<td>$42.61</td>
<td>40.61</td>
<td>45.00</td>
<td>2.39</td>
</tr>
<tr>
<td>OPP</td>
<td>$390.54</td>
<td>438.10</td>
<td>464.90</td>
<td>74.37</td>
</tr>
<tr>
<td>IA</td>
<td>$233.30</td>
<td>231.37</td>
<td>263.00</td>
<td>29.70</td>
</tr>
<tr>
<td>U.S. Arctic Research Commission</td>
<td>$1.17</td>
<td>$1.45</td>
<td>$1.49</td>
<td>0.32</td>
</tr>
<tr>
<td>Research &amp; Related Activities</td>
<td>$4,449.25</td>
<td>$4,765.95</td>
<td>$5,131.69</td>
<td>$682.44</td>
</tr>
</tbody>
</table>

Change over FY 2006 Actual:

- **BIO**: $52.10, 9.0%
- **CISE**: 77.65, 15.6%
- **ENG (less SBIR/STTR)**: 80.50, 16.6%
- **SBIR/STTR**: 17.34, 17.5%
- **GEO**: 88.05, 12.5%
- **MPS**: 166.39, 15.3%
- **SBE**: 20.78, 10.3%
- **OCI**: 72.86, 57.3%
- **OISE**: 2.39, 5.6%
- **OPP**: 74.37, 19.0%
- **IA**: 29.70, 12.7%
- **U.S. Arctic Research Commission**: 0.32, 27.4%
- **Research & Related Activities**: $682.44, 15.3%

Change over FY 2007 Request:

- **BIO**: $25.15, 4.1%
- **CISE**: 47.31, 9.0%
- **ENG (less SBIR/STTR)**: 47.22, 9.1%
- **SBIR/STTR**: 7.53, 6.9%
- **GEO**: 47.15, 6.3%
- **MPS**: 102.70, 8.9%
- **SBE**: 8.24, 3.9%
- **OCI**: 17.58, 9.6%
- **OISE**: 4.39, 10.8%
- **OPP**: 26.80, 6.1%
- **IA**: 31.63, 13.7%
- **U.S. Arctic Research Commission**: 0.04, 2.8%
- **Research & Related Activities**: $365.74, 7.7%
## NSF-wide Investments Totals

**Dollars in Millions**

<table>
<thead>
<tr>
<th>Area</th>
<th>FY 2006 Actual</th>
<th>FY 2007 Request</th>
<th>FY 2008 Request</th>
<th>Change over FY 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biocomplexity in the Environment</td>
<td>80.03</td>
<td>42.58</td>
<td>0.00</td>
<td>-42.58 -100.00%</td>
</tr>
<tr>
<td>Climate Change Science Program</td>
<td>196.88</td>
<td>205.25</td>
<td>208.25</td>
<td>3.00 1.46%</td>
</tr>
<tr>
<td>Cyber-enabled Discovery &amp; Innovation</td>
<td>0.00</td>
<td>0.00</td>
<td>51.98</td>
<td>N/A N/A</td>
</tr>
<tr>
<td>Cyberinfrastructure</td>
<td>520.50</td>
<td>597.31</td>
<td>644.09</td>
<td>46.78 7.83%</td>
</tr>
<tr>
<td>Human and Social Dynamics</td>
<td>39.47</td>
<td>41.45</td>
<td>37.95</td>
<td>-3.50 -8.44%</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>88.81</td>
<td>78.45</td>
<td>0.00</td>
<td>-78.45 -100.00%</td>
</tr>
<tr>
<td>National Nanotechnology Initiative</td>
<td>359.71</td>
<td>373.18</td>
<td>389.90</td>
<td>16.72 4.48%</td>
</tr>
<tr>
<td>Networking &amp; Information Technology R&amp;D</td>
<td>811.53</td>
<td>903.74</td>
<td>993.69</td>
<td>89.95 9.95%</td>
</tr>
</tbody>
</table>
Cyber-Enabled Discovery & Innovation (CDI)

“Broaden the Nation’s capability for innovation by developing a new generation of computationally based discovery concepts and tools to deal with complex, data-rich, and interacting systems.”

- ENG broadly supports research in advanced cyber-enabled engineering throughout all its divisions.
- CDI investments areas include:
  - Complex interactions
  - Computational experimentation
  - Knowledge extraction
  - Virtual environments
  - Education in computational discovery

- Budgets - 2008 2009 2010 2011 2012
  - $51.98m $100m $150m $200m $250m
## Engineering FY 2008 Budget Request

### Dollars in Millions

<table>
<thead>
<tr>
<th></th>
<th>FY 2006 Actual</th>
<th>FY 2007 Plan</th>
<th>FY 2008 Request</th>
<th>Change over FY 2007 Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBET</td>
<td>$125.09</td>
<td>$128.29</td>
<td>$144.97</td>
<td>$16.68 13.0%</td>
</tr>
<tr>
<td>CMMI</td>
<td>148.82</td>
<td>156.86</td>
<td>174.08</td>
<td>17.22 11.0%</td>
</tr>
<tr>
<td>ECCS</td>
<td>77.91</td>
<td>83.40</td>
<td>93.96</td>
<td>10.56 12.7%</td>
</tr>
<tr>
<td>IIP</td>
<td>109.65</td>
<td>120.08</td>
<td>128.39</td>
<td>8.31 6.9%</td>
</tr>
<tr>
<td>Small Business Innovation Research (SBIR)</td>
<td>99.45</td>
<td>108.88</td>
<td>116.41</td>
<td>7.53 6.9%</td>
</tr>
<tr>
<td>EEC</td>
<td>123.99</td>
<td>114.92</td>
<td>116.90</td>
<td>1.98 1.7%</td>
</tr>
<tr>
<td>EFRI</td>
<td>-</td>
<td>25.00</td>
<td>25.00</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Total, ENG</strong></td>
<td><strong>$585.46</strong></td>
<td><strong>$628.55</strong></td>
<td><strong>$683.30</strong></td>
<td><strong>$54.75 8.7%</strong></td>
</tr>
</tbody>
</table>

(Totals may not add due to rounding.)
## ENG NSF-wide Investments

**Dollars in Millions**

<table>
<thead>
<tr>
<th>Project</th>
<th>FY 2006 Actual</th>
<th>FY 2007 Request</th>
<th>FY 2008 Request</th>
<th>Change over FY 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biocomplexity in the Environment</td>
<td>6.00</td>
<td>4.00</td>
<td>0.00</td>
<td>-4.00</td>
</tr>
<tr>
<td>Climate Change Science Program</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Cyber-enabled Discovery &amp; Innovation</td>
<td>0.00</td>
<td>0.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Cyberinfrastructure</td>
<td>52.00</td>
<td>54.00</td>
<td>58.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Human and Social Dynamics</td>
<td>2.00</td>
<td>2.00</td>
<td>1.50</td>
<td>-0.50</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>2.91</td>
<td>1.46</td>
<td>0.00</td>
<td>-1.46</td>
</tr>
<tr>
<td>National Nanotechnology Initiative</td>
<td>123.77</td>
<td>137.02</td>
<td>139.02</td>
<td>2.00</td>
</tr>
<tr>
<td>Networking &amp; Information Technology R&amp;D</td>
<td>11.20</td>
<td>11.20</td>
<td>21.20</td>
<td>10.00</td>
</tr>
</tbody>
</table>

**Change over FY 2006**

- Biocomplexity in the Environment: -100.00%
- Climate Change Science Program: 0.00%
- Cyber-enabled Discovery & Innovation: N/A
- Cyberinfrastructure: 7.41%
- Human and Social Dynamics: -25.00%
- Mathematical Sciences: -100.00%
- National Nanotechnology Initiative: 1.46%
- Networking & Information Technology R&D: 89.29%
ENG and SBIR/STTR Budget History

Dollars in Millions
ENG and NSF Funding Rates

Research Grants

<table>
<thead>
<tr>
<th>Year</th>
<th>ENG Proposals</th>
<th>ENG Awards</th>
<th>ENG Funding Rate</th>
<th>NSF Funding Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2000</td>
<td>4000</td>
<td>1000</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>FY 2001</td>
<td>4500</td>
<td>1200</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>FY 2002</td>
<td>5000</td>
<td>1400</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>FY 2003</td>
<td>5500</td>
<td>1600</td>
<td>18%</td>
<td>24%</td>
</tr>
<tr>
<td>FY 2004</td>
<td>6000</td>
<td>1800</td>
<td>16%</td>
<td>22%</td>
</tr>
<tr>
<td>FY 2005</td>
<td>6500</td>
<td>2000</td>
<td>14%</td>
<td>20%</td>
</tr>
<tr>
<td>FY 2006</td>
<td>7000</td>
<td>2200</td>
<td>12%</td>
<td>18%</td>
</tr>
<tr>
<td>FY 2007</td>
<td>7500</td>
<td>2400</td>
<td>10%</td>
<td>16%</td>
</tr>
<tr>
<td>FY 2008</td>
<td>8000</td>
<td>2600</td>
<td>8%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Request Projection
ENG Standard vs. Continuing Grants

The chart shows the percentage of continuing and standard grants for fiscal years (FY) 2005, 2006 (estimated), 2007 (estimated), and 2008 (estimated). The bars represent the distribution of grants, with the darker purple section indicating continuing grants and the lighter blue section indicating standard grants.
ENG Funding Analysis
Fenced vs. Constrained vs. Unfenced

---|---|---|---
Fenced | Constrained
Research Collaborations
Percent of Single PI vs. Multiple Investigator Awards

[Graph showing the percentage of single PI vs. multiple investigator awards from 1984 to 2006. The graph indicates a trend where the percentage of single PI awards has decreased over time, while the percentage of multiple investigator awards has increased.]
ENG Funding Rates

Research Grants

![Graph showing ENG Funding Rates for Research Grants from FY 2000 to FY 2008. The graph includes bars and lines representing different funding rates: Proposal Funding Rate, Awards, Projected Funding Rate, Single PI Funding Rate, and Multi PI Funding Rate. The graph also shows the trend in funding rates over the years.]
NSF Research Collaborations

Percent of Single PI vs. Multiple Investigator Awards

- Multi % by $
- Single % by $
- Single % by #
- Multi % by #

Years: 1984 to 2006
CAREER Funding Rates

ENG CAREER Proposals and Awards
Recent Solicitations

- Active Nanostructures and Nanosystems – NSF 06-595, August 6, 2006
- Major Research Instrumentation Program – NSF 07-510, October 26, 2006
- Engineering Research Centers – NSF 07-521, November 13, 2006
- Grant Opportunities for Academic Liaison with Industry – NSF 07-522, November 13, 2006
- Nanotechnology UG Education – NSF 07-554, March 13, 2007
- RET in Engineering – NSF 07-557, April 3, 2007
- Engineering Virtual Organizations – NSF 07-558, April 4, 2007
Summary and Discussion

Topics

- Directorate update
  - New ENG programs
  - NSB transformative research
  - NSF and ENG trends
- Additional Advisory Committee items
  - EFRI
  - Diversity and broadening participation
  - NSF strategic planning - ENG division plans
  - Understanding and improving U.S. K-12 engineering education
  - Break out groups
    - Engineering PhD education
    - Engineering grand challenges
  - NSF and ENG cyberinfrastructure activities
  - Messages for improving public understanding of engineering
Thank You
Chemical, Bioengineering, Environmental, and Transport Systems

**Division Director**
- Judy Raper

**Deputy Division Director**
- Bob Wellek

**Senior Advisor**
- Marshall Lih

**Chemical, Biochemical, and Biotechnology Systems**
- Process and Reaction Engineering
  - Maria Burka
- Catalysis and Biocatalysis
  - John Regalbuto
- Biochemical Engineering
  - Bruce Hamilton
- Biotechnology
  - Fred Heineken
- Chemical and Biological Separations
  - Geoff Prentice

**Transport and Thermal Fluids**
- Thermal Transport Processes
  - Pat Phelan
- Interfacial Processes and Thermodynamics
  - Bob Wellek
- Particulate and Multiphase Processes
  - Marc Ingber
- Fluid Dynamics
  - Bill Schultz
- Combustion, Fire, and Plasma Systems
  - Phil Westmoreland

**Biomedical Engineering and Engineering Healthcare**
- Research to Aid Persons With Disabilities
  - Bob Jaeger
- Biomedical Engineering
  - Semahat Demir
- Biophotonics
  - Leon Esterowitz

**Environmental Engineering and Sustainability**
- Environmental Engineering
  - Pat Brezonik
- Environmental Technology
  - Cindy Ekstein
- Energy for Sustainability
  - Rose Wesson/Trung Van Nguyen
- Environmental Sustainability
  - Cindy Lee
Electrical, Communications and Cyber Systems

Division Director
Usha Varshney

Senior Advisor
Lawrence Goldberg

Electronics, Photonics and Device Technologies
Optoelectronics; Nanophotonics; Ultrafast and Extreme Ultra-Violet Technologies
Rongqing Hui

Micro/Nanoelectronics; Bioelectronics; NEMS/MEMS; Sensors
Rajinder Khosla

Micro/Nanoelectronics; Molecular Electronics; Spin Electronics; Organic Electronics; Micromagnetics; Power Electronics
Olufemi Olowolafe

Power, Controls and Adaptive Networks
Embedded, Distributed and Adaptive Control; Sensing and Imaging Networks; Systems Theory; Telerobotics
Radhakisan Baheti

Power and Energy Systems and Networks; Interdependencies of Power and Energy on Critical Infrastructures; Power Drives; Renewable and Alternative Energy Sources
Dagmar Niebur

Adaptive Dynamic Programming; Neuromorphic Engineering; Quantum and Molecular Modeling and Simulations of Devices and Systems
Paul Werbos

Integrative, Hybrid and Complex Systems
RF and Optical Wireless and Hybrid Communications Systems; Inter and Intra-chip Communications; Mixed Signals
Leda Lunardi

Nano, Micro and Complex Systems; Systems-on-a-chip; System-in-a-Package; Diagnostic and Implantable Systems
Yogesh Gianchandani

Cybersystems; Signal Processing
Scott Midkiff
Industrial Innovation and Partnerships

Division Director
Kesh Narayanan

Senior Advisor
Joe Hennessey

Industry University Cooperative Research Centers
Alex Schwarzkopf
Edward Clancy
Glenn Larsen

Grants Opportunities for Academic Liaison With Industry
Donald Senich

Office of Industrial Innovation SBIR/STTR

Partnerships for Innovation
Sara Nerlove

• Advanced Electronics (4)
• Advanced Manufacturing (3)
• Advanced Materials (7)
• Biotechnology (4)
• Civil Infrastructure Systems (3)
• Energy and the Environment (5)
• Fabrication and Processing Technology (7)
• Health and Safety (4)
• Information and Communications (6)
• Quality, Reliability and Maintenance (2)
• System Design and Simulation (1)

• Advanced Materials and Manufacturing
Deepak Bhat, Rathindra DasGupta, Joseph Raksis, Rosemarie Wesson
• Biotechnology
Thomas Allnutt, Ali Andalibi, George Vermont
• Chemical Technology
Rosemarie Wesson
• Electronics
Juan Figueroa, Murali Nair, T. James Rudd
• Information Technology
Errol Arkilic, Ian Bennett
• Special Topics
EFRI Timeline

FY 2006-2007

- Solicitation Release
- Preproposals due
- Preproposal Panels
- Full proposals due
- Full Proposals
- Awards
- Grantees meeting

Aug 06  Oct 06  Dec 06  Feb 07  Apr 07  Jun 07  Aug 07  Oct 07

FY 2007-2008

- Community Input
  - Workshops
  - Meetings
  - Panels
  - Societies
  - Academies
  - Proposals
  - Publications
  - COV
- PD Proposals
- PD Working Groups
- ENG Advisory Committee
- ENG Leadership Retreat
- PD Retreat
- Solicitation Release