



NSF, ENG and ACI

Nanoscale Science and Technology Grantee Conference

December 4-6, 2006



**National Science Foundation
Directorate for Engineering**

**Assistant Director for Engineering
Richard O. Buckius**

ACI and Trends



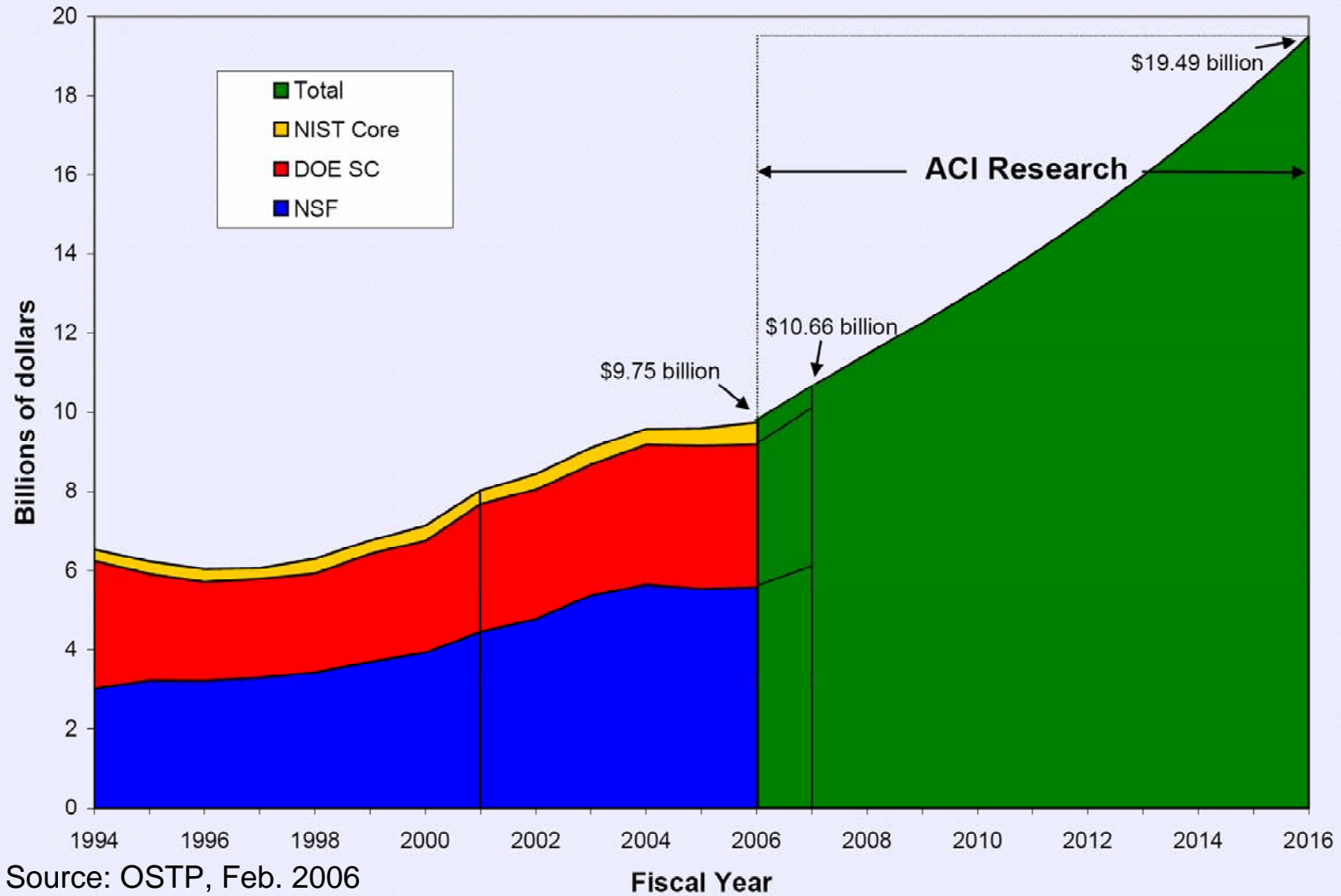
American Competitiveness Initiative

- 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.
- The NSF funds “ ... potentially transformative basic research in areas such as nanotechnology, advanced networking and information technology, physics, chemistry, materials science, mathematics and engineering.”
- NSF expects to support
 - ◆ More than 500 additional research grants in 2007
 - ◆ Opportunities for upward of 6,400 additional scientists, engineers, students, post-doctoral fellow, and technicians in 2007
 - ◆ Enhanced STEM education and workforce programs



American Competitiveness Initiative

FY 2007 – FY 2016

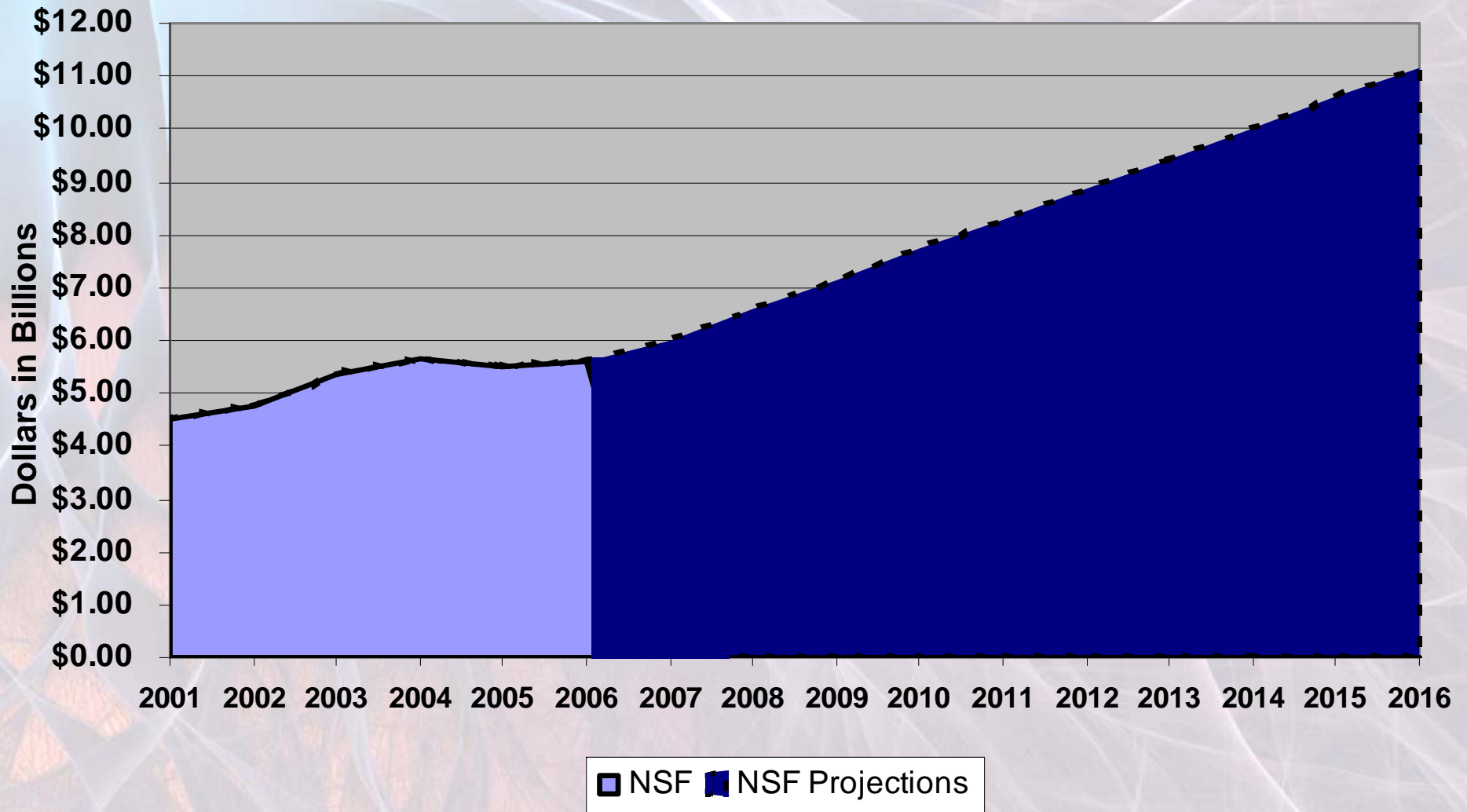


Source: OSTP, Feb. 2006



NATIONAL SCIENCE FOUNDATION

ACI-Driven NSF Budget Projections



NATIONAL SCIENCE FOUNDATION
FY 2006 through FY 2016 budgets are estimates based on White House data.

NSF and ACI

- **ACI Goal: World-class capability in nanofabrication and nanomanufacturing – transforming discovery into industrial applications.**
- **ACI Goal: Materials research critical to nanotechnology, biotechnology, alternative energy, and the hydrogen economy through essential infrastructure.**
- **ACI Goal: High-end computing to advance modeling and simulation in a broad range of disciplines including intelligent manufacturing.**
- **ACI Goal: Overcoming barriers to quantum information processing for secure communications, as well as quantum mechanics simulations in physic, chemistry, biology, and materials science.**



NSF and ACI

- **ACI Goal: Addressing gaps and needs in cyber security and information assurance.**
- **ACI Goal: Efficient and economic use of hydrogen, nuclear, and solar energy through basic research in materials.**
- **ACI Goal: Improved sensor and detection capabilities resulting in world-leading automation and control technologies.**
- **ACI Goal: Manufacturing standards for more efficient production practices.**
- **ACI Goal: Advances in materials for improving structural performances during natural disasters.**



NSF Research and Related Activities

FY 2007 Request by Directorate (Dollars in Millions)

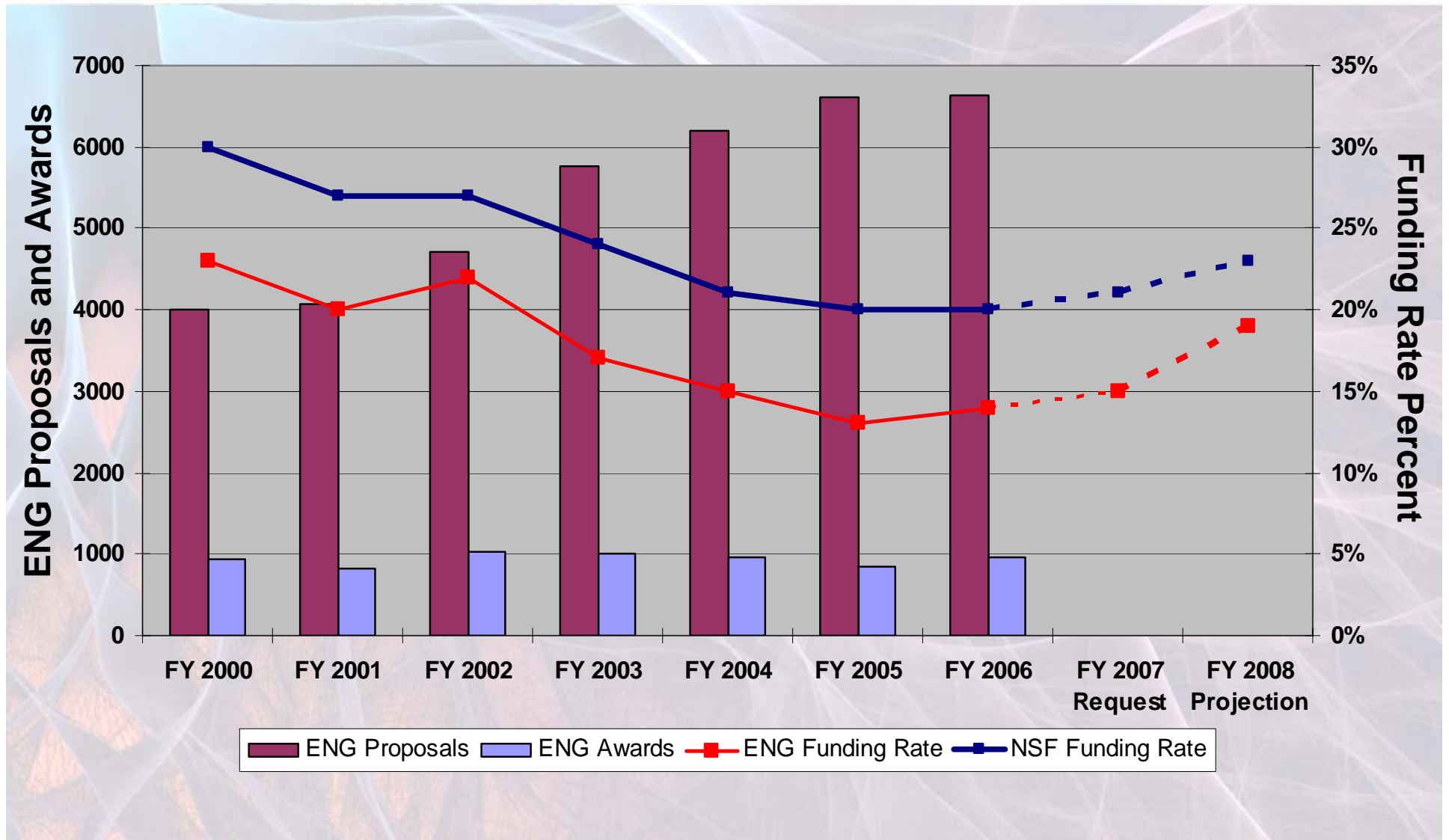
	FY 2006 Actuals	FY 2007 Request	Amount Change	Percent Change
Biological Sciences	\$576.69	\$607.85	\$31.16	5.4%
Computer & Information Science & Engineering	496.41	526.69	30.28	6.1%
Engineering (includes SBIR/STTR)	580.92	628.55	47.63	8.2%
Geosciences	702.83	744.85	42.02	6.0%
Mathematical & Physical Sciences	1,085.45	1,150.30	64.85	6.0%
Social, Behavioral & Economic Sciences	199.91	213.76	13.85	6.9%
Office of Cyberinfrastructure	127.12	182.42	55.3	43.5%
Office of International Science and Engineering	34.52	40.61	6.09	17.6%
U.S. Polar Research Programs	322.68	370.58	47.9	14.8%
U.S. Antarctic Logistical Support Activities	66.66	67.52	0.86	1.3%
Integrative Activities	137.12	131.37	-5.75	-4.2%
Arctic Research Commission	1.17	1.45	0.28	23.9%
Total, R&RA	\$4,331.48	\$4,665.95	\$334.47	7.7%

Totals may not add due to rounding.



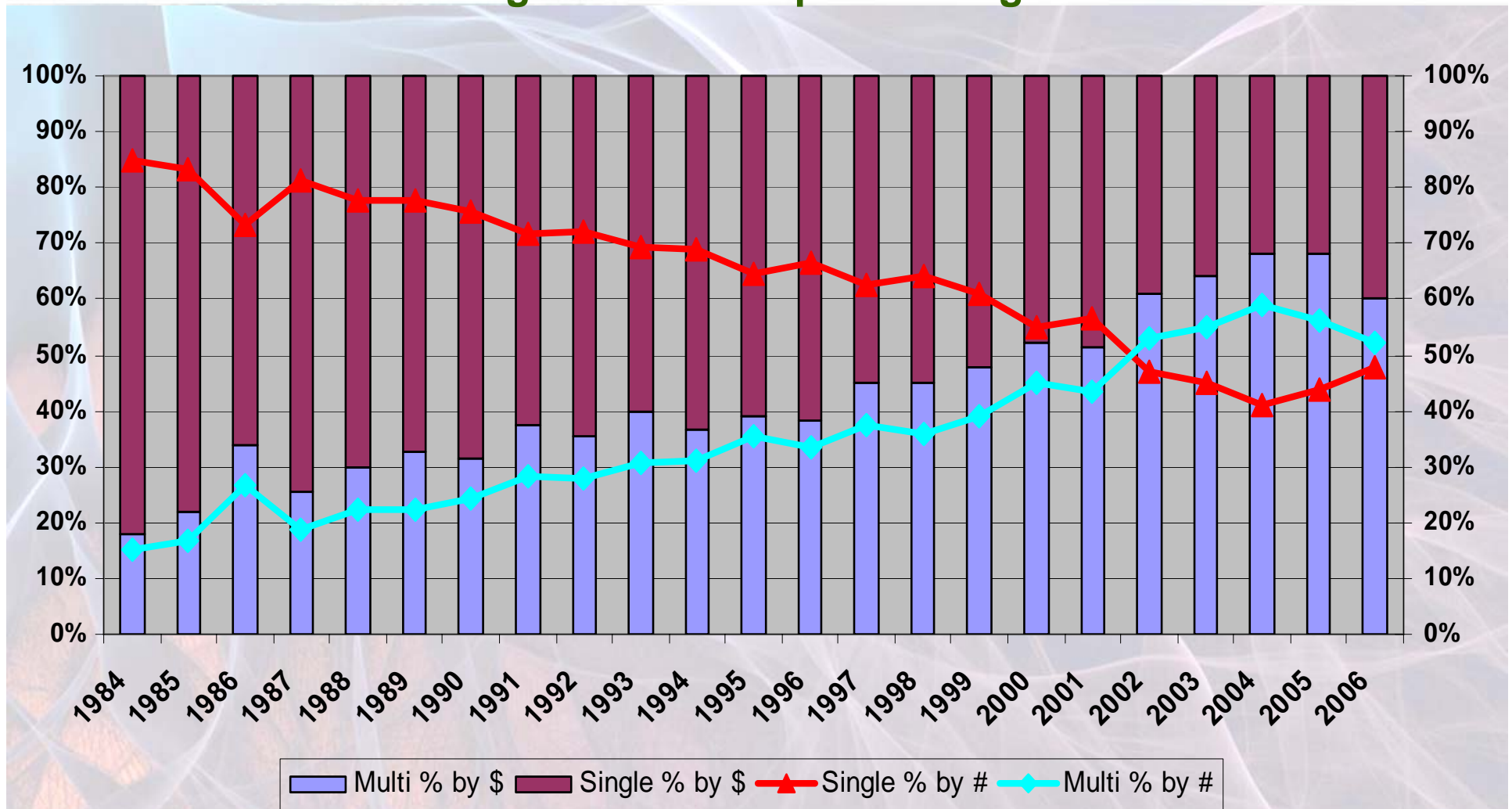
ENG and NSF Funding Rates

Research Grants



Research Collaborations

Percent of Single PI vs. Multiple Investigator Awards

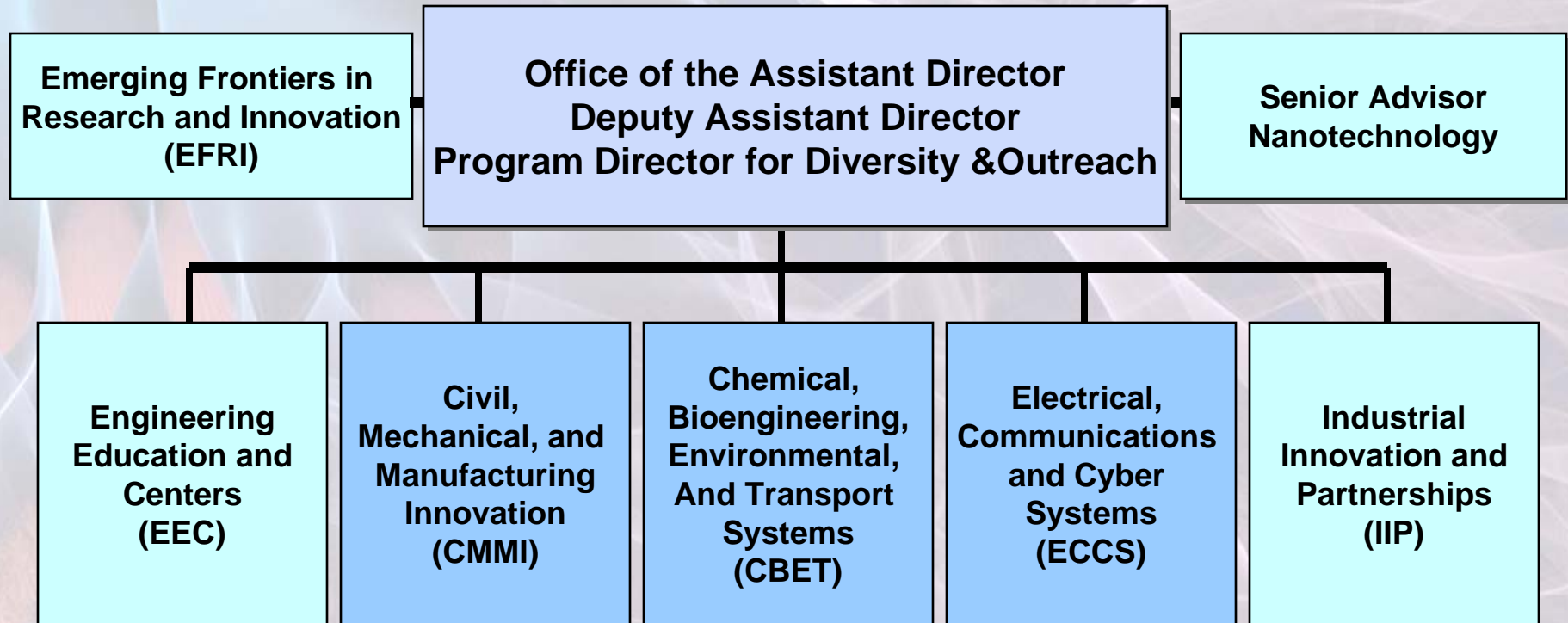


ENG Organization

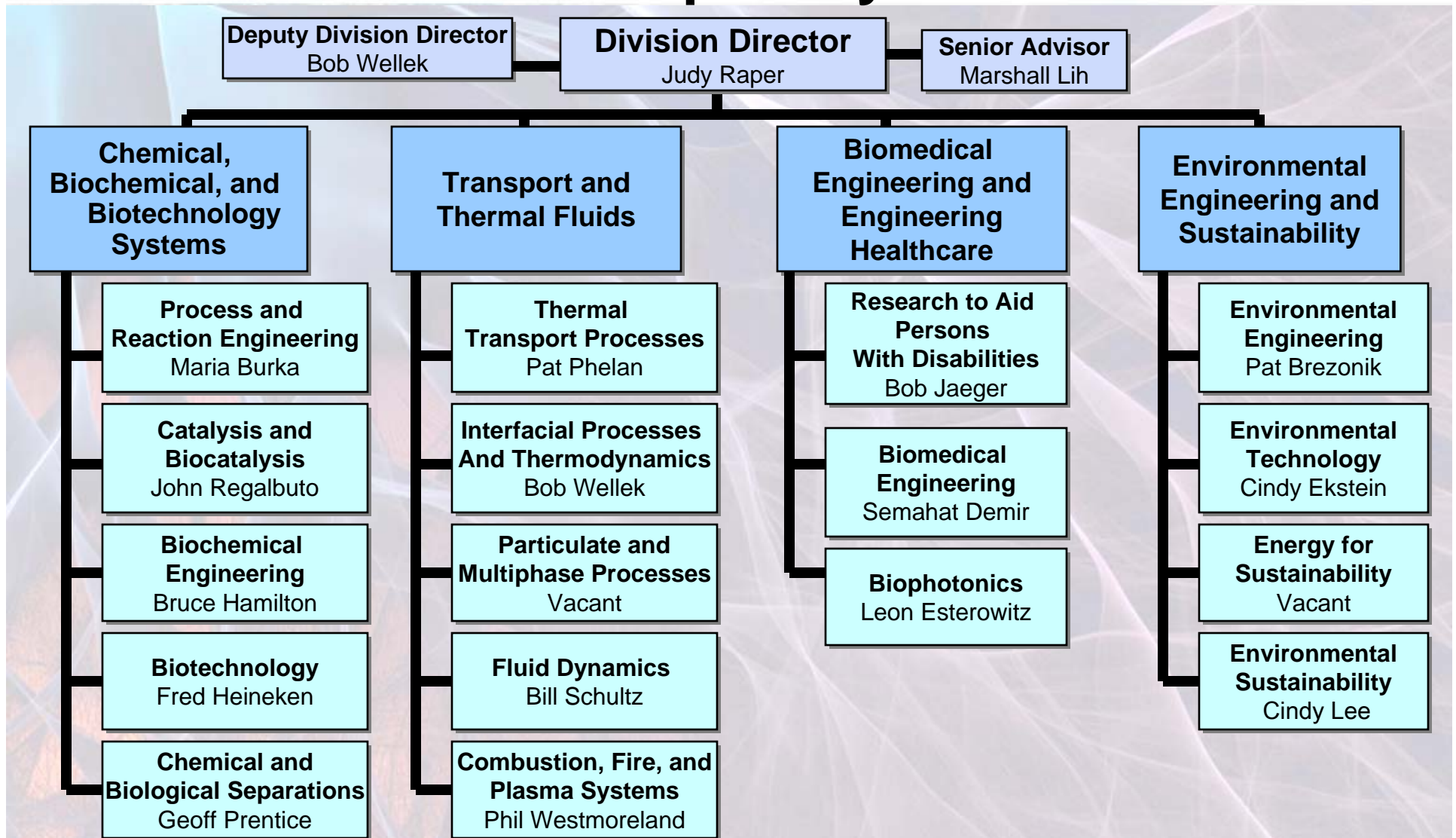


Directorate for Engineering

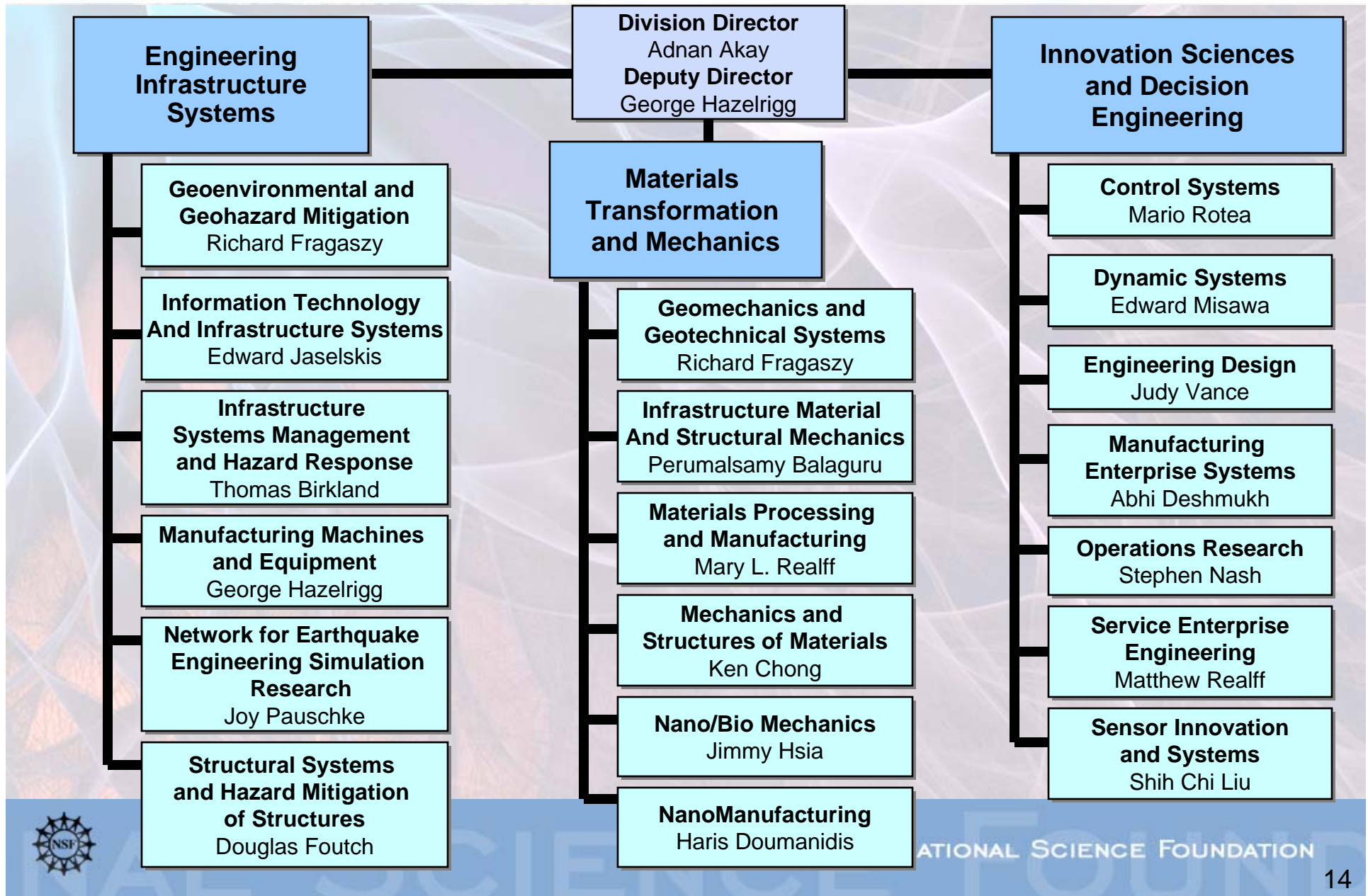
FY 2007



Chemical, Bioengineering, Environmental, and Transport Systems



Civil, Mechanical, and Manufacturing Innovation



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
Olofemi 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
Vacant

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

Integrative, Hybrid and Complex Systems

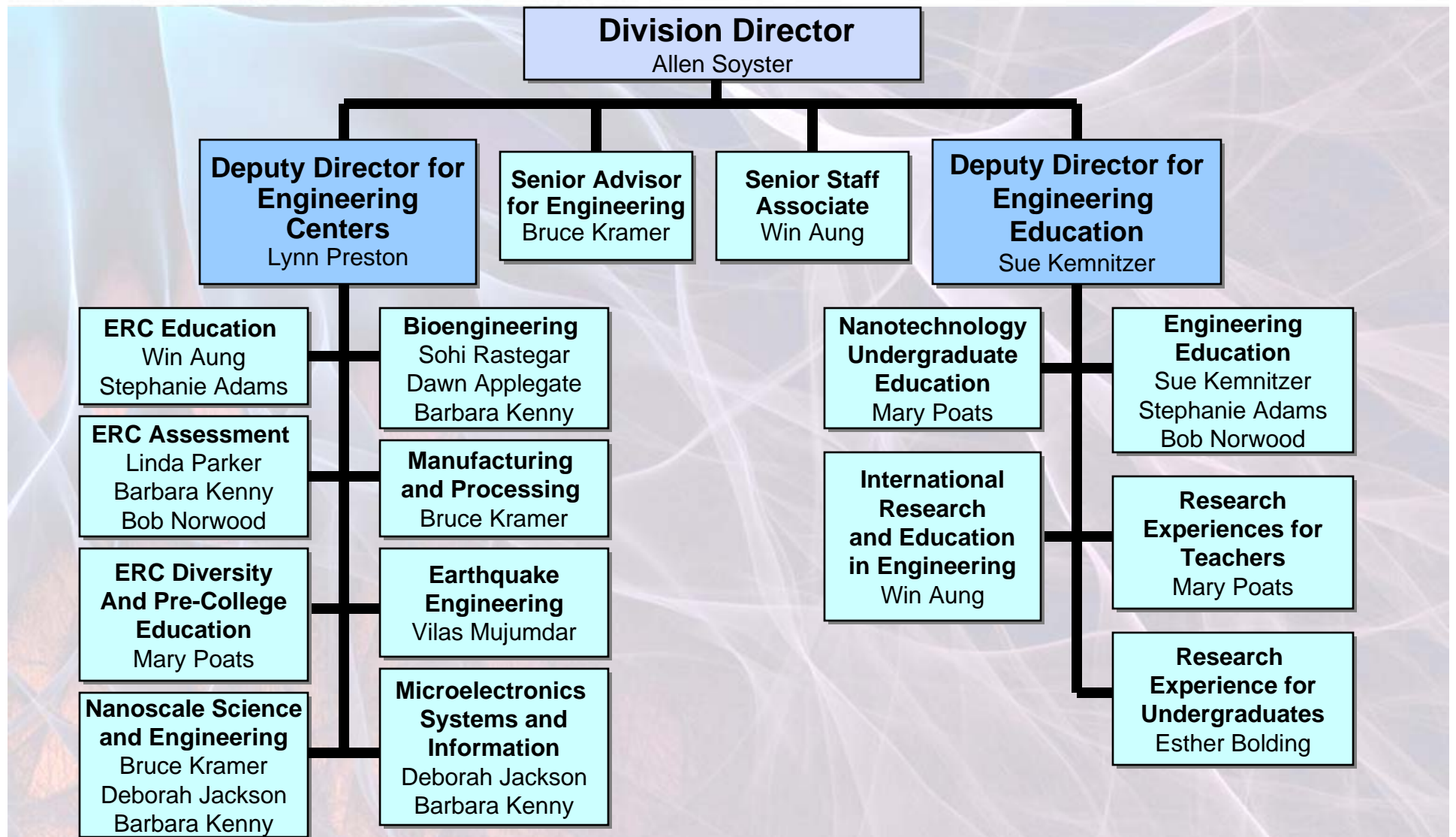
RF and Optical Wireless and Hybrid Communications Systems; Inter and Intra-chip Communications ; Mixed Signals
Leda Lunardi

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

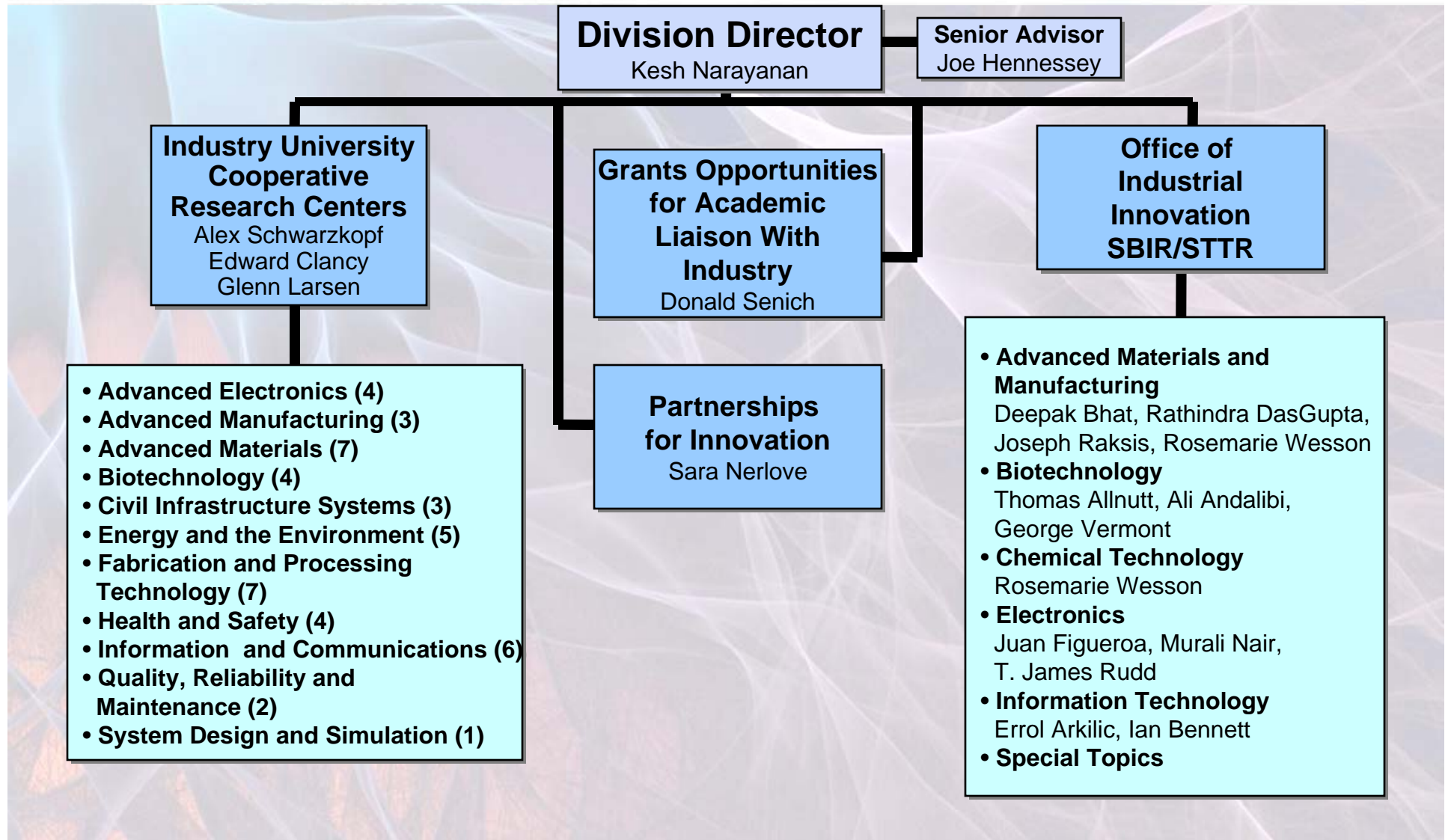
Cybersystems; Signal Processing
Scott Midkiff



Engineering Education and Centers



Industrial Innovation and Partnerships



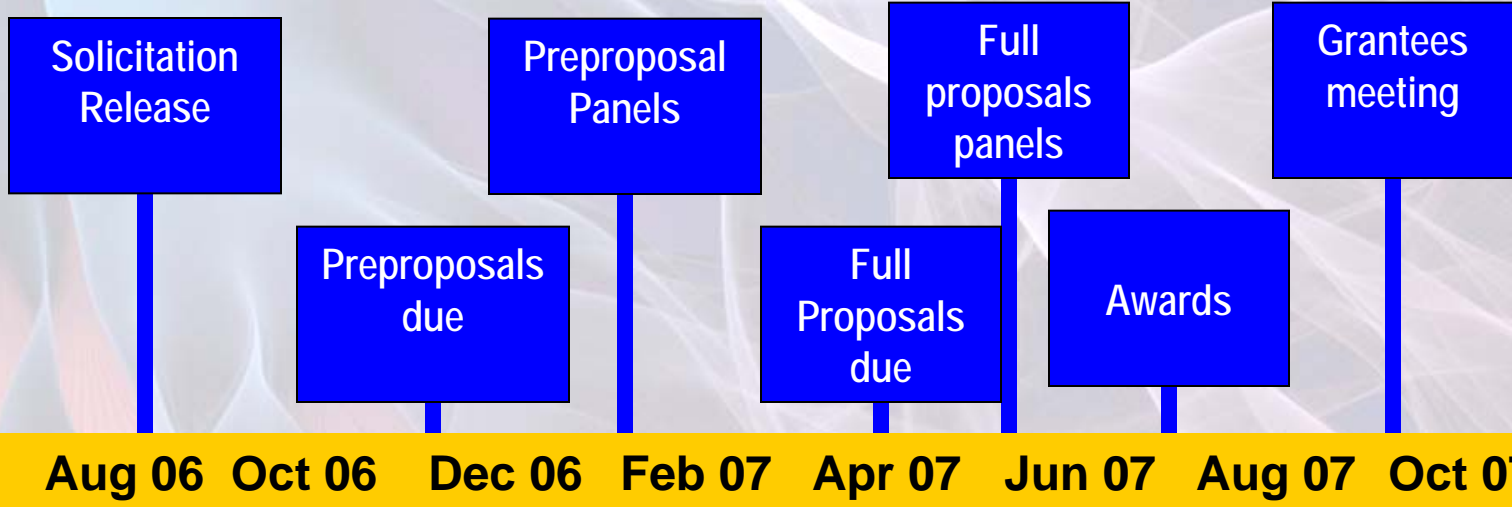
EFRI Office

- **EFRI will support higher risk, higher payoff opportunities leading to:**
 - ◆ **new research areas for NSF, ENG, and other agencies**
 - ◆ **new industries/capabilities resulting in a leadership position**
 - ◆ **significant progress on advancing a “grand challenge”**
- **Successful topics would likely require:**
 - ◆ **small- to medium-sized interdisciplinary teams**
 - ◆ **the necessary time to demonstrate substantial progress and evidence for follow-on funding through other established mechanisms**
- **The current investment for EFRI totals \$25 million for 4-year awards at \$500k per year.**



EFRI Timeline

FY 2006- 2007

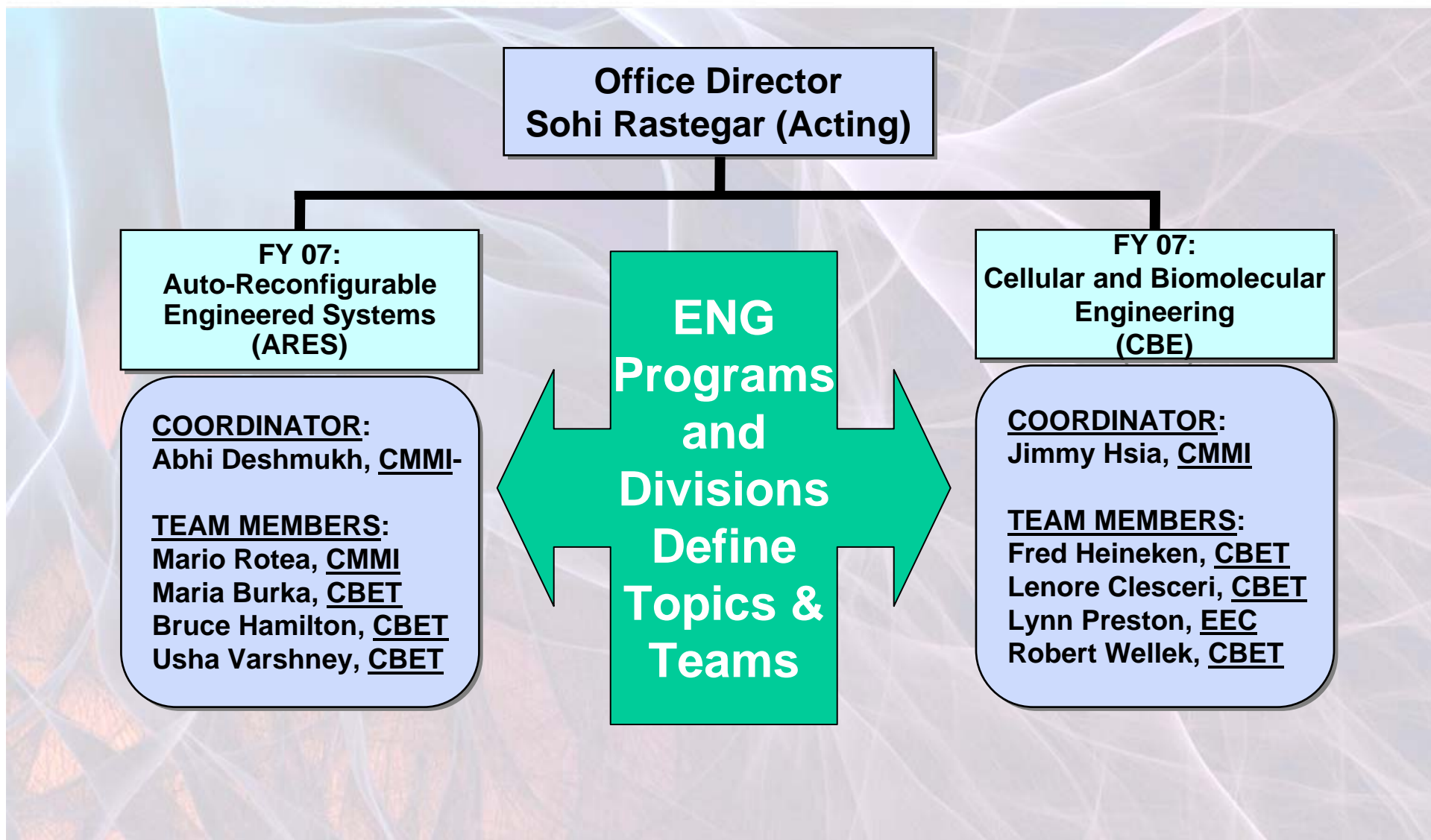


FY 2007- 2008



Emerging Frontiers in Research and Innovation

FY07



Recent Solicitations

→ Posted

- ◆ **Engineering Research Centers – NSF 07-521, posted November 13, 2006**
- ◆ **Grant Opportunities for Academic Liaison with Industry – NSF 07-522, posted November 13, 2006**
- ◆ **Major Research Instrumentation Program – NSF 07-510, posted October 26, 2006**

→ Forthcoming

- ◆ **Sensors and Related Research – See “Sensors Research” in the FY 2007 Request located at www.nsf.gov/about/budget/fy2007/toc.jsp**



Questions

