

**Chemical, Bioengineering, Environmental,
and Transport Systems (CBET) Division**

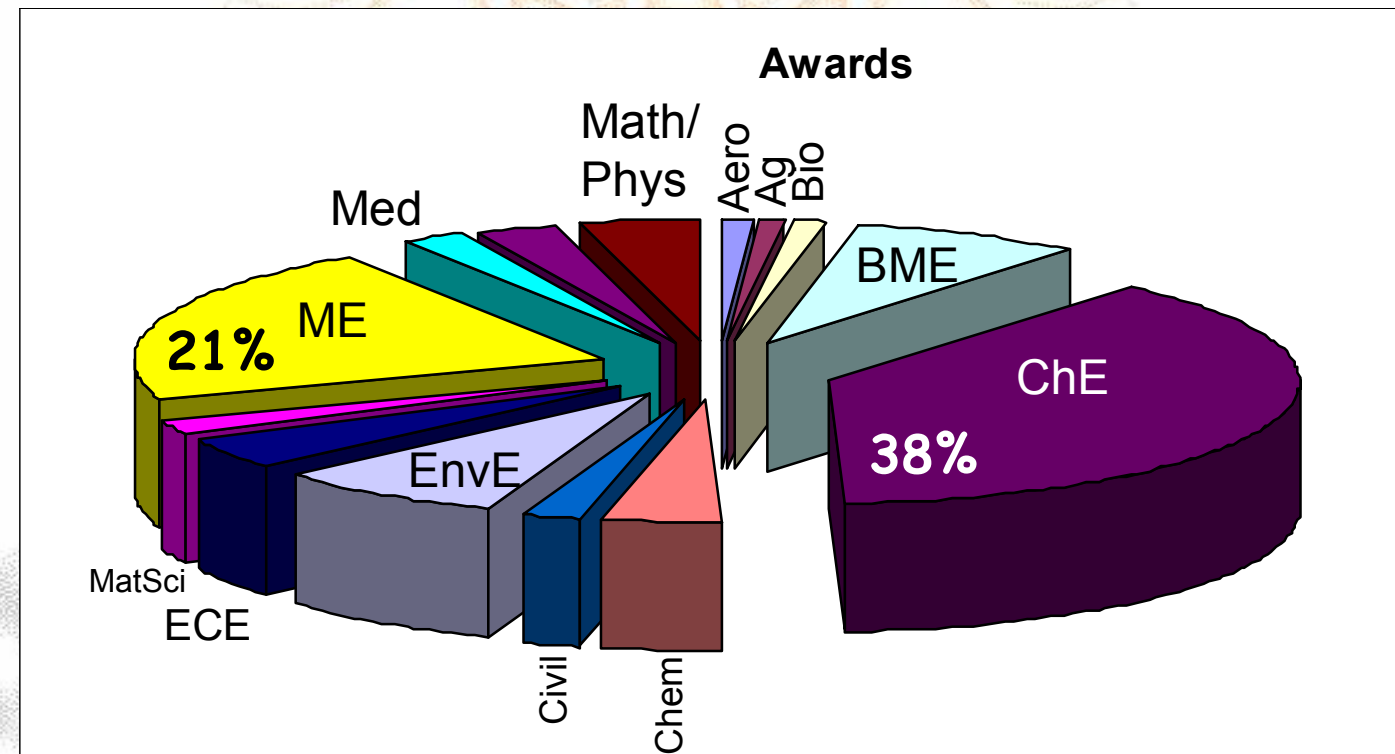
National Science Foundation
Directorate for Engineering

John J. McGrath
Division Director

ASEE ERC
March 16, 2010



CBET Serves a Diverse Community



- Dominated by ChE & ME
- Significant BME & Environmental
- Chemistry (MPS), Math/Physics (MPS), ECE (ECCS)

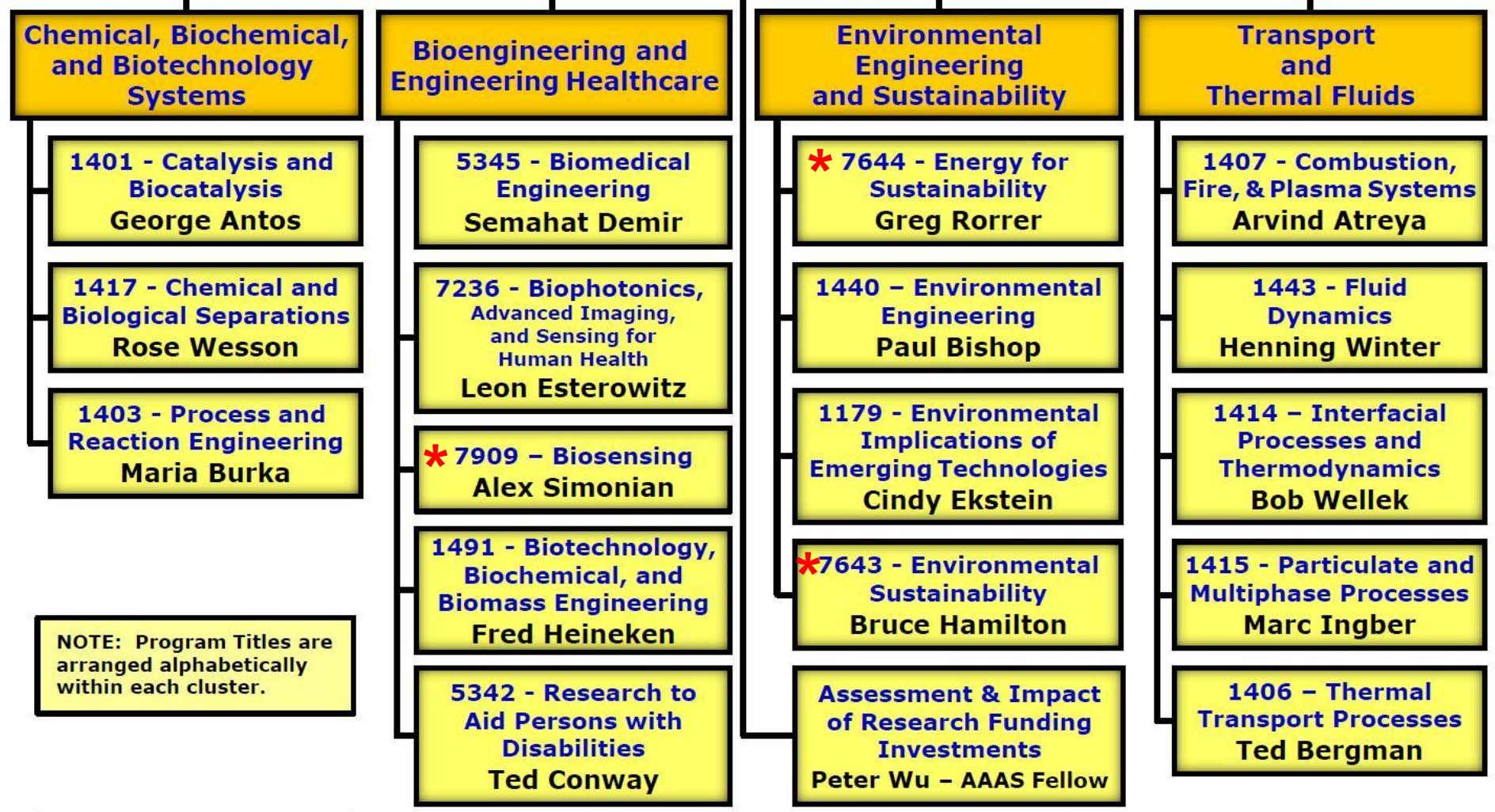


National Science Foundation | Directorate for Engineering
**Chemical, Bioengineering, Environmental,
and Transport Systems Division (CBET)**

Deputy Division Director
Bob Wellek

Division Director
John McGrath

Senior Advisor
Marshall Lih





CBET Research Cluster:

Chemical, Biochemical & Biotechnology Systems

- ***Research aimed at processing and manufacture of products of economic importance by effectively utilizing chemical resources and renewable resources of biological origin.***

- ***Supporting programs***
 - ◆ ***Catalysis & Biocatalysis***
 - ◆ ***Chemical & Biological Separations***
 - ◆ ***Process & Reaction Engineering***



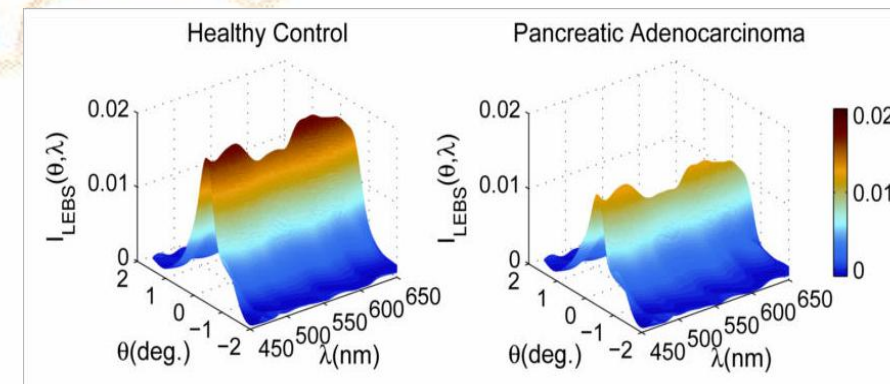
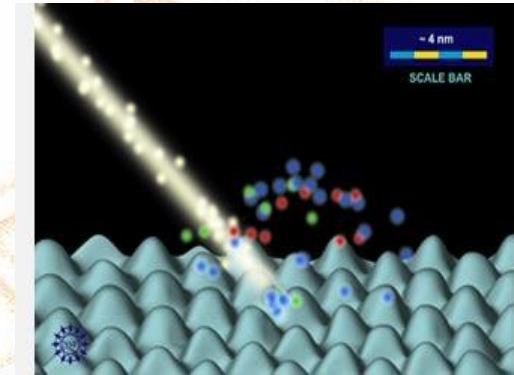


CBET Research Cluster: Bioengineering & Engineering Healthcare

→ ***Research at the interface of engineering and life science aimed at improving healthcare.***

→ ***Supporting programs***

- ◆ ***Biomedical Engineering***
- ◆ ***Biophotonics***
- ◆ ***Biosensing***
- ◆ ***Biotechnology, Biochemical and Biomass***
- ◆ ***Research to Aid Persons with Disabilities***



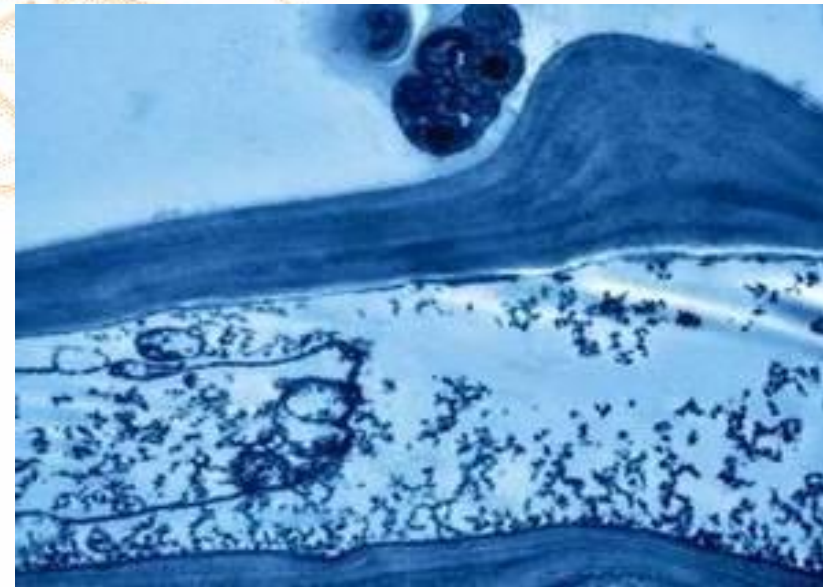
Backman, Northwestern



CBET Research Cluster: Environmental Engineering & Sustainability

- ***Research on innovative biological, chemical, and physical processes used alone or as components of engineered systems to restore the usefulness of polluted land, water, and air resources. Nanotechnology and health.***

- ***Supporting programs***
 - ◆ *Energy for Sustainability*
 - ◆ *Environmental Engineering*
 - ◆ *Environmental Implications of Emerging Technologies*
 - ◆ *Environmental Sustainability*



Ke, Clemson

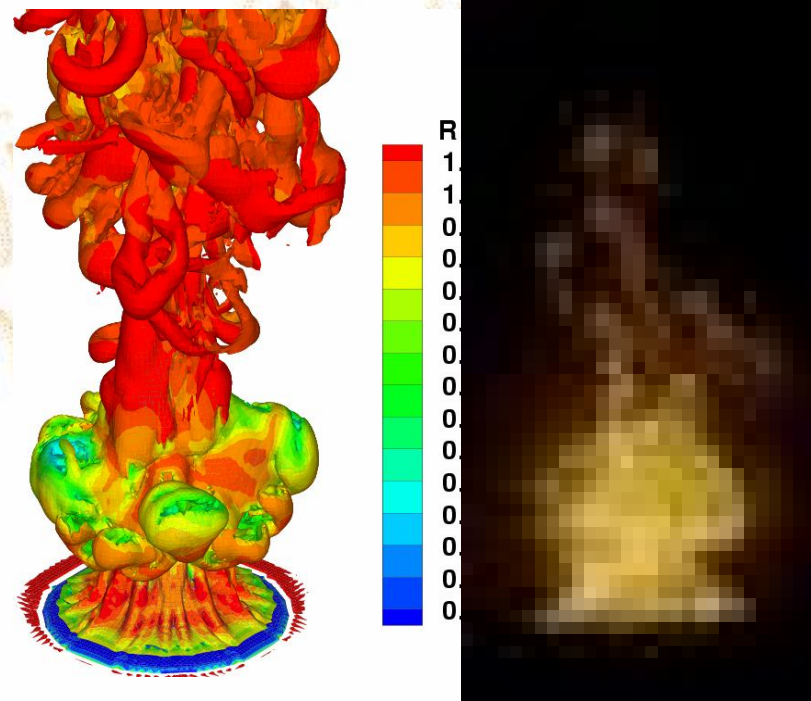


CBET Research Cluster: Transport & Thermal Fluids

→ ***Supports fundamental advances in transport processes enabling new technological solutions to understand pressing issues in energy, the environment, manufacturing, health care, and other fields.***

→ ***Supporting programs***

- ***Combustion, Fire & Plasma Systems***
- ***Fluid Dynamics***
- ***Interfacial Processes & Thermodynamics***
- ***Particulate & Multiphase Processes***
- ***Thermal Transport Processes***



Desjardin, SUNY Buffalo



Emphasize Four Thematic Research Areas

- ◆ Energy, Water, Environment & Sustainability
- ◆ Integration of Life Sciences with Engineering
- ◆ Nano-scale Science and Engineering
- ◆ Systems & Multi-Scale Modeling Engineering



Future Directions

Examples of Broad Opportunities

Sustainable Systems: Energy, Water, Environment

- Renewable Energy, Water, Climate Change
- Bio-Economy
- Partnerships with DOE, EPA

Healthcare

- Neural Engineering, Cellular & Tissue Engineering
- Minimally Invasive Diagnostics & Therapeutics
- Exo-skeletal Robotics, Sensory Organ Augmentation
- Health Effects of Nano-materials
- Partnerships with NIH, FDA

Materials & Manufacturing



Water Sustainability & Climate (WSC)

- BIO, ENG, GEO, SBE
- Three Categories:
 - Exploratory, Incubation Grants
 - Place-based Observational and Modeling Studies
 - Synthesis & Integration Grants
- \$16M Anticipated
- 8-14 Awards Anticipated
- Letter of Intent Due March 15, 2010
- Full Proposal Due April 15, 2010



NSF/FDA Scholar-In-Residence

Interagency partnership for the investigation of scientific and engineering issues concerning emerging trends in medical device technology.

Enable investigators in science, engineering, and mathematics to develop research collaborations within the intramural research environment at the FDA.

Four flexible mechanisms for support of research at the FDA: 1) Faculty at FDA; 2) Graduate Student Fellowships; 3) Postdoctoral Fellowships; and, 4) Undergraduate Student Research Experiences.

Number of Awards Anticipated: 3 to 10

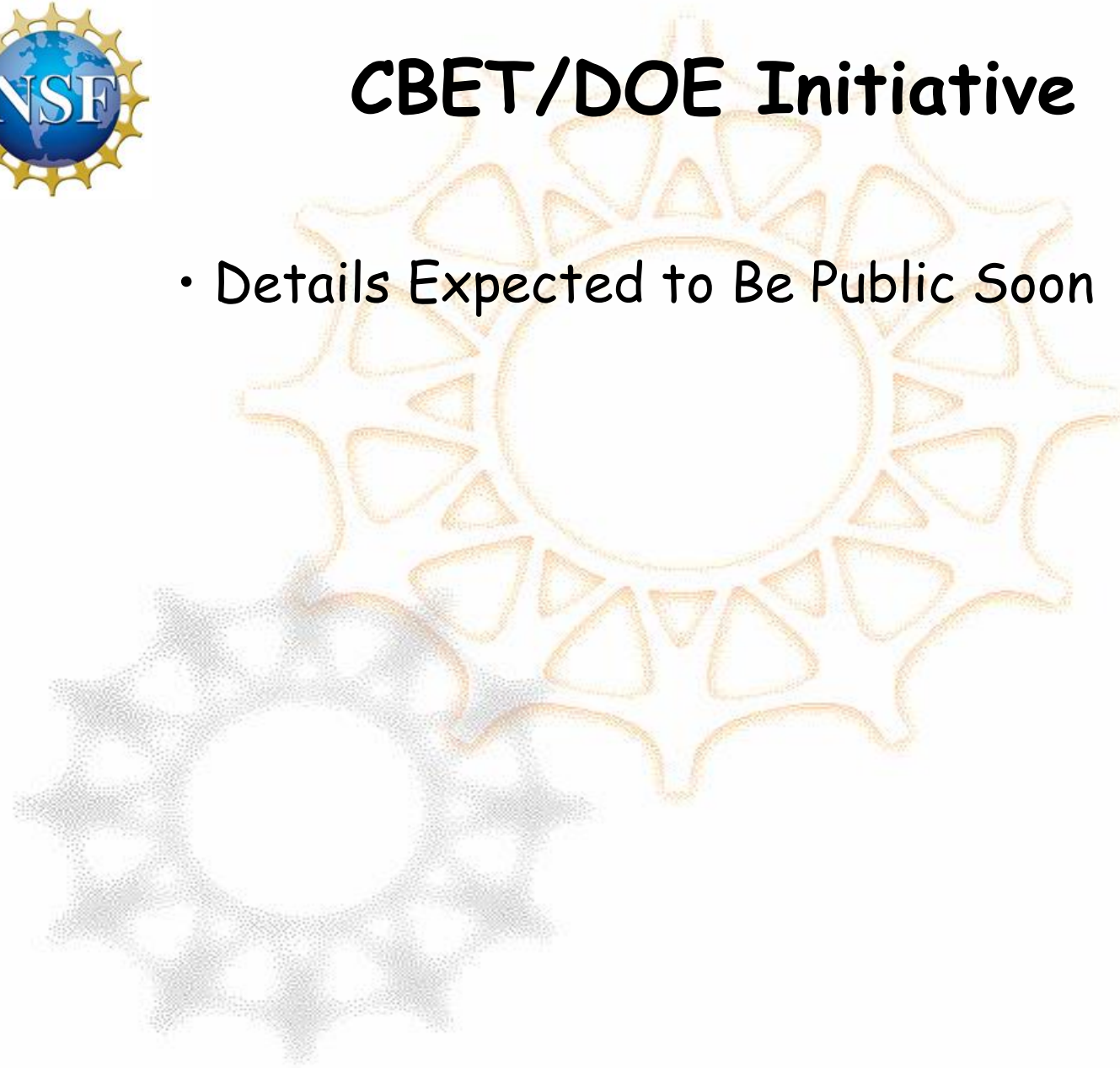
Funding Anticipated: \$500,000

Due Dates: April 27, 2010; March 15, 2011; March 15, Annually
Thereafter



CBET/DOE Initiative

- Details Expected to Be Public Soon





FY 2010 NSF Initiatives



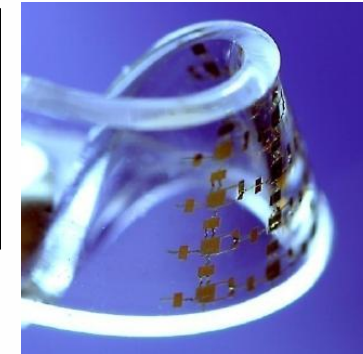
FY10 Budget Request to Congress

- Cyber-enabled Discovery and Innovation (CDI)
- Science and Engineering Beyond Moore's Law (SEBML)
- National Nanotechnology Initiative (NNI)
- RE-ENERGYSE
- Graduate Research Fellowships (GRF)
- CAREER Awards
- Broadening Participation
- Science & Technology Centers (STCs)
- Transformative Interdisciplinary Research

- Climate Change Science Program
- Climate Research
- Networking and Information Technology R&D



FY 2011 NSF Initiatives



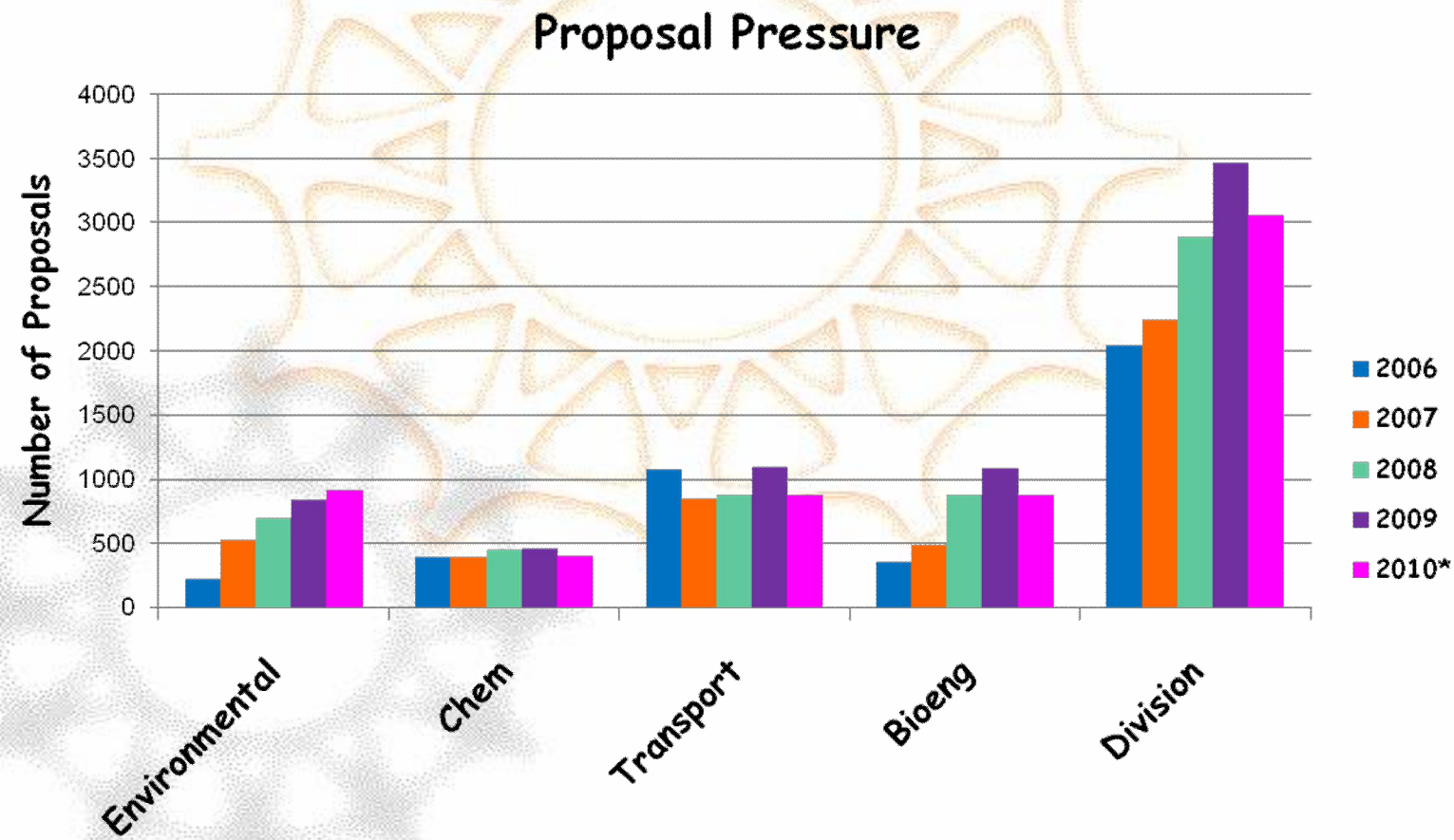
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- RE-ENERGYSE
- Graduate Research Fellowships (GRF)
- CAREER Awards
- Broadening Participation

- Transformative Interdisciplinary Research- National Interests
 - Bio-Economy & Advanced Manufacturing (Cyber-Physical Systems)
- National Nanotechnology Initiative (NNI)
 - Nano-manufacturing & Nano-Environmental Health and Safety
- Science, Engineering and Education for Sustainability (SEES)
- Innovation



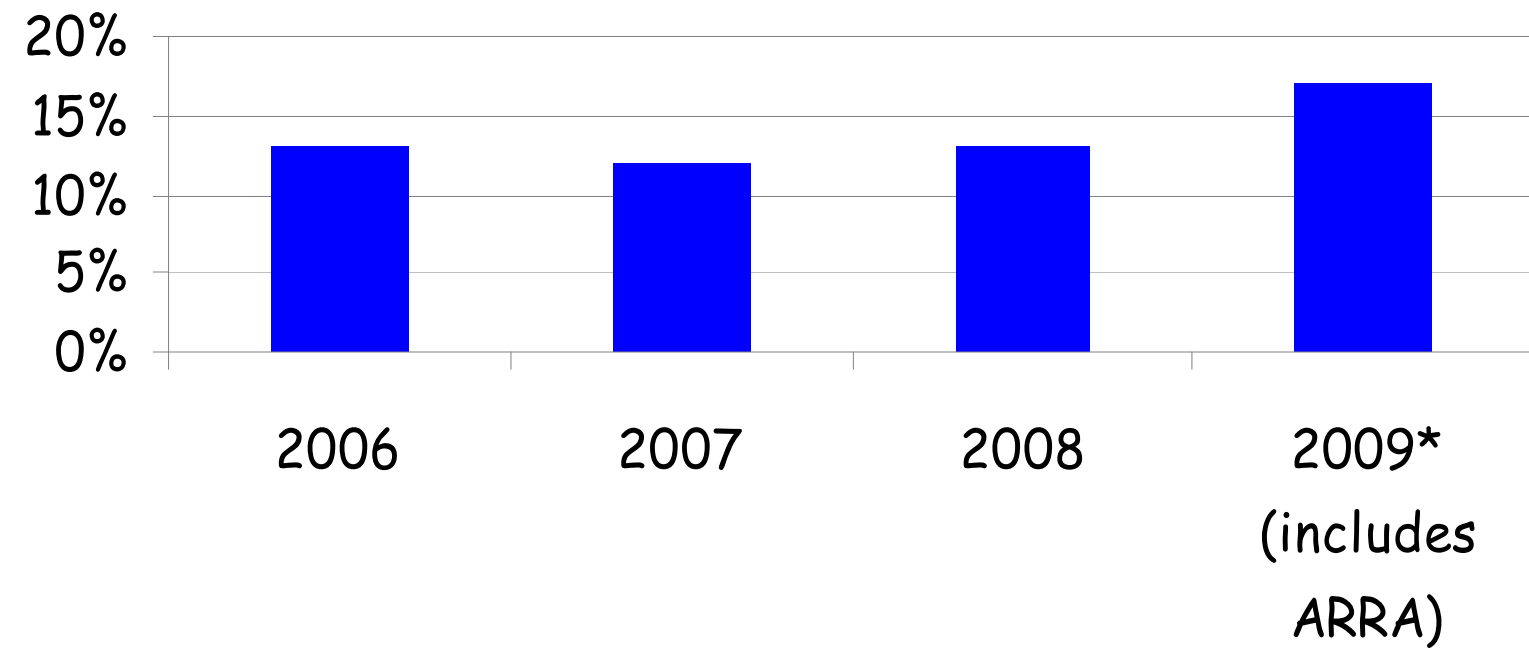
Growth in CBET Has Been in Environmental & Bioengineering





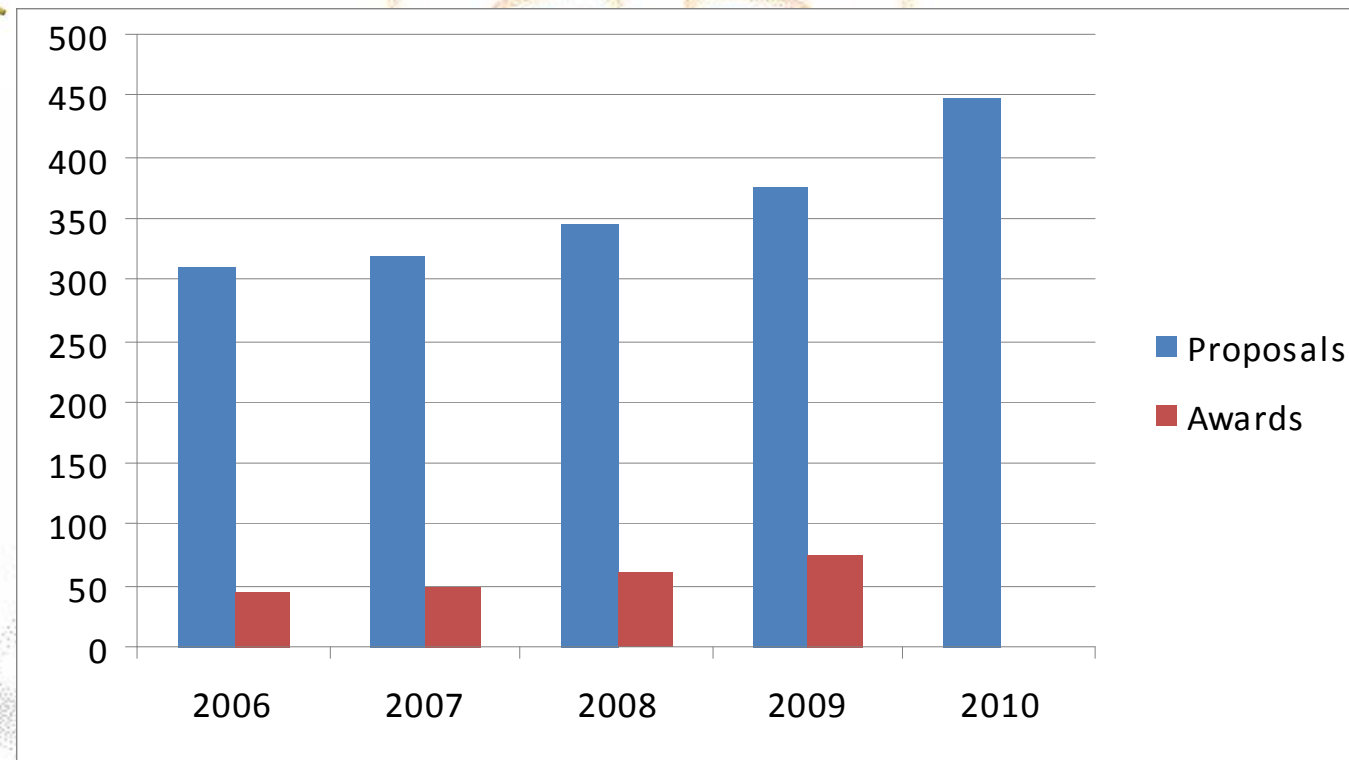
CBET Funding Rate Comparison for Research Awards

Funding Rate





CBET CAREER Data



	2006	2007	2008	2009	2010
Proposals	310	320	346	376	448
Awards	44	49	60	74	
Success Rate	14%	15%	17%	20%	



Thank You



ENG Budget (\$M)

	FY 2009 Omnibus Actual	FY 2009 ARRA Actual	FY 2010 Estimate	FY 2011 Request	Change over FY 2009 Omnibus		Change over FY 2010 Estimate	
					Amt	%	Amt	%
CBET	\$146.00	\$60.57	\$156.82	\$169.07	\$23.07	15.8	\$12.25	7.8%
CMMI	174.93	57.96	188.00	206.50	31.57	18.0	18.50	9.8
ECCS	87.21	45.57	94.00	103.00	15.79	18.1	9.00	9.6
EEC	118.23	32.18	124.11	138.40	20.17	17.1	14.29	11.5
IIP	112.12	54.70	152.00	177.70	65.58	58.5	25.70	16.9
<i>SBIR/STTR</i>	<i>90.39</i>	<i>49.91</i>	<i>125.77</i>	<i>142.86</i>	<i>52.47</i>	<i>58.0</i>	<i>17.09</i>	<i>13.6</i>
EFRI	26.50	14.00	29.00	31.00	4.50	17.0	2.00	6.9
ENG TOTAL	\$664.99	\$264.99	\$743.93	\$825.67	\$160.68	24.2%	\$81.74	11.0%