



National Science Foundation

Matthew S. Platz, Division Director, CHE

Linda S. Sapochak, Program Director, DMR

John McGrath, Division Director, CBET

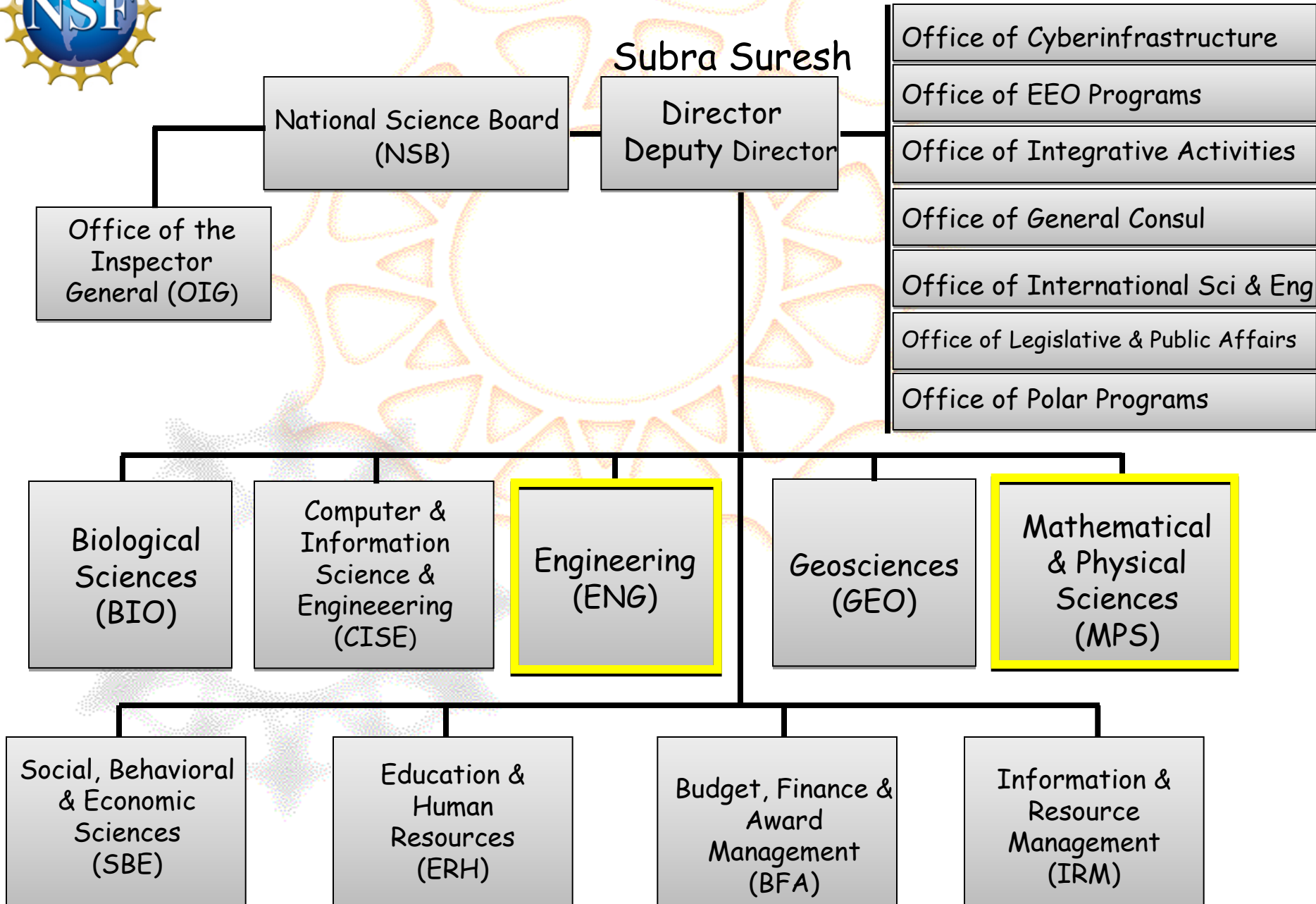
Overview

Council for Chemical Research

May 1-3, 2011



National Science Foundation

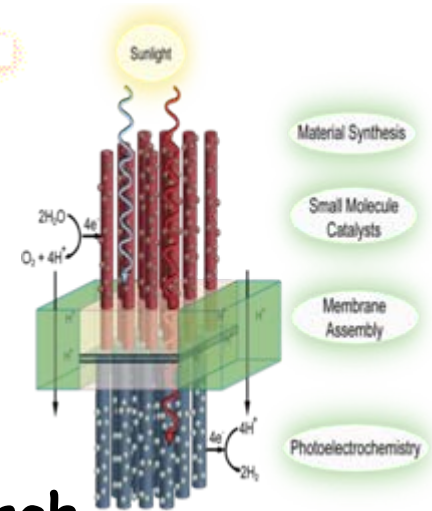




NSF FY12 Budget Priorities

SEES: Science, Engineering and Education for Sustainability

- RCN- Research Coordination Networks
- SRN- Sustainability Research Network
- SEP- Sustainable Energy Pathways
- PIRE- Partnerships for International Research & Education
- Post-Doc support



NSF: \$998M

<http://www.nsf.gov/sees>

NSF-Wide Investment

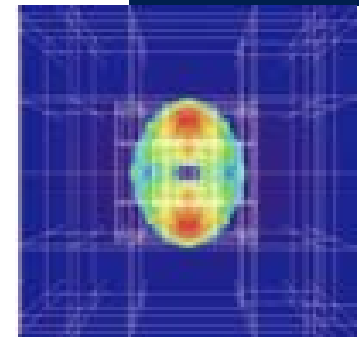
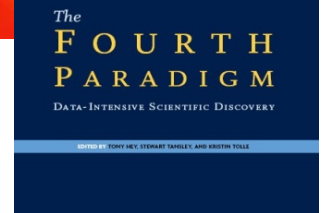
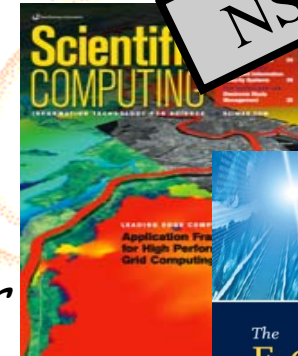


NSF FY12 Budget Priorities

CIF21: Cyberinfrastructure Framework for 21st Century Science and Engineering

NSF: \$117M

- Cyberinfrastructure to transform research, innovation and education
- Coherent program building on other CI investments across NSF
 - *eXtreme Digital (XD), Software Infrastructure for Sustained Innovation(SI2)*
- Four major components
 - ◆ *Data-enabled science*
 - ◆ *New computational infrastructure, including "matter-by-design"*
 - ◆ *Community research networks*
 - ◆ *Access and connections to cyberinfrastructure facilities*





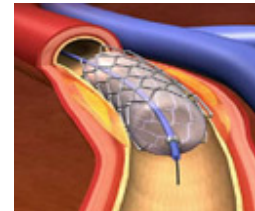
NSF FY12 Budget Priorities

BioMaPS: Biological, Mathematical, Physical Sciences and Beyond

Research at the interface between BIO, MPS, and ENG

- Renewable fuels; bio-based materials; bio-imaging; supports SEES and Advanced Manufacturing activities
- Computational modeling for visualizing the geometrical structure of photosynthetic vesicles
- Improved mathematical models for blood vessel stents lead to a better stent with less chance of buckling
- Sandfish swimming in sand inform studies of motion in granular media

NSF: \$76M





Directorate for Mathematical & Physical Sciences (MPS)

Mathematical and Physical Sciences
(MPS) Director - Edward Seidel

Division of
Astronomical
Sciences
(AST)

James S. Ulvestad

Division of
Chemistry
(CHE)
Matthew S.
Platz

Division of
Materials
Research
(DMR)
Ian Robertson

Division of
Mathematical
Sciences
(DMS)
Sastry Pantula

Division of
Physics
(PHY)
Joseph L. Dehmer

Office of Multidisciplinary Activities (OMA)



NSF Division of Chemistry (CHE)

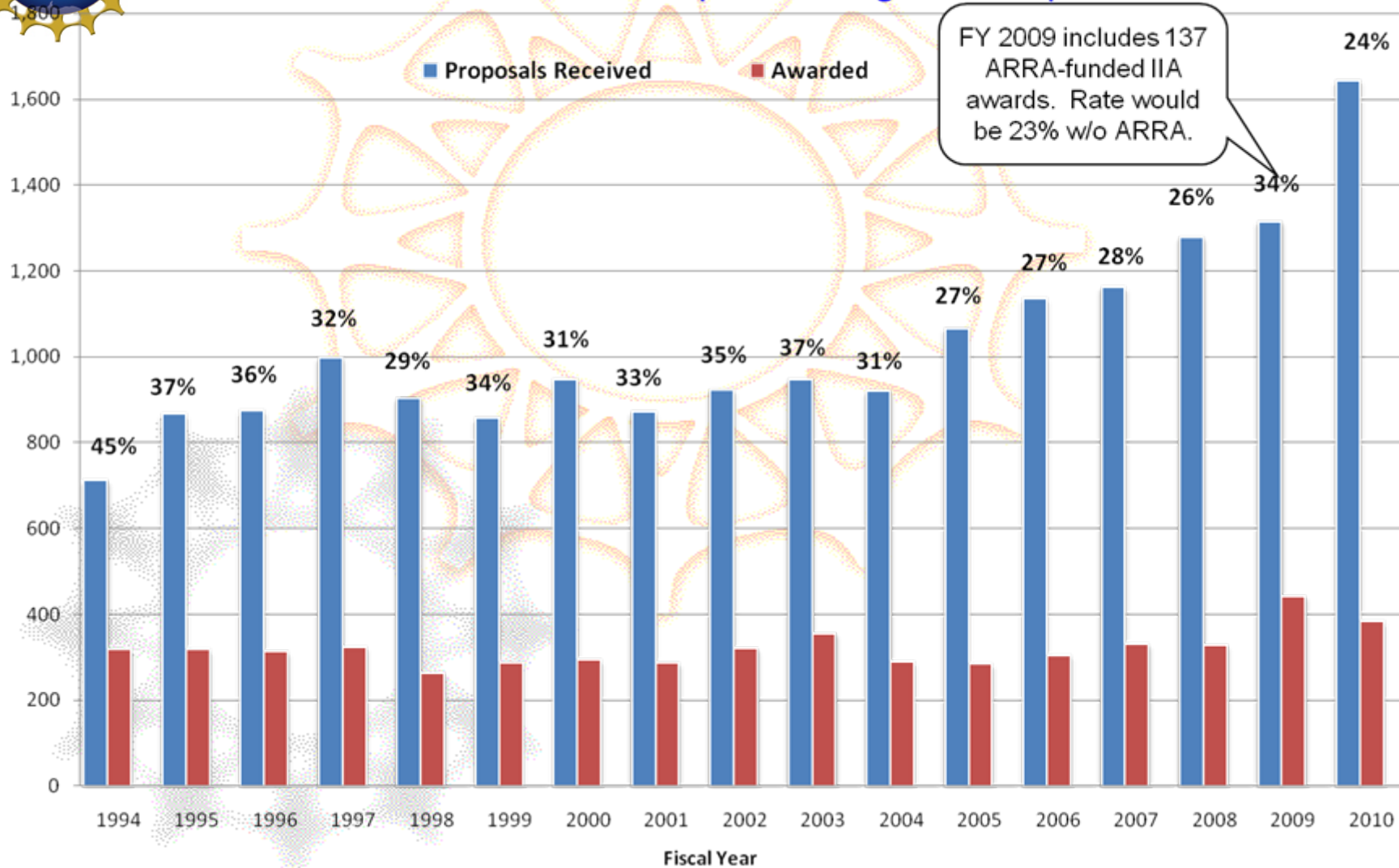
**Matthew S. Platz
The Ohio State University
and
The NSF Division of Chemistry**



Individual Investigator Awards FY10	SUBMITTED	FUNDED	AWARD Rate, FY10
CAREER	224	43	19.2%
RENEWAL	256	138	53.9%
PRIOR	43	19	44.2%
NEW	1345	227	16.9%
TOTAL	1644	384	23.4%



Competitive Research Awards and Proposals Division of Chemistry, IIA Programs Only





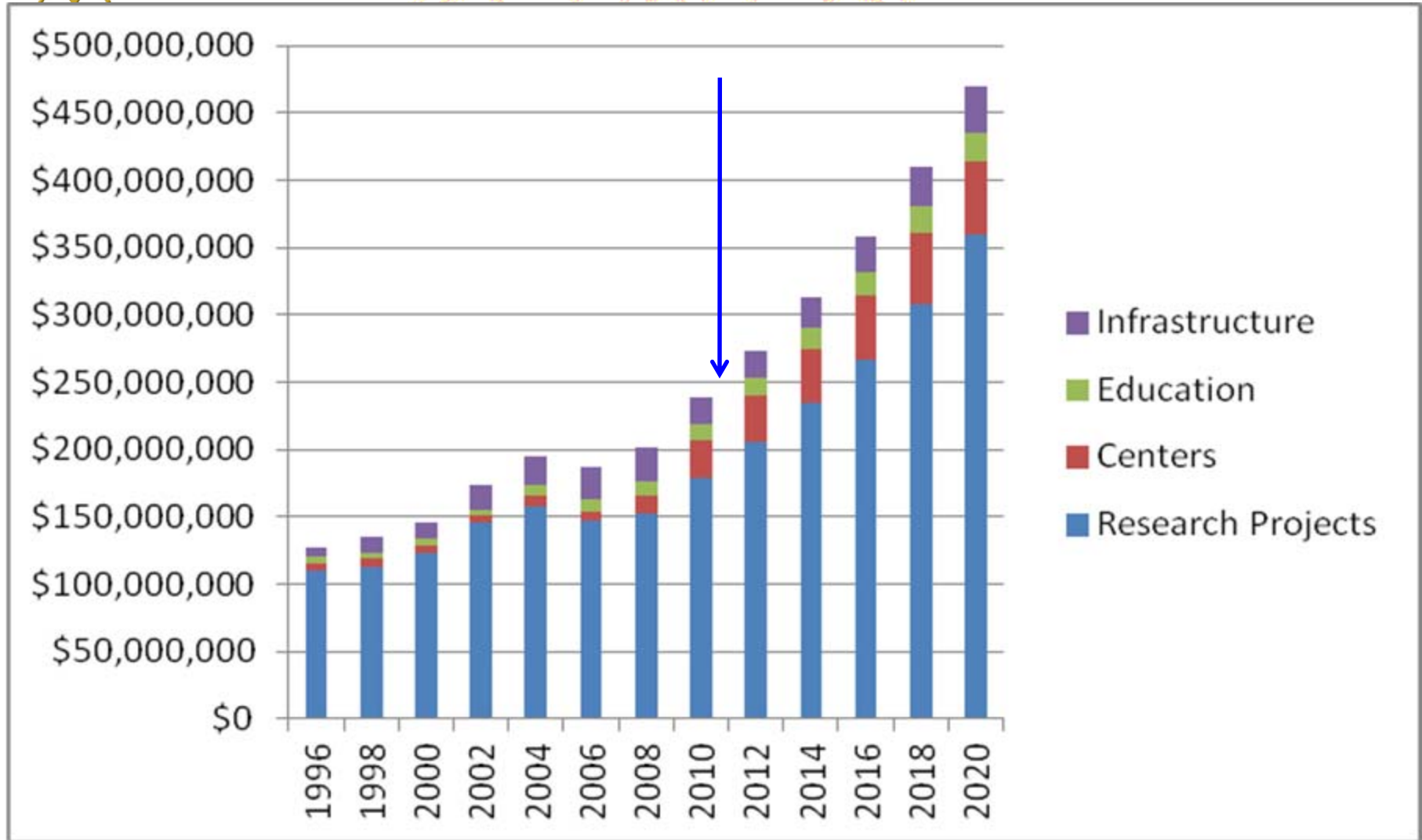
IIA Submission Windows

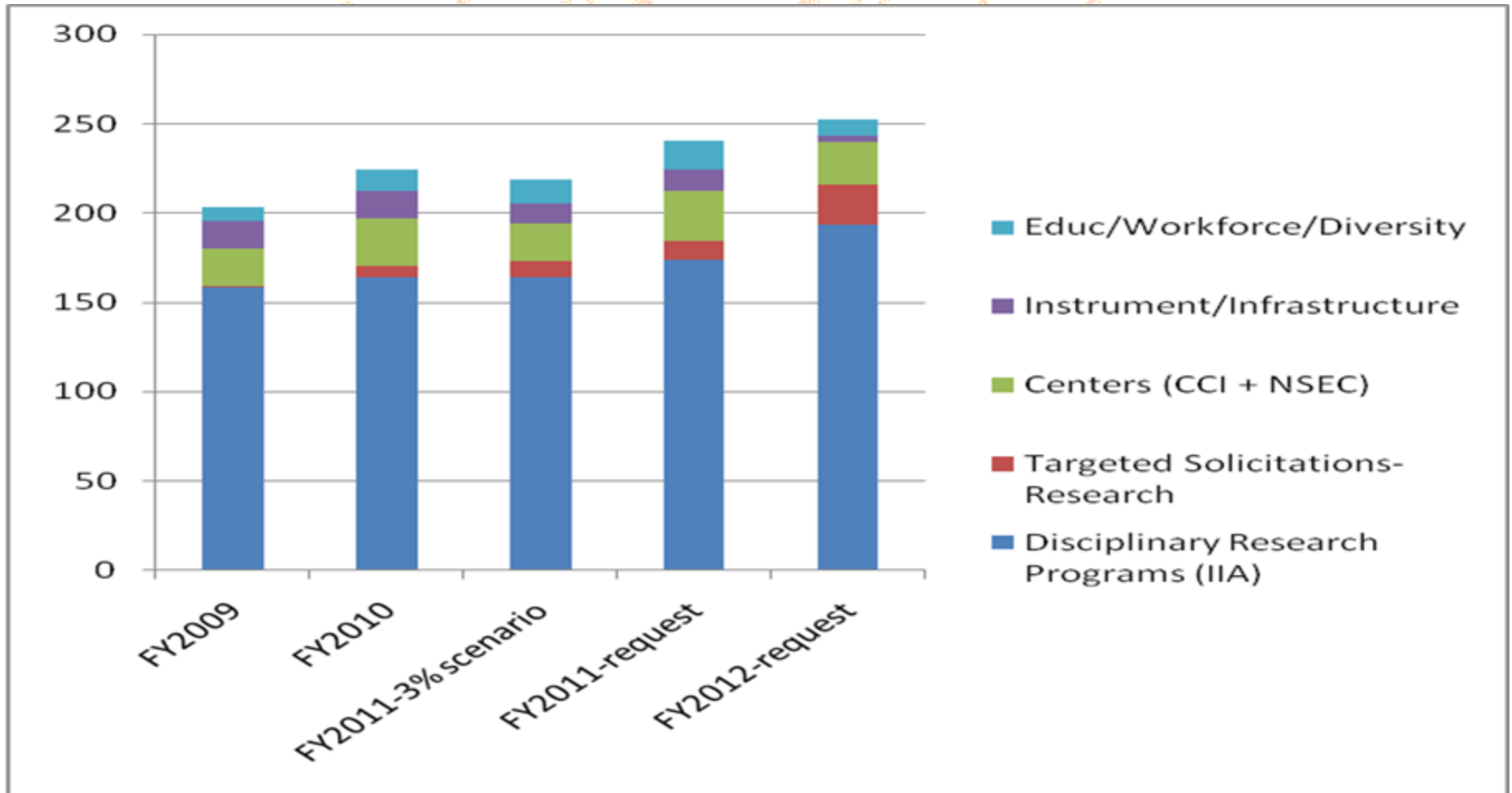
Now: July and November

Future: Summer Only? (2012)



How CHE Allocates Dollars







Science, Engineering and
Education for
Sustainability
(SEES)

<http://www.nsf.gov/sees/>



AMERICA COMPETES ACT

SEC. 509. SUSTAINABLE CHEMISTRY BASIC RESEARCH

The Director shall establish a Green Chemistry Basic Research program to award competitive, merit-based grants to support research into green and sustainable chemistry which will lead to **clean, safe, and economical alternatives to traditional chemical products and practices.**



Division of Materials Research (DMR)

Linda S. Sapochak, Program Director
Solid State & Materials Chemistry

CCR MEETING 2011
Detroit, MI



Division of Materials Research



Ian Robertson
Division Director



Janice Hicks
Deputy Division Director

Offices and Centers

Office of Materials
Instrumentation and National
Facilities




Charles
Bouldin



Guebre X.
Tessema

Office of Special
Programs



Carmen
I. Huber


Individual Investigator Programs

Ceramics




Lynnette
Madsen

Electronic and Photonic
Materials



Nadia El-Masry




Z. Charles Ying

Polymers




Andrew
Lovinger

Biomaterials




Joseph
Akkara




David
Brant

Condensed Matter and
Materials Theory



Daryl Hess



Serdar Ogut

Materials Research Centers and Teams



Sean L.
Jones



Thomas P.
Rieker




Mary
Galvin

Metal and Metallic
Nanostructures




Alan Ardell

Condensed Matter
Physics



Daniele
Finotello



Jia Grace
Liu

Solid State and
Materials Chemistry



Linda
Sapochak

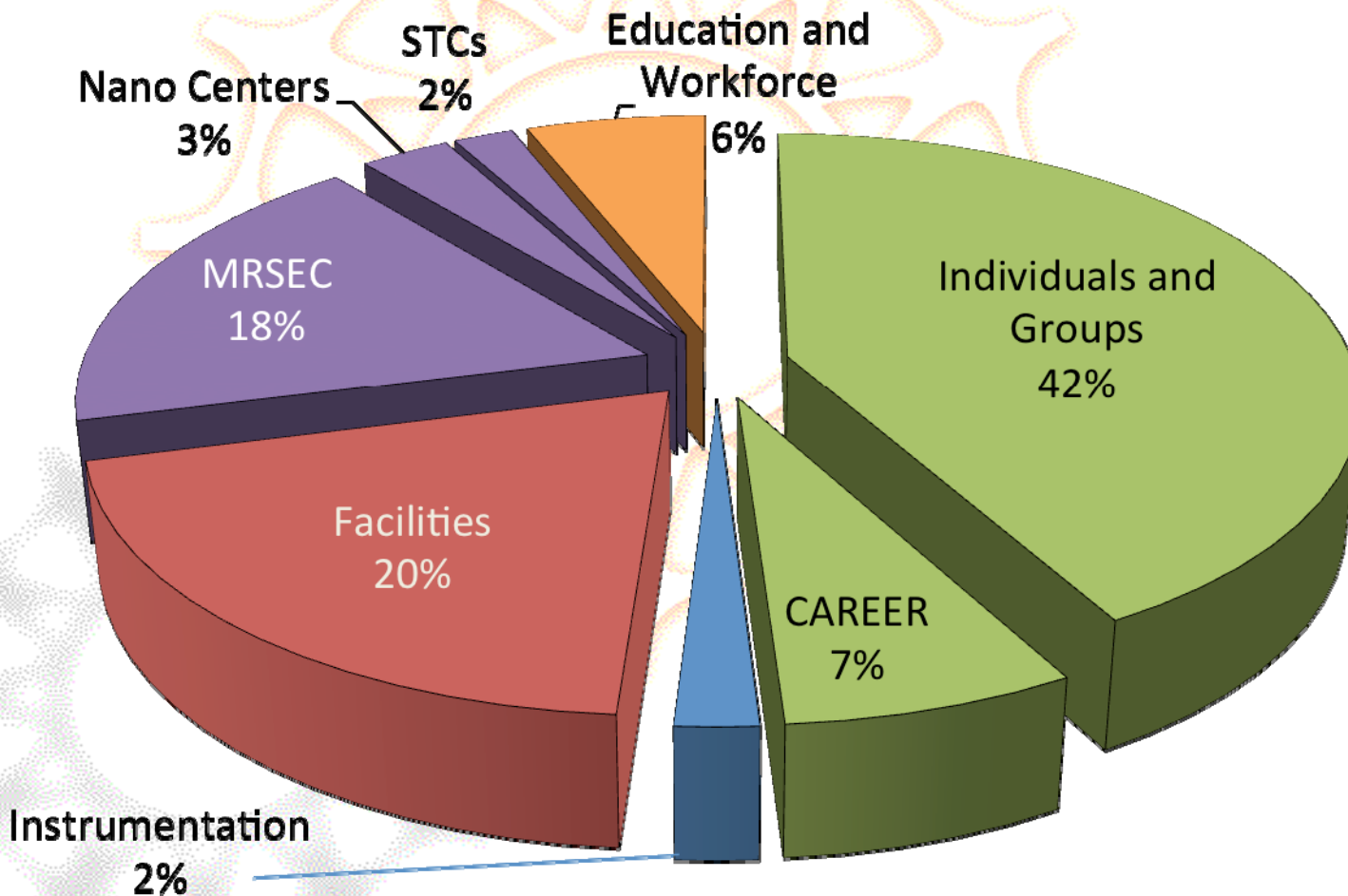


Michael
Scott

ONE proposal submission window for IIA Programs - Sept 1 - Oct 31.



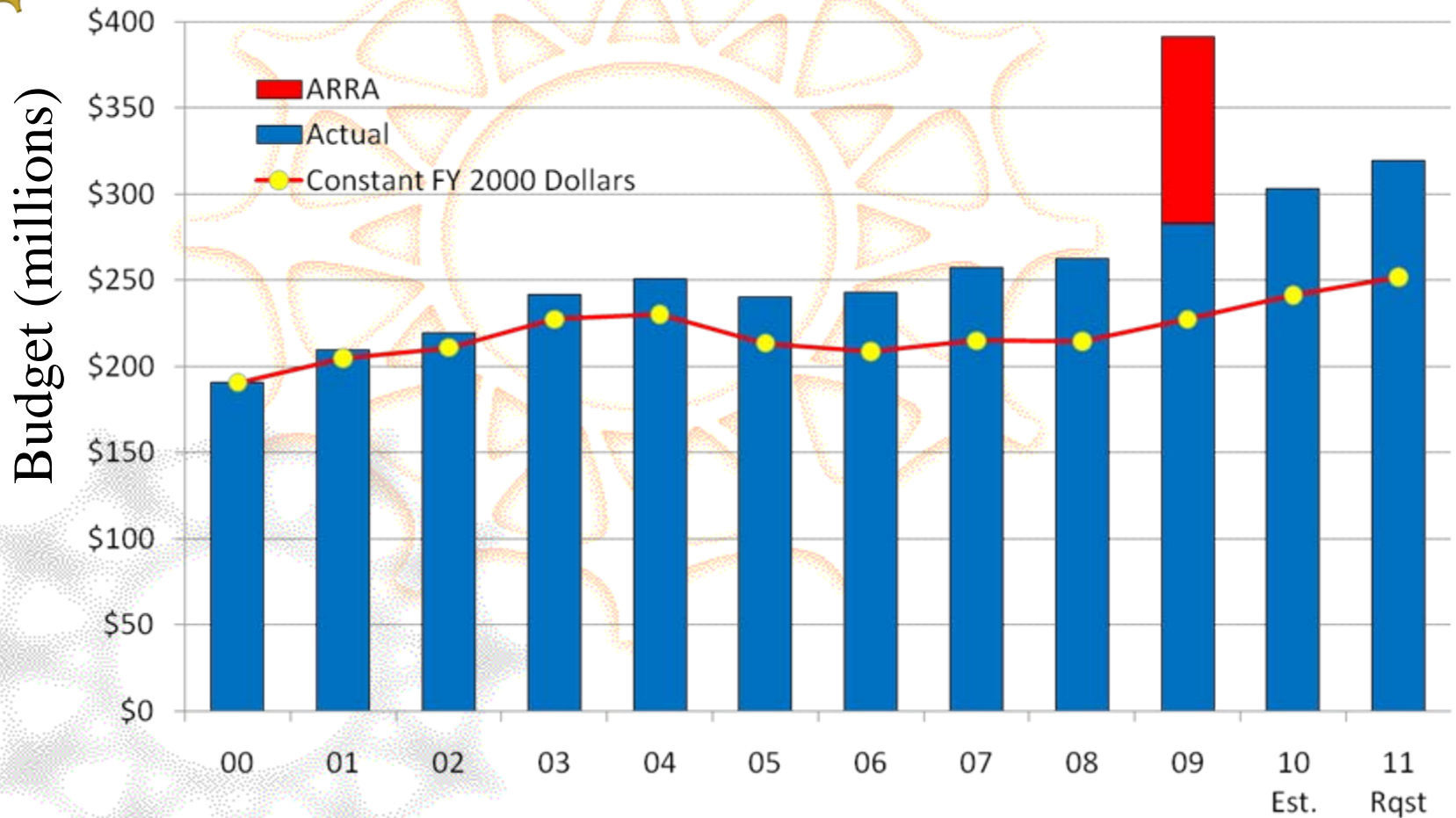
Allocation of resources within the Division of Materials Research, FY 10. Budget ~ \$300M



Major Research Instrumentation Program - MRI (FY 10)- \$16.1 M (5.6% of DMR budget and 18.9 % of total MRI budget). Note the percentage allocated is driven by proposal pressure!



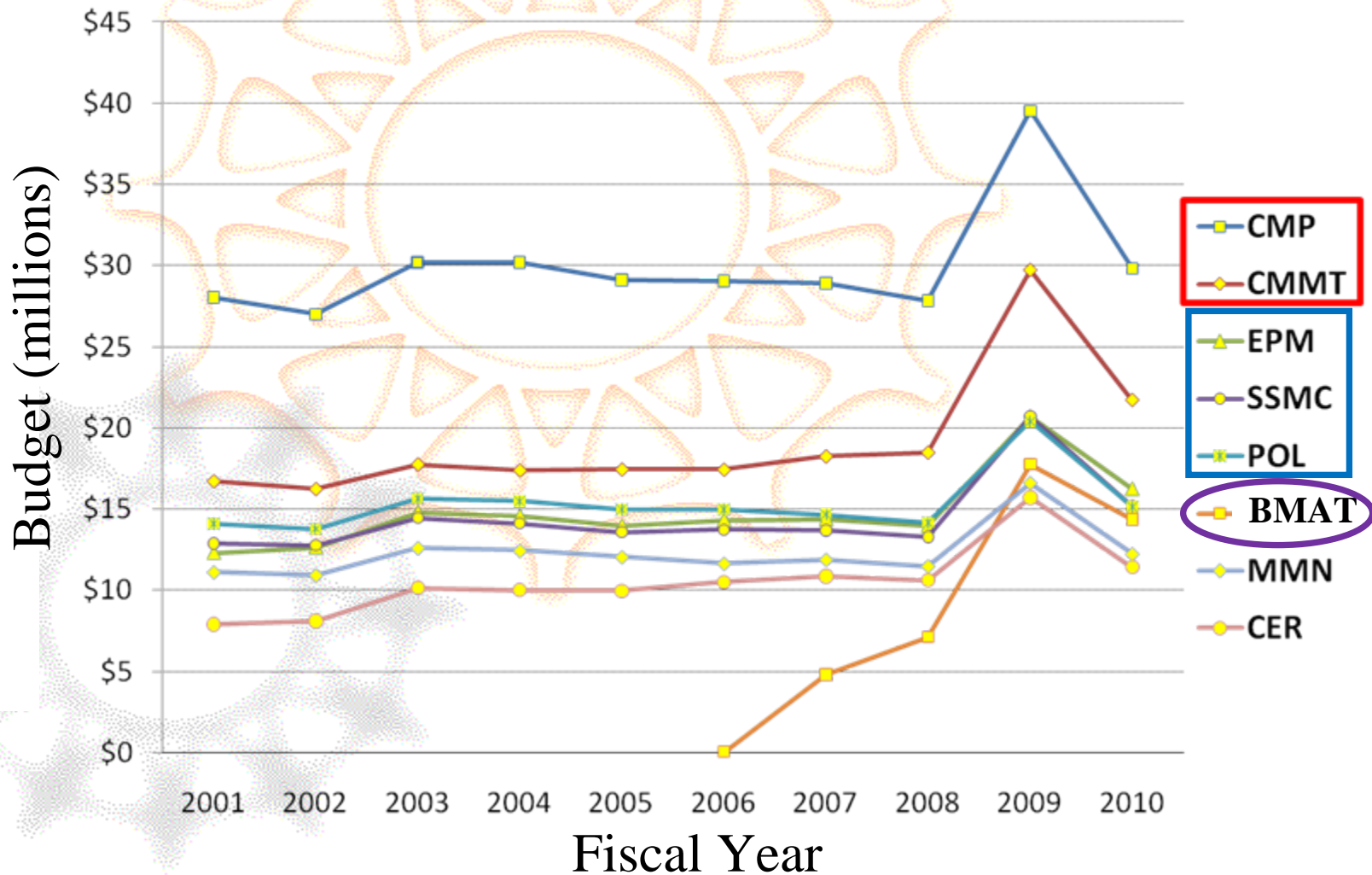
Funding Levels for Division of Materials Research 2000-2010



Constant FY 2000 dollars excludes ARRA funds



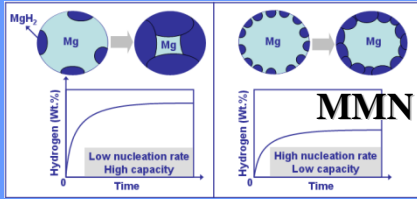
DMR Distribution by Individual Investigator Award Program (FY 2010)





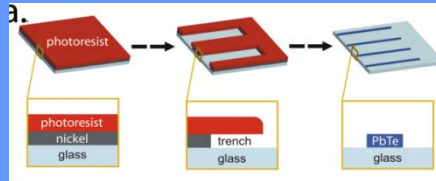
Energy Research in DMR

Hydrogen storage MgAl alloys



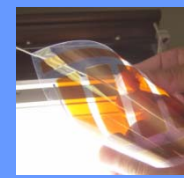
Ebrahimi/ Univ of Florida

Fabrication of thermoelectric nanowires (EPM)

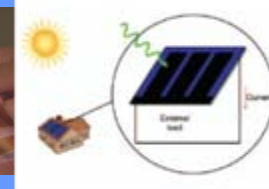


Penner / UC Irvine

Renewable Energy Materials Research Science and Engineering Center (MRSEC)
Craig Taylor, Colorado School of Mines



Flexible silicon solar cell

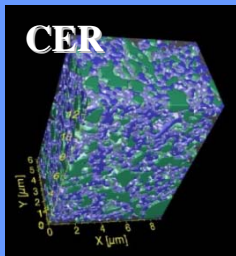


Roof-top Solar Panels



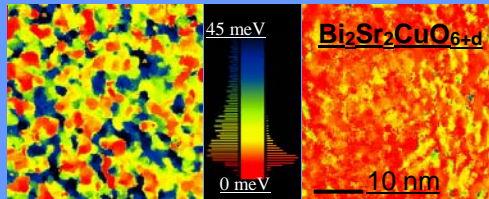
PV Power Plant Alamosa, CO

3D Imaging of Fuel Cell Cathodes



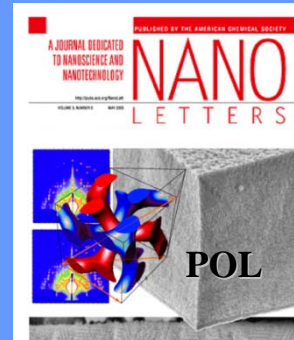
Barnett (Northwestern)
Thornton (Univ Michigan) Adler (Univ Washington)

CMP - Understanding High Tc Superconductivity



Hoffman / Harvard Univ

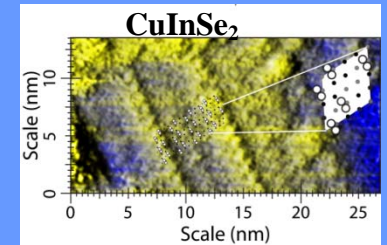
Block copolymer Gyroid structure, a solid-state dye-sensitized solar cell



Wiesner / Cornell University

EPM/MWN

Understanding structure of Solar Cells



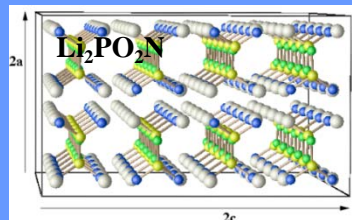
Angus Rockett / U of Illinois - UC

New battery cathode materials for implantable cardioverter defibrillators



Poepelmeier / Northwestern

CMMT - Simulation of battery electrolyte structure



Hozwarth / Wake Forest Univ

New emitters for Solid State Lighting



Zur Loye / U of South Carolina



DMR FY 12 Budget **Request** Activities

National Nanotechnology Initiative (NNI):

NNI Signature Initiatives:

Nanoelectronics for 2020 and Beyond,
Nanomanufacturing for Sustainable Development,
Nanotechnology for Solar Energy Collection and Conversion.

Science, Engineering, and Education for Sustainability (SEES):

<http://www.nsf.gov/sees/>

CAREER: Support of young investigators who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.

DMR success rate is about 28 %.

Deadline in MPS is July 27,2011.



DMR FY 12 Budget **Request** Activities

Research at the Interface of Biological, Mathematical, and Physical Sciences (BioMaPS): BIO, MPS, and ENG will coordinate research from the discovery of biological, physical, and mathematical principles underlying the biological processes, to their application to the energy sector and advanced manufacturing.

Cyber-Infrastructure Framework for the 21st Century (CIF21): Investments in MPS computational sciences, algorithm development, and software infrastructure needed for sustained long-term research efforts.

Advanced Manufacturing: nanomanufacturing, industry/university partnerships, and BioMaPS.

NSF: \$96.18M;

Science and Engineering Beyond Moore's Law (SEBML): advancing the forefront of communications and computation capability.



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

John J. McGrath
Division Director

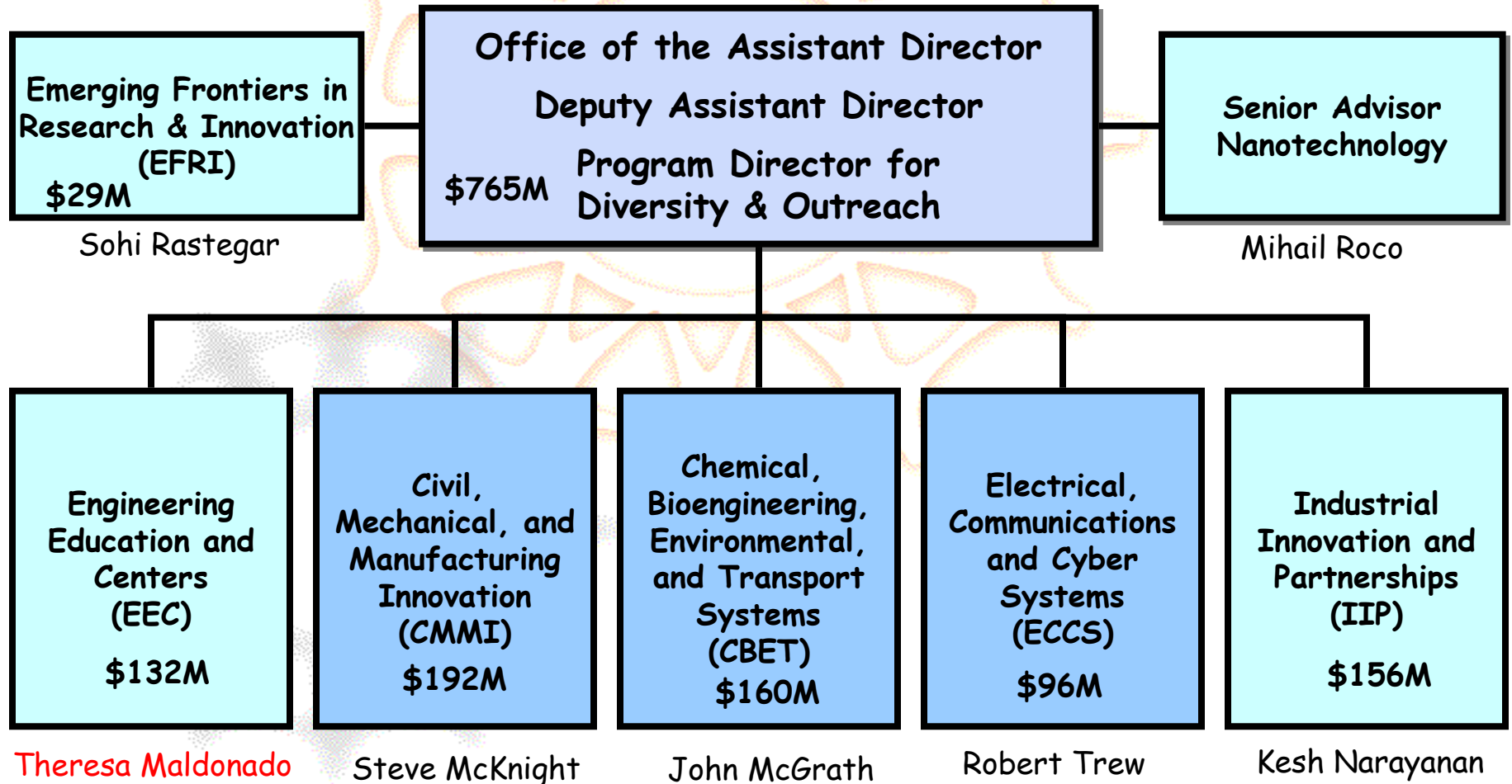
Council for Chemical Research
May 1-3, 2011



Directorate for Engineering

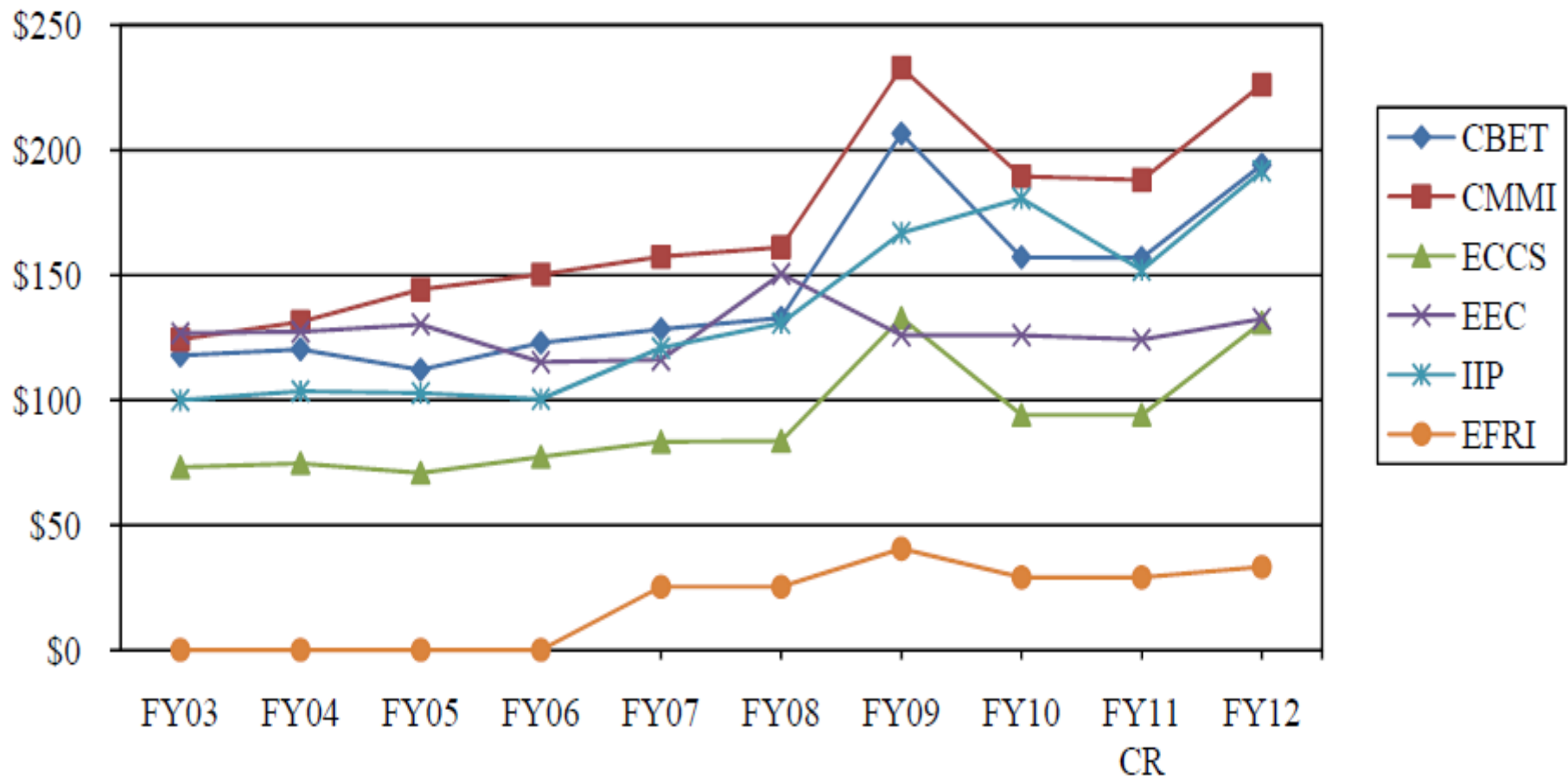
FY 2011

Tom Peterson, **Mike Reischman**, Omnia El-Hakim



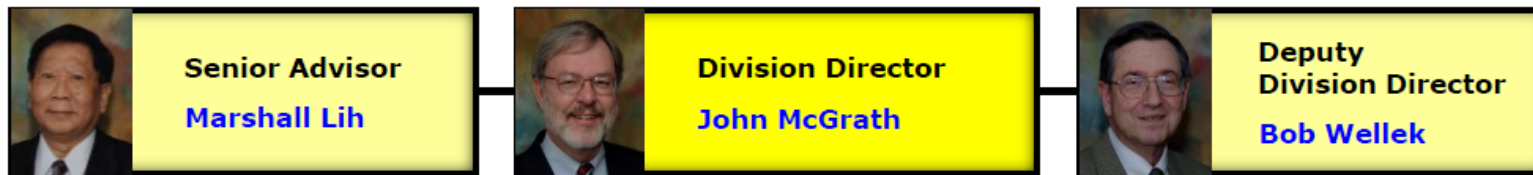


ENG Subactivity Funding (Dollars in Millions)





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



1401 - Catalysis and Biocatalysis
George Antos

5345 - Biomedical Engineering
Semahat Demir

7644 - Energy for Sustainability
Greg Rorrer / Geoff Prentice

1407 - Combustion, Fire, and Plasma Systems
Arvind Atreya

1417 - Chemical and Biological Separations
Rose Wesson

7236 Biophotonics
Leon Esterowitz

7644 - Energy for Sustainability & 1440 Environmental Engrg
Geoff Prentice

1443 - Fluid Dynamics
Henning Winter

1403 - Process and Reaction Engineering
Maria Burka

7909 Biosensing
Alex Simonian

1440 - Environmental Engineering
Paul Bishop / Geoff Prentice

1414 - Interfacial Processes and Thermodynamics
Bob Wellek

1491 Biotechnology, Biochemical, and Biomass Engineering
Theresa Good

1179 - Environmental Health and Safety of Nanotechnology
Barbara Karn

1415 - Particulate and Multiphase Processes
Ashok Sangani

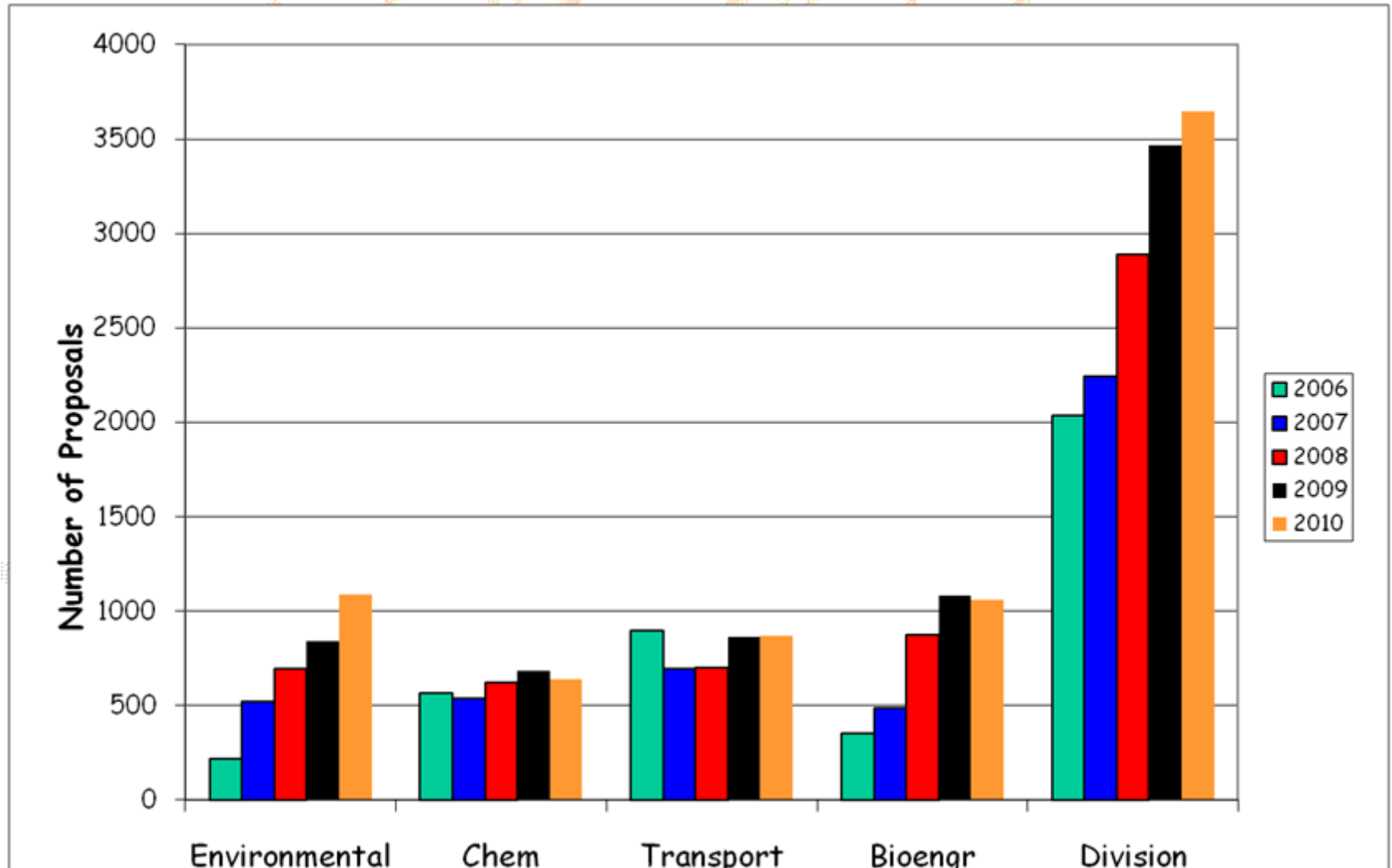
5342 - General and Age Related Disabilities Engrg
Ted Conway

7643 - Environmental Sustainability
Bruce Hamilton

1406 - Thermal Transport Processes
Sumanta Acharya



Growth in CBET Has Been Primarily in Environmental & Bioengineering





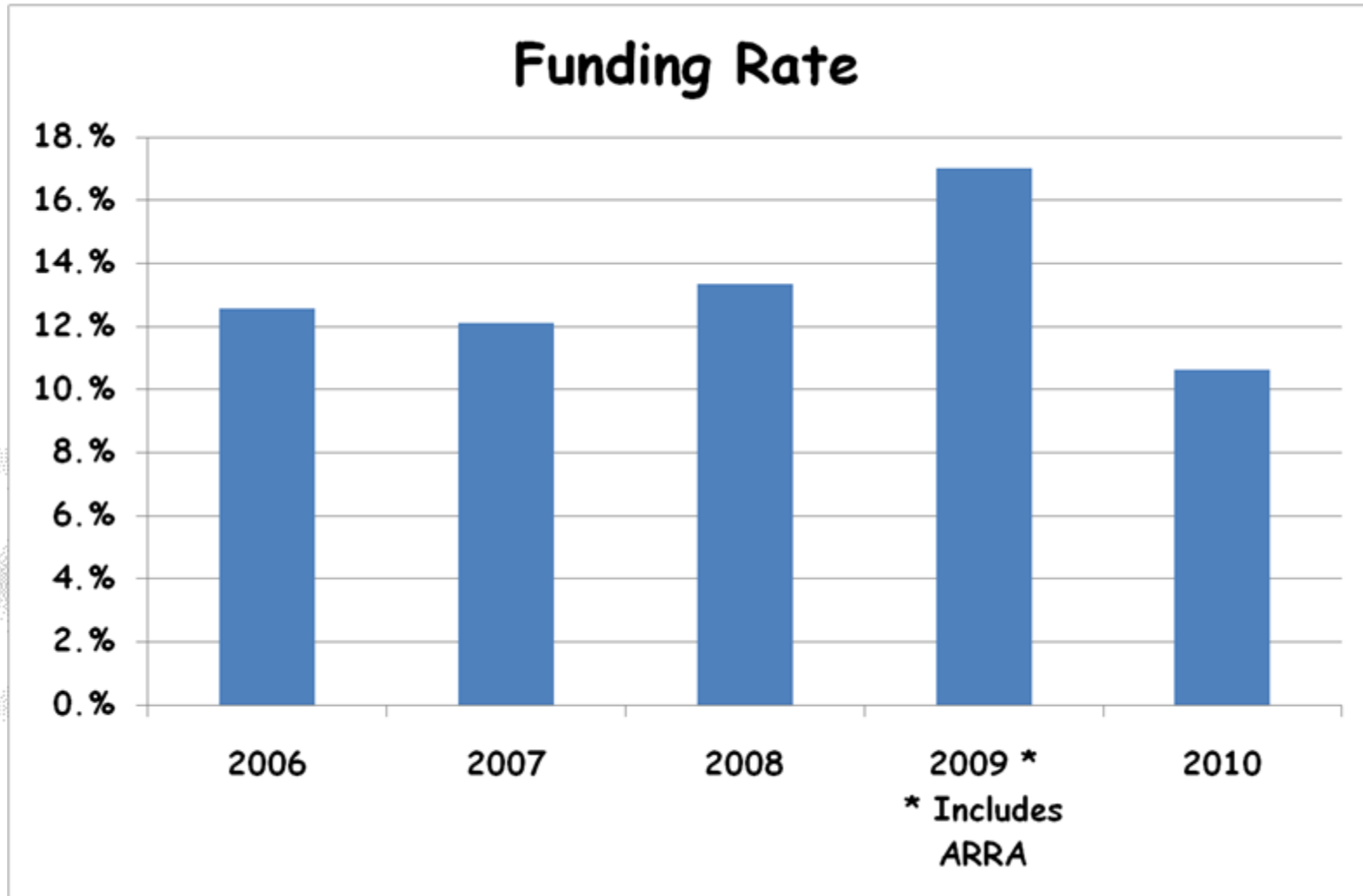
Largest Proposal Load in ENG/NSF Lowest Funding Rate

Overall ENG Funding Rate: 15%



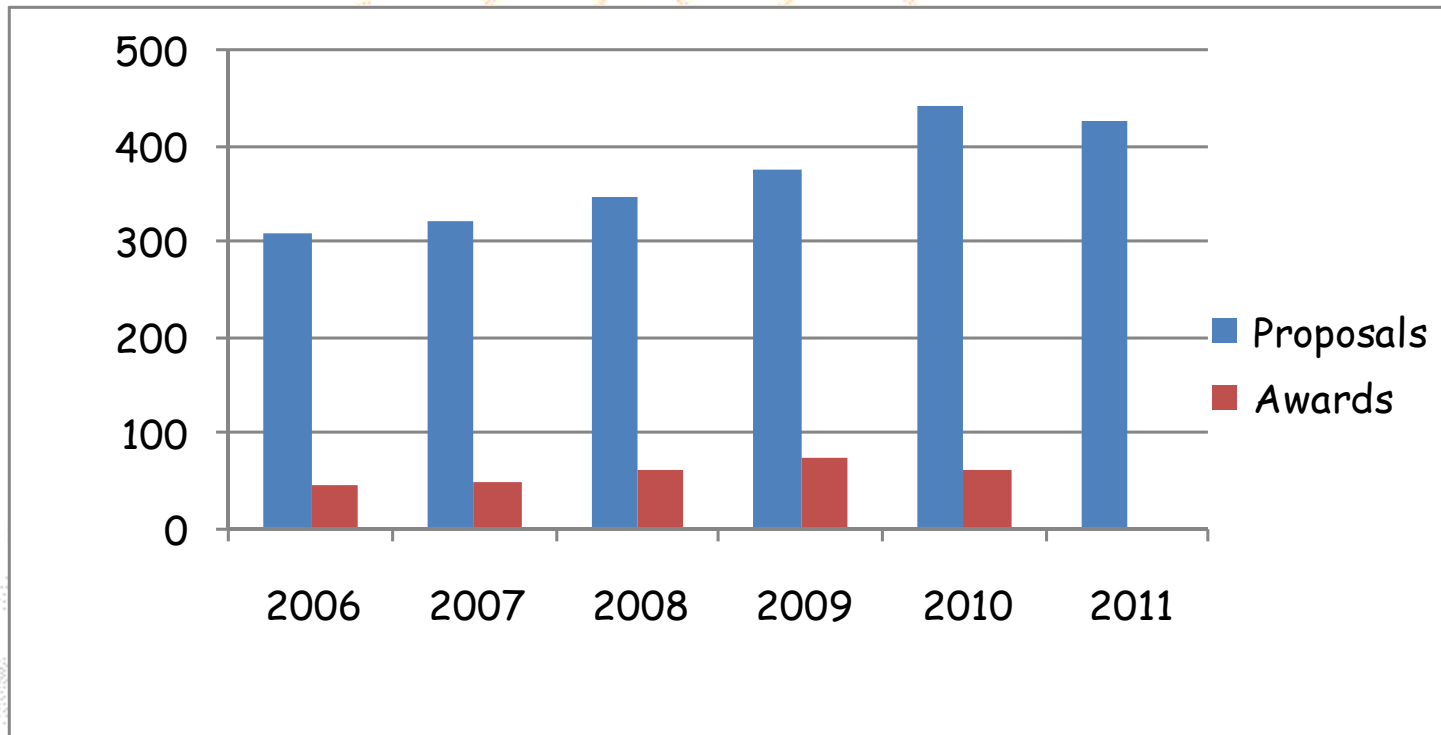


CBET Funding Rate Comparison for Research Awards





CBET CAREER Data



	2006	2007	2008	2009	2010	2011
Proposals	310	320	346	376	443	423
Awards	44	49	60	74	61	57
Success Rate	14%	15%	17%	20%	16%	14%



FY12 Budget Request

ENG Major Investments

(Dollars in Millions)

Area of Investment	FY 2010	FY 2010	FY 2010	FY 2012	Change Over	
	Omnibus	ARRA	Enacted/ Annualized FY 2011 CR		Request	FY 2010 Enacted
	Actual	Actual			Amount	
NNI *	\$152.50	\$17.72	\$148.00	\$174.37	\$26.37	17.8%
Clean Energy *	115.20	-	115.20	172.65	57.45	49.9%
SEES Portfolio *	102.00	-	108.20	162.00	53.80	49.7%
Engineering Research Centers	48.60	-	54.91	81.00	26.09	47.5%
Advanced Manufacturing *	38.50	-	38.42	65.42	27.00	70.3%
CAREER	60.26	-	46.98	53.38	6.40	13.6%
BioMaPS *	-	-	-	18.00	18.00	N/A
National Robotics Initiative	-	-	-	12.50	12.50	N/A
Science and Technology Centers	3.37	-	3.36	10.00	6.64	197.6%
CIF21 Portfolio *	-	-	-	9.00	9.00	N/A
EARS	-	-	-	4.00	4.00	N/A

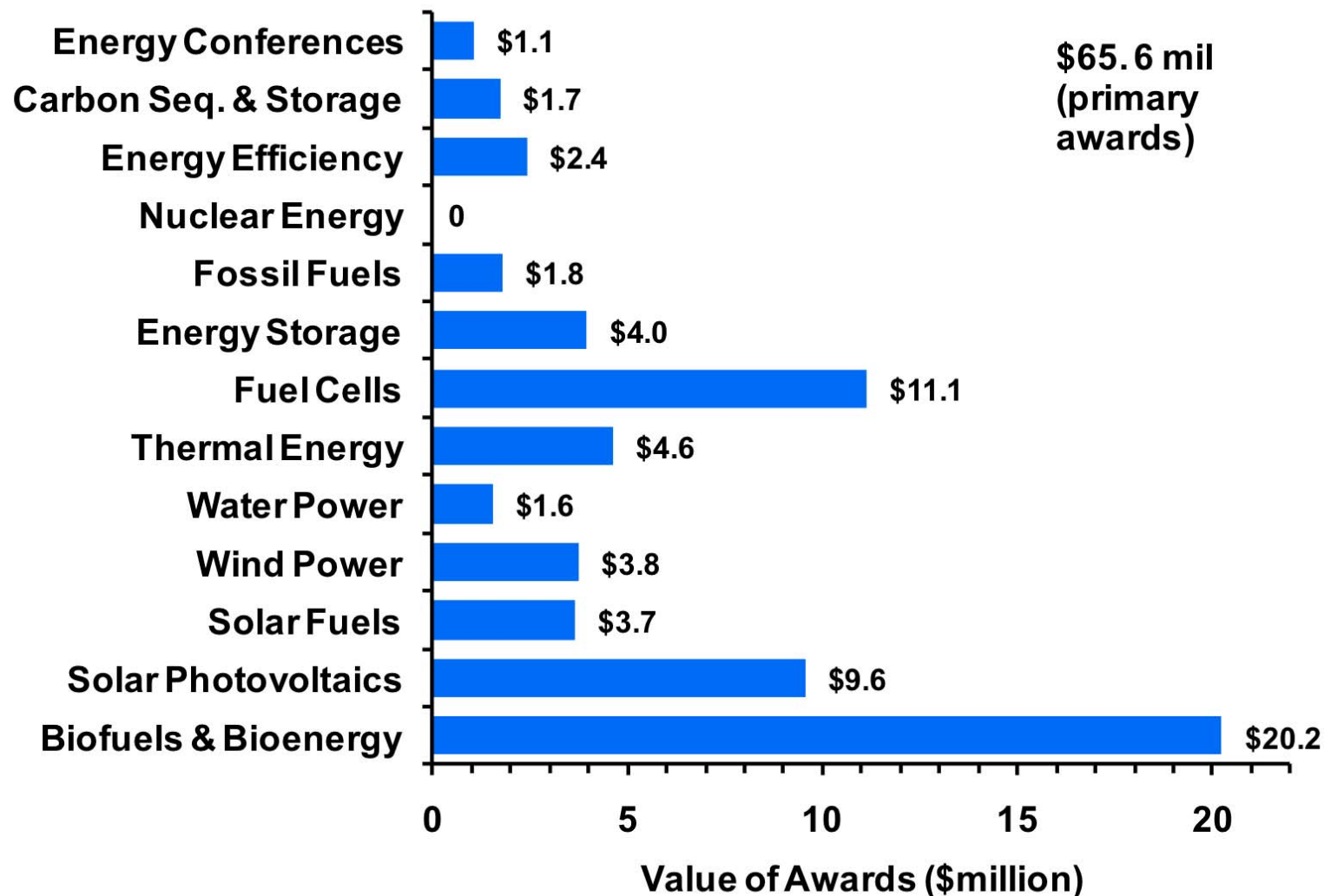
Major investments may have funding overlap, and thus should not be summed.



- **NNI**
 - Sustainable Manufacturing, Nanotech for Solar
- **Clean Energy**
- **SEES**
 - Energy, Environment (Water, Climate), EHS
- **Advanced Manufacturing**
 - Nano-manufacturing, Innovative Materials and Manufacturing Processes, Modeling & Control
- **BioMaPS**
 - Energy, Manufacturing, Core
- **CIF21**
 - Computation for energy device design and optimization, embedding CI in manufacturing



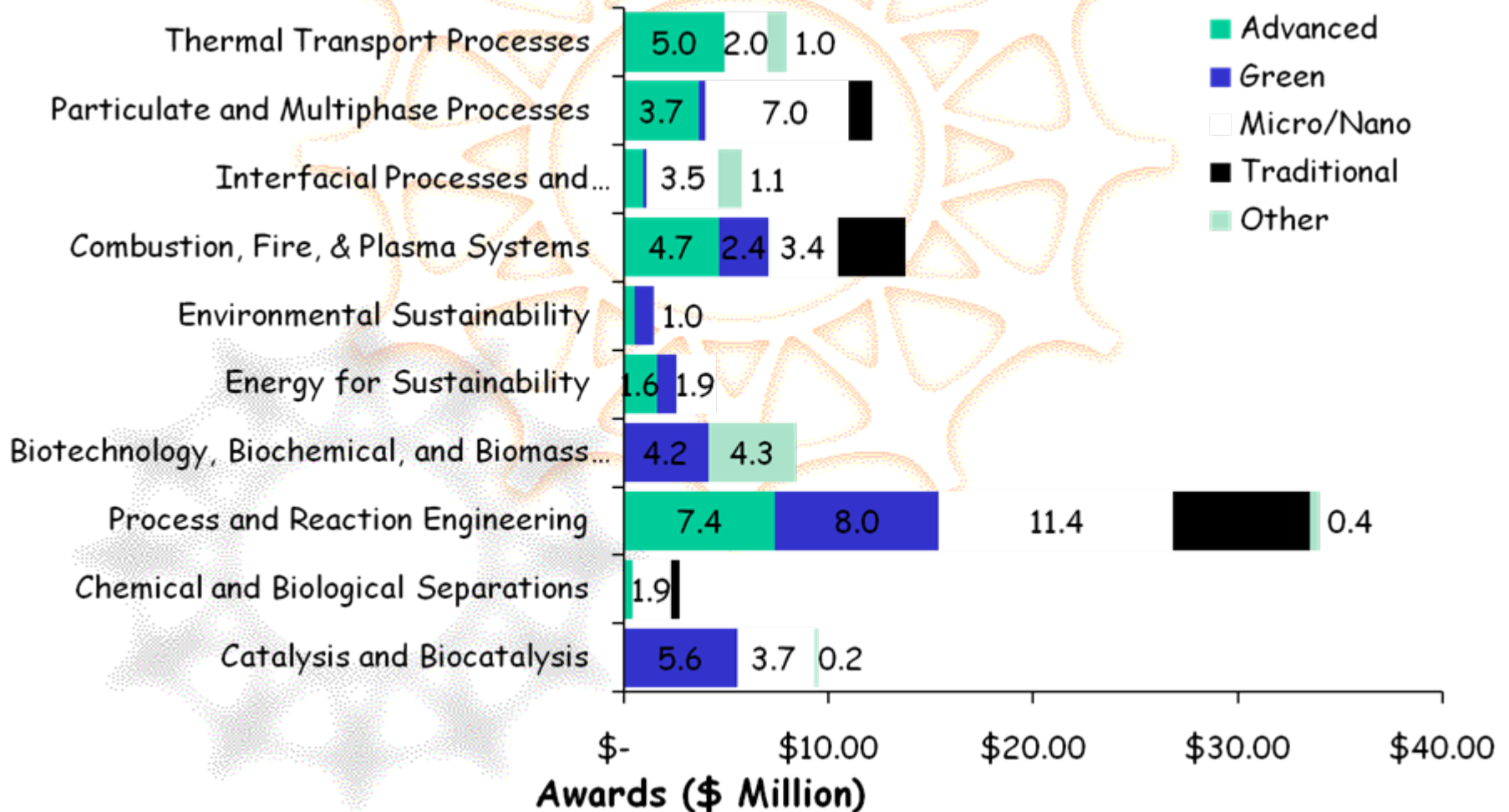
Clean Energy Current Awards By Technology





Advanced Manufacturing Distribution

~\$100M





Submission Windows

Current Situation

All four clusters with same timing

- Fall Window: Aug 15 to Sept 15, 2011
- Spring Window: Feb 1 to Mar 3, 2011

Future Situation- Expect Fall 2011 Implementation

Two clusters in Fall & Two clusters in Winter

- Fall Window: As above
 - Bioengineering & Transport and Thermal Fluids Clusters
- Winter Window: ~ Mid-Dec to Mid-Jan
 - Chemical Systems & Environmental Clusters

