



An Overview of the ECCS Division

Robert J. Trew
Division Director
Electrical, Communications and Cyber Systems (ECCS)
Division
Engineering Directorate
National Science Foundation
Arlington, VA





Electrical, Communications and Cyber Systems (ECCS)

Division Director: Robert Trew

Senior Engineering Advisor: Lawrence Goldberg

Electronics, Photonics, and Magnetic Devices (EPMD)

Samir El-Ghazaly

- Microwave/mm-Wave/THz Devices & Circuits
- Novel & Next Generation Devices
- Vacuum Devices & Electronics Antennas
- Electromagnetic Propagation & Scattering
- Microwave Metamaterials-Based Devices
- Device /Circuit Simulation & Modeling

Anupama Kaul

- Flexible & Printed Electronics
- Light Emitting Devices & Displays
- Molecular /Organic Electronics & Photonics
- Energy-Efficient Green Electronics
- Next Generation Memories, Memristors, & other Novel Devices

Usha Varshney

- Bioelectronics & Biomagnetics Devices
- Science & Engineering Beyond Moore's Law
- Quantum Devices
- Magnetism, Multiferroics, & Spintronics
- Sensor Devices & Technologies

John Zavada & Dominique Dagenais

- Optoelectronics & Photonics
- Nanophotonics
- Plasmonics & Optical Metamaterials-Based Devices
- Large-Scale Photonic Integration
- Ultrafast Photonics

Communications, Circuits, and Sensing-Systems (CCSS)

Gerry Tian

- Cyber-Physical Systems (CPS)
- Embedded Systems
- Wireless Communications Algorithms & Networking
- Integrated Sensing, Communications, & Computational Systems
- Signal Processing & Coding
- Cyber Security

Vacant

- Sensors, Actuators, & Electronic Interfaces
- Chemical, Biological, & Physical Diagnostic Systems
- Implantable & Wearable Systems
- Environmental Sensing & Monitoring
- MEMS/NEMS Devices
- System-Level Fabrication, Packaging, & Assembly

Vacant

- RF/Wireless, Optical, & Hybrid Communications
- Broadband & Low Power Communications
- RF/Microwave & mm-Wave Components/Circuits
- Inter- and Intra-Chip Communications & Networking
- Submm-Wave/THz Imaging & Sensing
- Mixed Signal Circuits & Systems
- Enabling Technologies for Intelligent Communications Systems
- Interconnects & Packaging Techniques

Energy, Power, and Adaptive Systems (EPAS)

Kishan Baheti

- Control Theory & Hybrid Dynamical Systems
- Distributed & Mobile Networked Control
- Systems Theory in Molecular, Cellular, & Synthetic Biology/Medicine
- Estimation in Sensing & Imaging Systems
- Sensor Networks for Energy-Efficient Buildings
- Transportation Networks
- Human-Robot Interaction
- Stochastic Modeling & Applications

George Maracas

- Energy Collection, Photovoltaics, & Thermal Devices
- Novel Energy Conversion Devices
- Renewable Energy Devices & Systems
- Power Conversion, Generators, Motors & Network Interfacing
- Energy & Power Sensing Technologies
- Energy Storage Technologies
- High Voltage, High Power Switching & Conversion Devices

Paul Werbos

- Adaptive & Intelligent Systems
- Transmission & Distributed Systems
- Intelligent Power Grid
- Quantum Systems & Modeling
- Neural Networks
- High Performance & Multiscale Modeling
- Cognitive Optimization & Predication
- Intelligent Vehicles & Robots

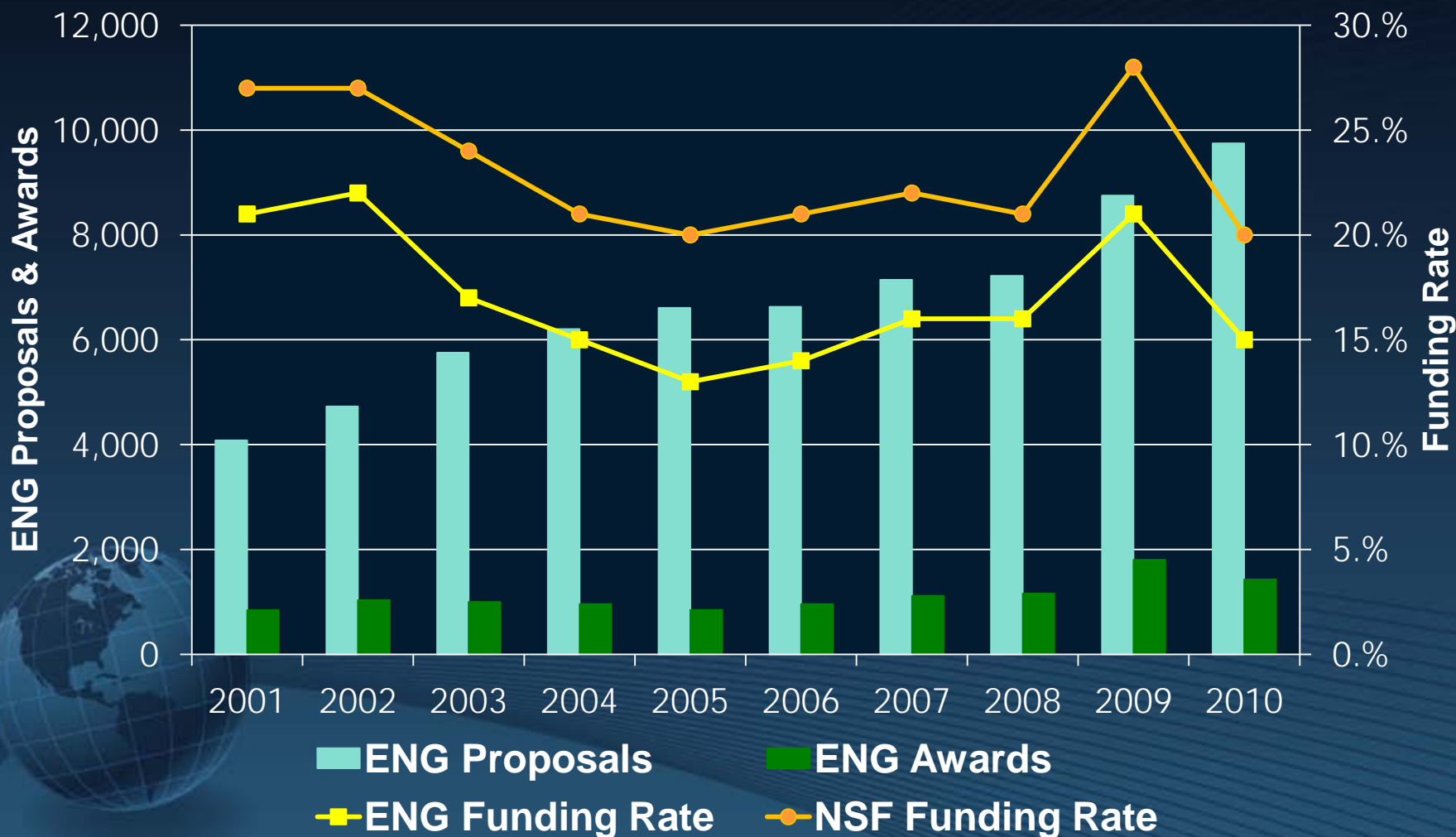


ENG Funding (\$M)

	FY 2010 Omnibus Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted	
				Amount	Percent
CBET	\$157.08	\$156.82	\$194.03	\$37.21	23.7%
CMMI	189.40	188.00	226.10	38.10	20.3%
ECCS	93.97	94.00	131.00	37.00	39.4%
EEC	125.86	124.11	132.40	8.29	6.7%
IIP	180.63	152.00	191.57	39.57	26.0%
<i>SBIR/STTR</i>	<i>156.84</i>	<i>125.77</i>	<i>146.88</i>	<i>21.11</i>	<i>16.8%</i>
EFRI	28.99	29.00	33.20	4.20	14.5%
Total, ENG	\$775.92	\$743.93	\$908.30	\$164.37	22.1%

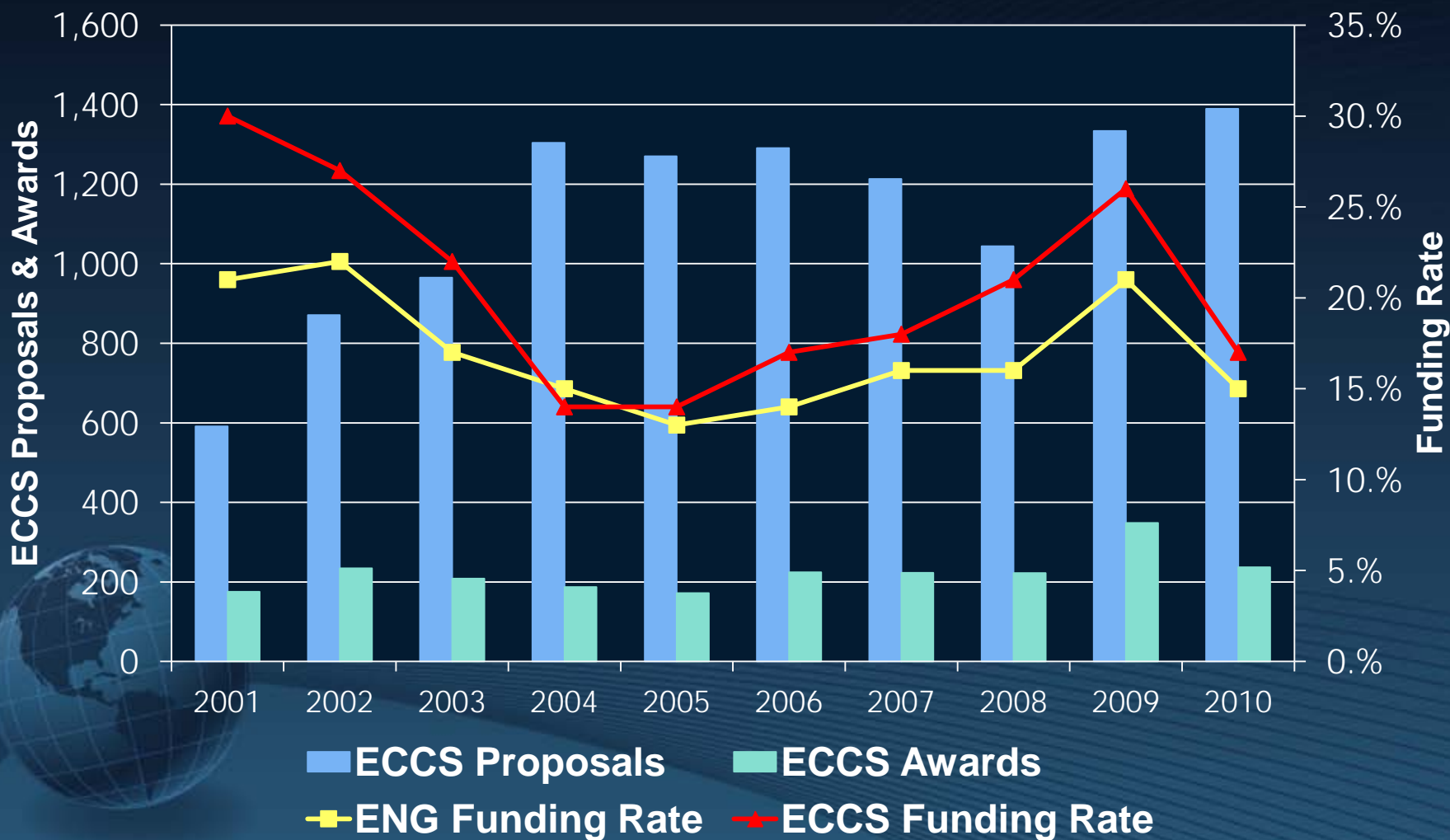


ENG and NSF Research Grant Proposals and Awards





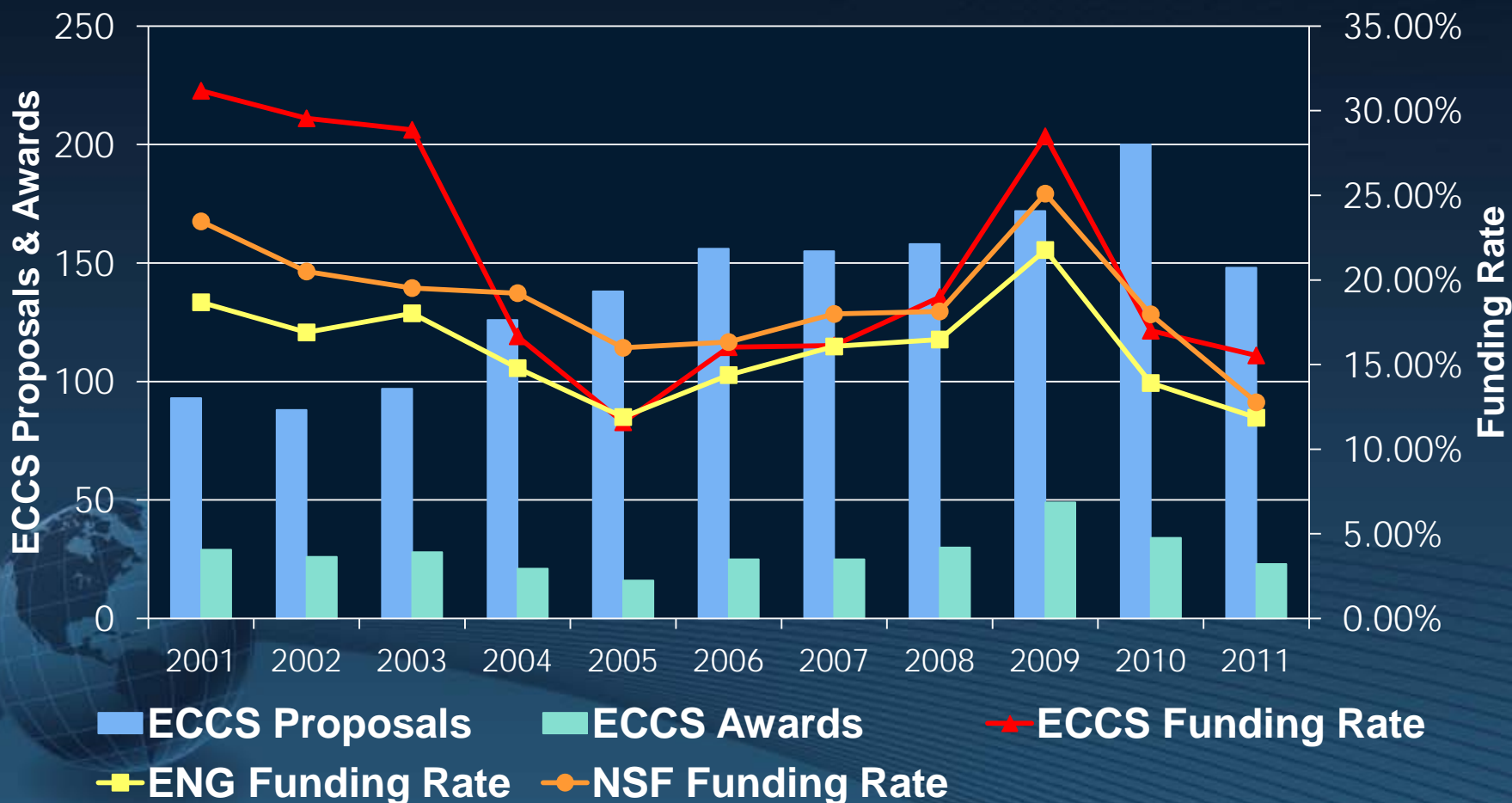
Research Grant Proposals and Awards ECCS & ENG





CAREER Proposals and Awards ECCS, ENG, NSF

CAREER Funding Rates





Emerging Research Opportunities

EAGER

(Early Concept Grants For Exploratory Research)

**Ex: In FY 2008
24 Awards**



Subsequently:
✓4 Unsolicited Proposals Awarded (3 yrs)
✓4 CAREER Awards (5 yrs)

WORKSHOPS / CONFERENCES

**Ex: 50 Workshops (FY 2008-
2010) that reviewed the State-
of-the-Art & Collected
Recommendations for Future
Research from Experts in the
field**



EFRI

(Exploring Frontiers of Research & Innovation)

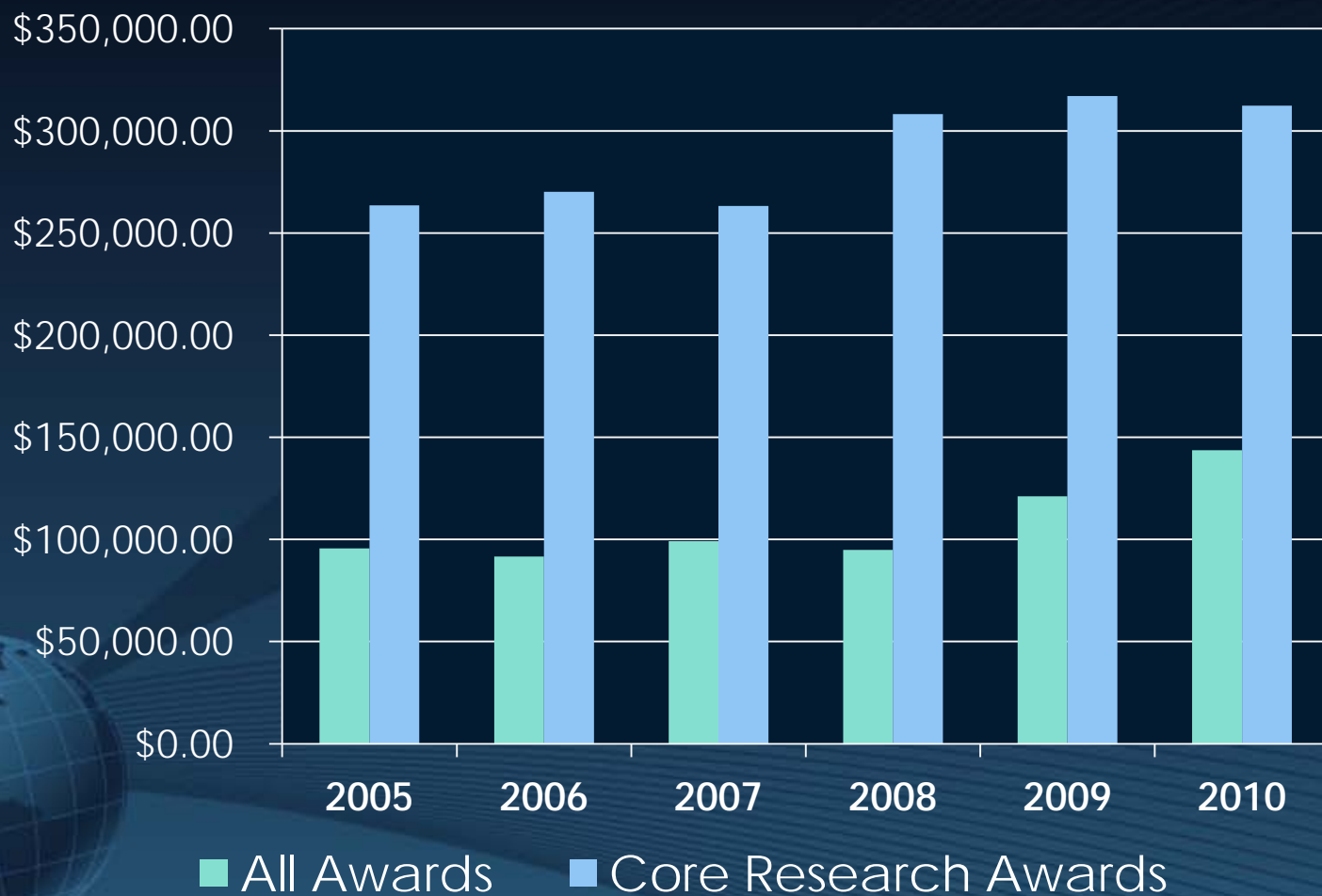


Initiative on Bio- Flex Electronics



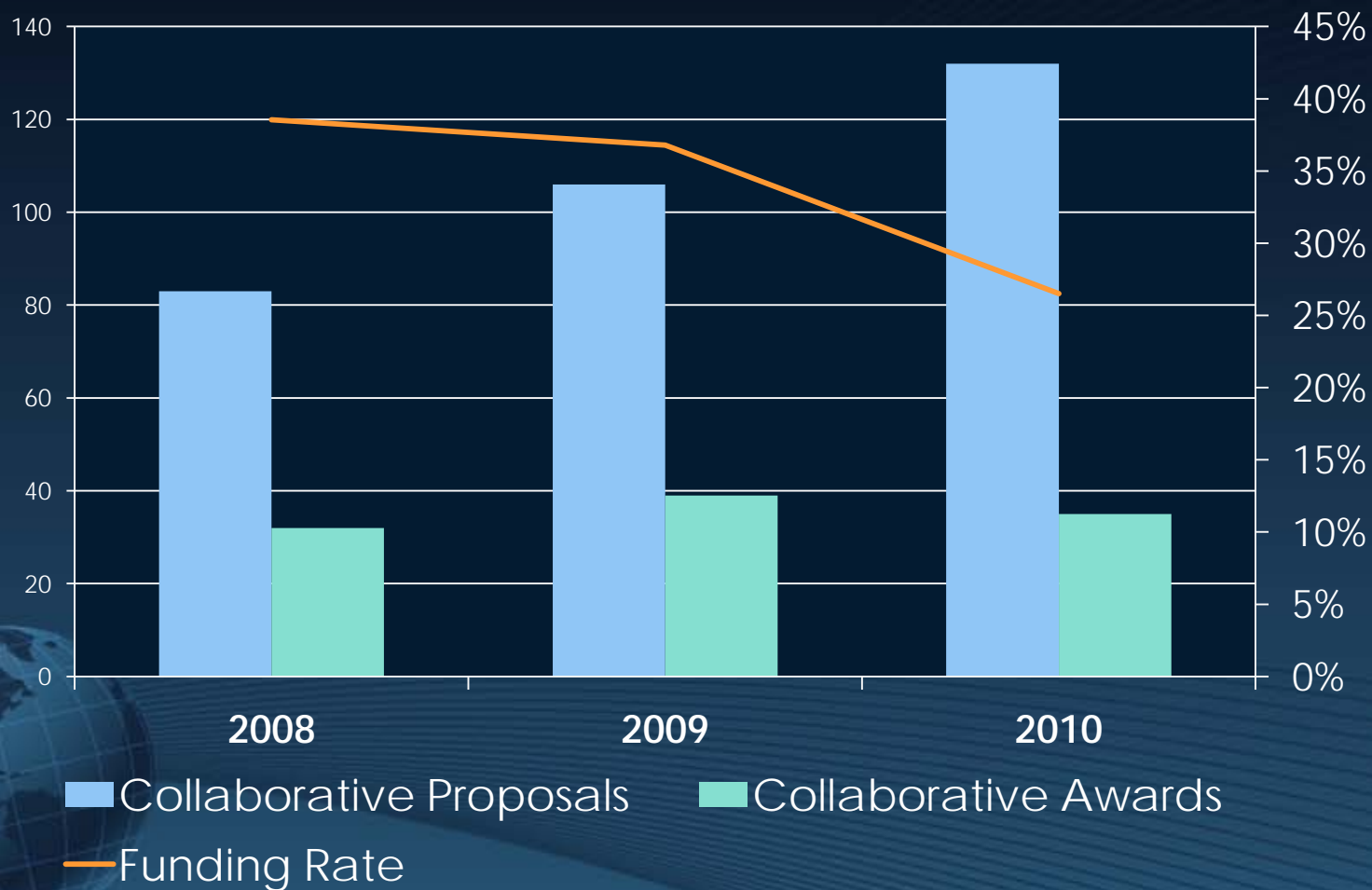


Average Award Size





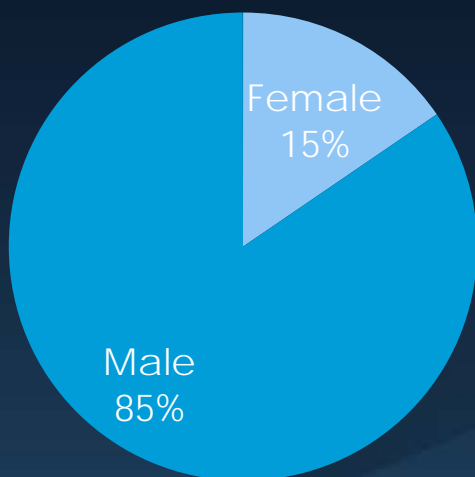
Supporting Research Collaboration





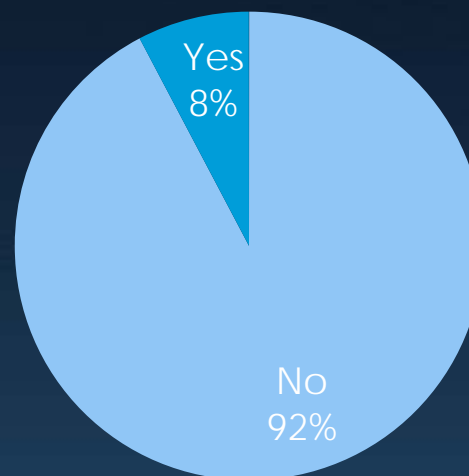
Reviewer Demographics FY 2008-2010

Panelist Participation by Gender



* 60.1% Reporting Rate

Panelist Minority Status



* 48.7% Reporting Rate

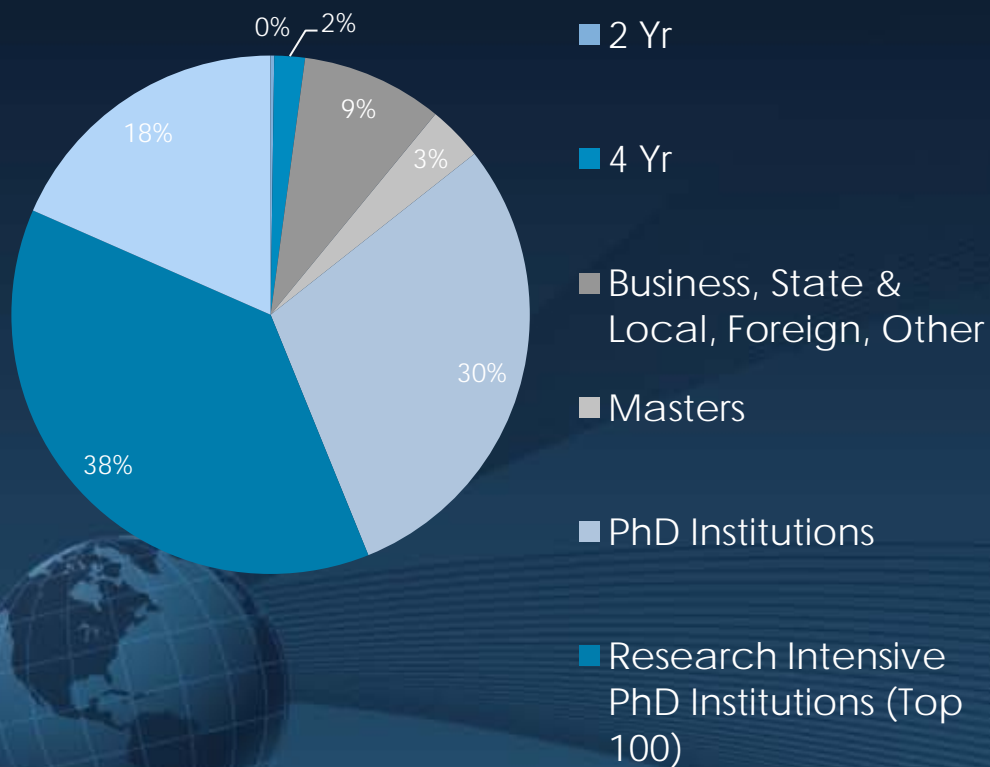
- Women constitute **9.7%** of Electrical Engineering Faculty

- Underrepresented Minorities (Black, Hispanic, and Native American) constitute **3.6%** of Electrical Engineering Faculty

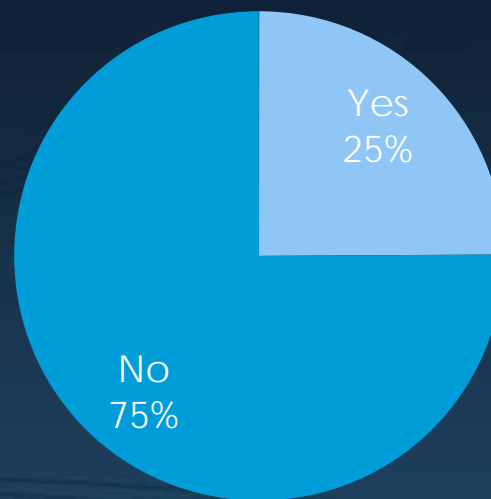


Reviewer Demographics FY 2008-2010

Institutional Distribution (N=1781)



First Time Panelist Status



* 34.2% Reporting Rate



Future Program Directions

- ◉ Science and Engineering Beyond Moore's Law (SEBML)
- ◉ Flexible Electronics (EFRI: BioFlex)
- ◉ Energy and Power
 - > Smart Grid
 - > Alternate Energy
- ◉ Cyber-Physical Systems (CPS)
- ◉ Enhanced Access to the Radio Spectrum (EARS)
- ◉ Robotics (NRI)



Thank you!

Questions?

