

# Engineering Education and Centers Trends and Investments in Global Education

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IREE Workshop  
[WWW.NSF.GOV](http://WWW.NSF.GOV)



# Outline

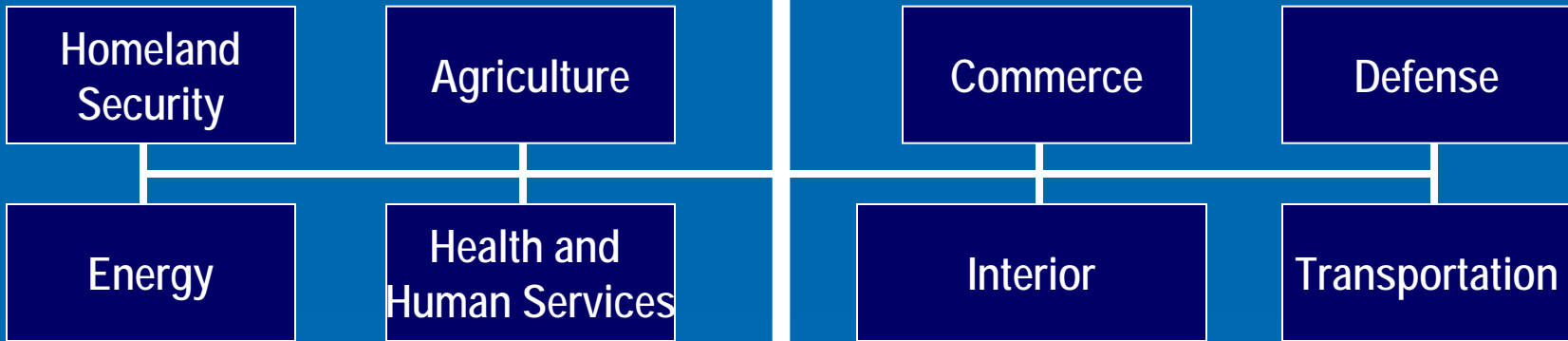
- Review of NSF Organization/Funding
- Review of Engineering Directorate/Funding
- Directions in EEC Global Research and Education
  - (1) ENG-International Research and Education in Engineering (IREE)
  - (2) ENG-Engineering Research Centers (ERC)



*Staff Offices*

- Office of Management and Budget
- Science Advisor, Office of Science & Technology Policy
- Other Boards and Councils

*Major Departments*



*Independent Agencies*





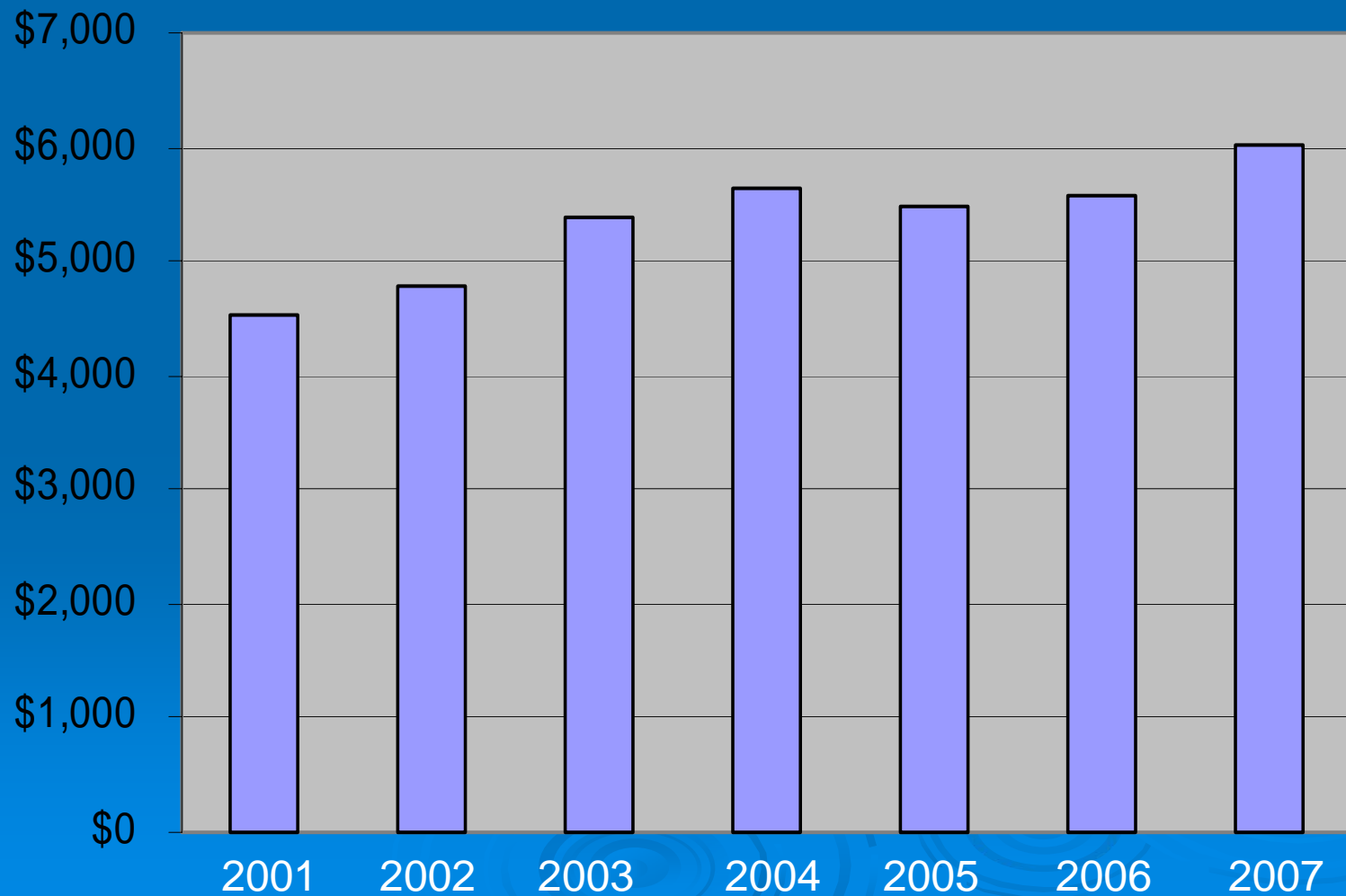
# NSF's Origin, Goals and Operations

- An Independent Agency Established in 1950 by NSF Act:  
*"To Promote Progress of Science" and "Advance National Health, Prosperity & Welfare", and "Secure the National Defense"*
- Support basic research and education across science and engineering
- Uses peer-evaluated grants
- Discipline-based structure with cross-disciplinary mechanisms
- Uses "rotators" from Academe (approx 50%)



# NSF Budget 2001-2007

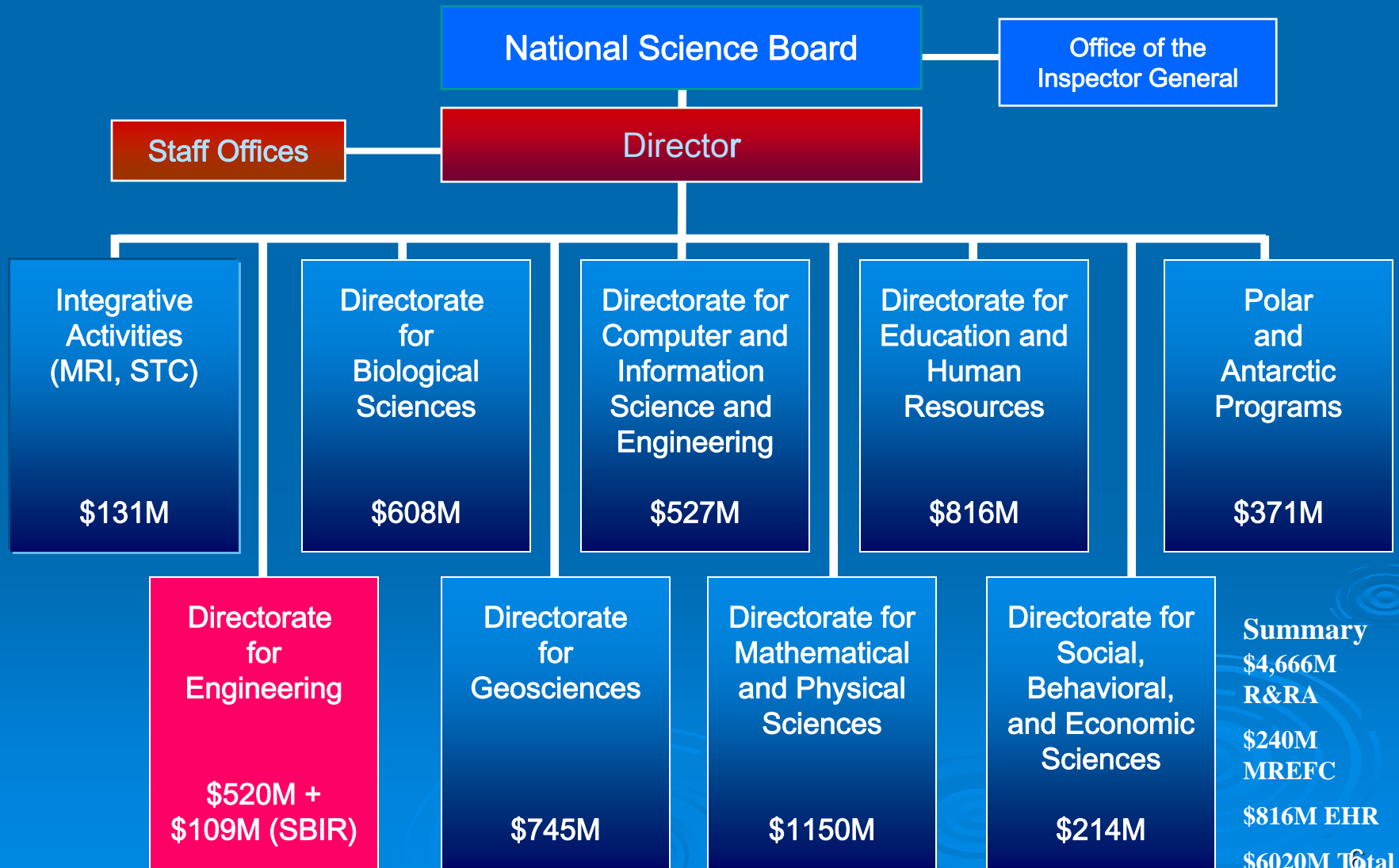
Dollars in Millions





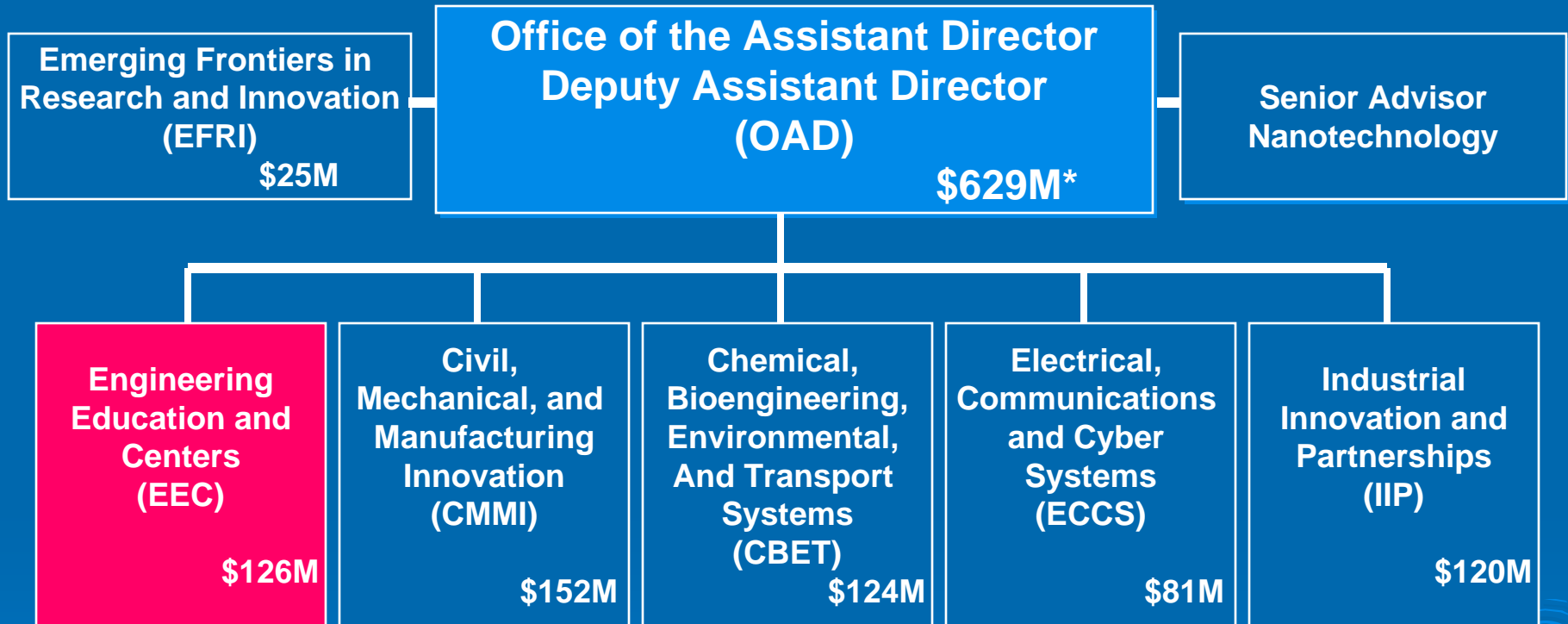
# National Science Foundation

FY 07 Budget (\$6,020 million)





# Directorate for Engineering FY 2007



# Global Engineering Issues

- (1) Conceptualization, design and manufacturing of devices and systems involve global resources
- (2) Engineers now must routinely accept overseas assignments in manufacturing and marketing
- (3) Many U.S. firms earning more revenue overseas than in U.S.

# Some Salient Facts about US International Experiences

(1) What percent of U.S. College students study abroad?

- a) 1%
- b) 2%
- c) 5%
- d) 10%

(2) What discipline ranks last (study abroad) in recent study?

- a) agriculture
- b) business
- c) engineering
- d) psychology

# ENG Global Programs

## Int'l Research and Eng Education

### (IREE)

- Completed two competitions
- Invested \$3 million to \$4 million/competition (2006-2007)
- Goals and highlights
  - Enhance education and research innovations in US through international partnerships
  - Contribute to developing a new generation of globally-engaged engineering workforce that can meet the challenges of the 21st century

# ENG GLOBAL Programs

## IREE

- Goals and highlights
  - NSF funded without the need of reciprocity arrangement
  - Focus on medium duration (3-6 months) travel to foreign institutions/laboratories
  - Target early-career researchers
  - Awards possible to all foreign countries

# Current Process for IREE

- (1) Current engineering PIs invited to submit a supplement request to their grant
- (2) Usually a summer assignment at an overseas laboratory
- (3) Typical awards are \$30,000 to \$50,000
- (4) Early career researchers/always students
- (5) 2007-Undergraduates included

# Sample IREE Projects

- Nonlinear model Using ambient Responses for Damage Diagnosis in Concrete Structures
- Processing Functionally Graded Coatings for Bio-Medical Implants
- Lab-on-a-Chip Channels for Novel Manufacturing Methods

# ENG GLOBAL Programs

## Engineering Research Centers

- **Undergoing FY 2007-2008 competition**
- **ENG will invest ~ \$40 each million each in 5 new Centers over 10 years**
- **Goals**
  - **Create and sustain an integrated, interdisciplinary research environment**
  - **Educate a globally competitive and diverse engineering workforce, and**
  - **Join academe and industry in partnership to achieve these goals.**

# "Generation 3" Engineering Research Centers

➤ Proposals now under review (143 preproposals in 2007)

➤ "Gen 3" features

(1) "A global experience designed to provide students and faculty with opportunities to collaborate across cultures and thereby achieve new heights in innovation....."

(2) "A diverse cross- disciplinary team of faculty and students from the US and abroad....."

(3) ".....it may be appropriate to include a foreign university....."

# Other NSF GLOBAL Programs

## PIRE

- **Partnerships for International Research and Education (PIRE) Goals**
  - NSF-wide program
  - Completed FY07 competition
  - Goals and Highlights
    - PIRE establishes innovative collaborative relationships with international groups
    - Advances research and education
  - NSF invests total \$27 million/competition
    - Awards are typically \$2.5 million
    - Awards to US institution

# Thank You

