FRONTIERS OF ENGINEERING EDUCATION
Creating Opportunity in a Changing and Uncertain World

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Who are we?
National Academies Scale

- National Academy of Sciences
  - Members: 2136
  - Foreign Assoc.: 400

- National Academy of Engineering
  - Members: 2220
  - Foreign Assoc.: 193

- Institute of Medicine
  - Members: 1722
  - Foreign Assoc.: 97

- National Research Council
  - Committees: 614
  - Volunteers: 6477
  - Reports: 234
Why are we here?
First Engineering Degrees (Thousands)

Source: NSF Science and Engineering Indicators, 2010
China Rises

First Engineering Degrees (Thousands)

Source: NSF Science and Engineering Indicators, 2010
Fraction of First Earned Degrees in S&E

Source: NSF Science and Engineering Indicators, 2010
U.S. Bachelors Degrees Awarded
ALL FIELDS

U.S. Bachelors Degrees Awarded
ENGINEERING

Women Intend to Graduate
% of entering freshmen who intend to major in ENGINEERING (2007)
% of Bachelors graduates with ENGINEERING Degrees (2007)

Men Intend to Graduate

source: NSF S&E Indicators 2010 and US Dept. of Education Digest of Educational Statistics 2008
Women

% of entering freshmen who intend to major in **NATURAL SCIENCES** (2007)

Men

% of Bachelors graduates with **NATURAL SCIENCE Degrees** (2007)

source: NSF S&E Indicators 2010 and US Dept. of Education Digest of Educational Statistics 2008
Our Minority Population is Growing.

U.S. Population Aged 18-23

Source: U.S. Census Bureau, 2011
This is a Workforce Train Wreck.
The Good News
Listen to the language of engineering.
BASIC ENGINEERING

Scale
State
Integration
Resilience
Affordability

Scope
Complexity
Architecture
Evolution
Social Context
BASIC ENGINEERING

ENGINEERING SYSTEMS

Cellular Circuitry
Adaptive Immunity
Reprogramming Bacteria
Synthetic Biology
Natural Adhesives
Bacteria-Laced Concrete
Integrated Cancer Research
Neuroprosthetics
Engineers are creative problem solvers.

Engineers make a world of difference.

Engineers help shape the future.

Engineering is essential to our health, happiness, and safety.

Engineers can meet the Grand Challenges of the 21st century.
BASIC ENGINEERING

ENGINEERING SYSTEMS

CHANGING THE CONVERSATION

CONVERGENCE (Biological Engineering)
Onward and upward!