Opening Remarks
NAE Grand Challenges Scholars Program

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National Science Foundation

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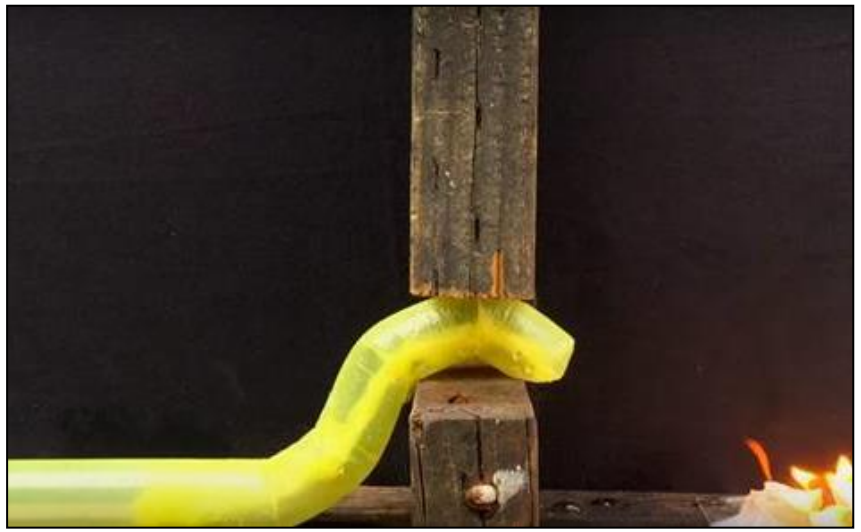
Image credit: *Rob Felt*

Create the future

NSF supports discovery and education to create a future where people thrive.

Engineers are making this future a reality through research in areas such as advanced manufacturing, health care, sustainability, infrastructure, and more.



Innovate for prosperity

NSF-funded engineering researchers create new knowledge, concepts, and designs that become technological breakthroughs and solve real-world problems. They create innovations for clean water, the electric grid, agriculture, and to address other national challenges.

To speed innovations to the market, NSF also spurs entrepreneurship, small business growth, and industry collaboration.

Image credits: *Jonathan Coe, Prescient Surgical, Inc.; Kurt Hickman and Aaron Kehoe*

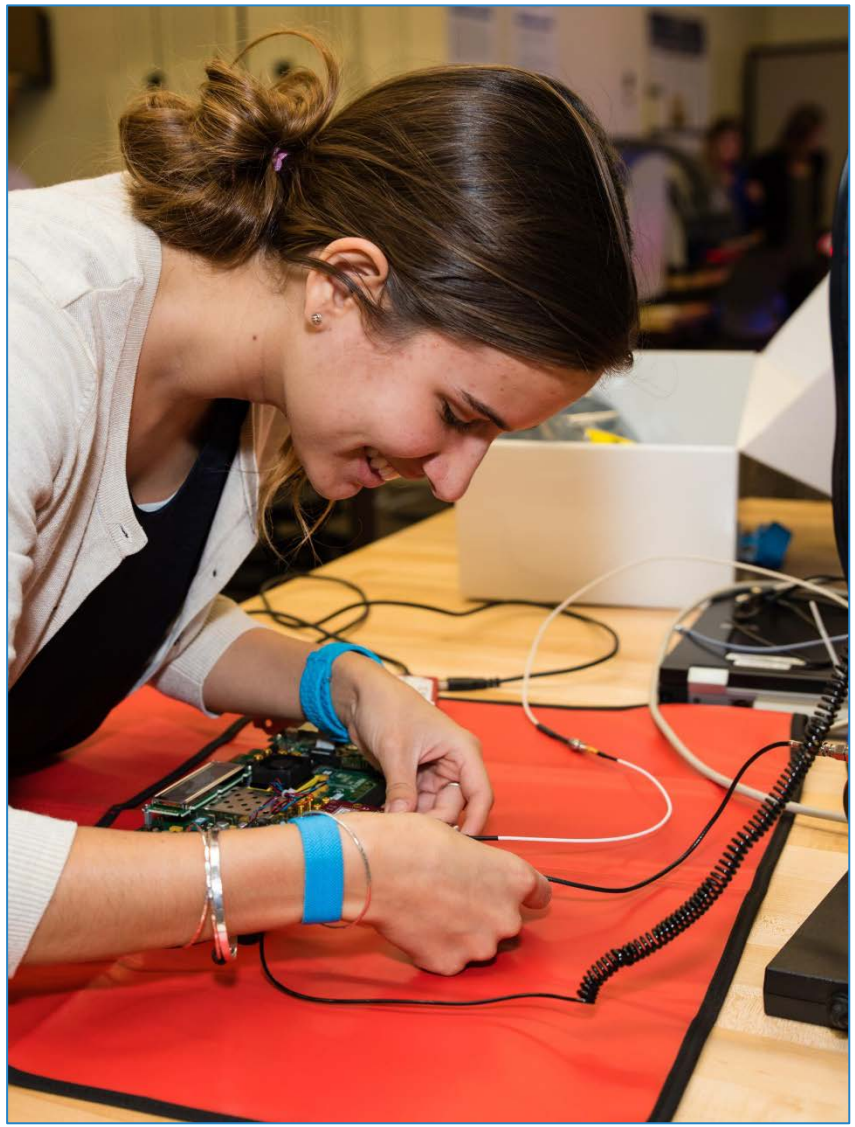
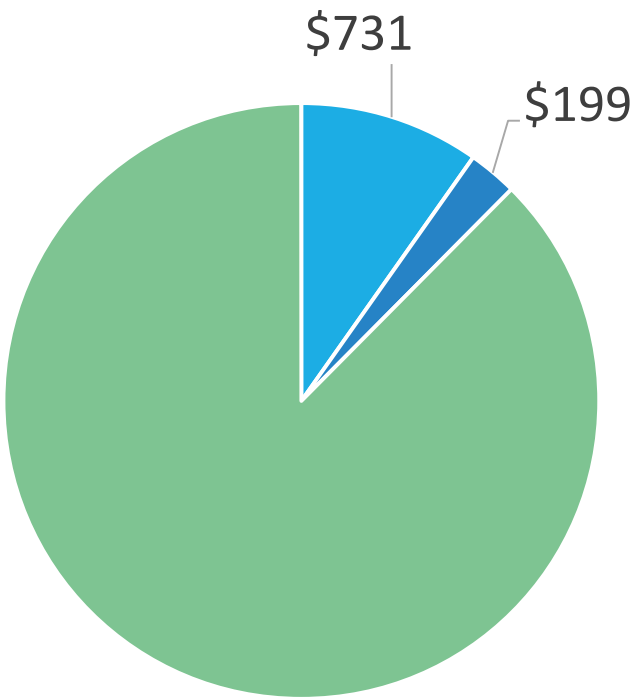


Image credit: *University of San Diego*

Educate the future workforce

To prepare an inclusive, innovative workforce that can meet the changing needs of the US economy, NSF supports advances in engineering education and introduces the exciting possibilities of engineering to the next generation.

NSF FY 2017 Budget (Enacted, $M)



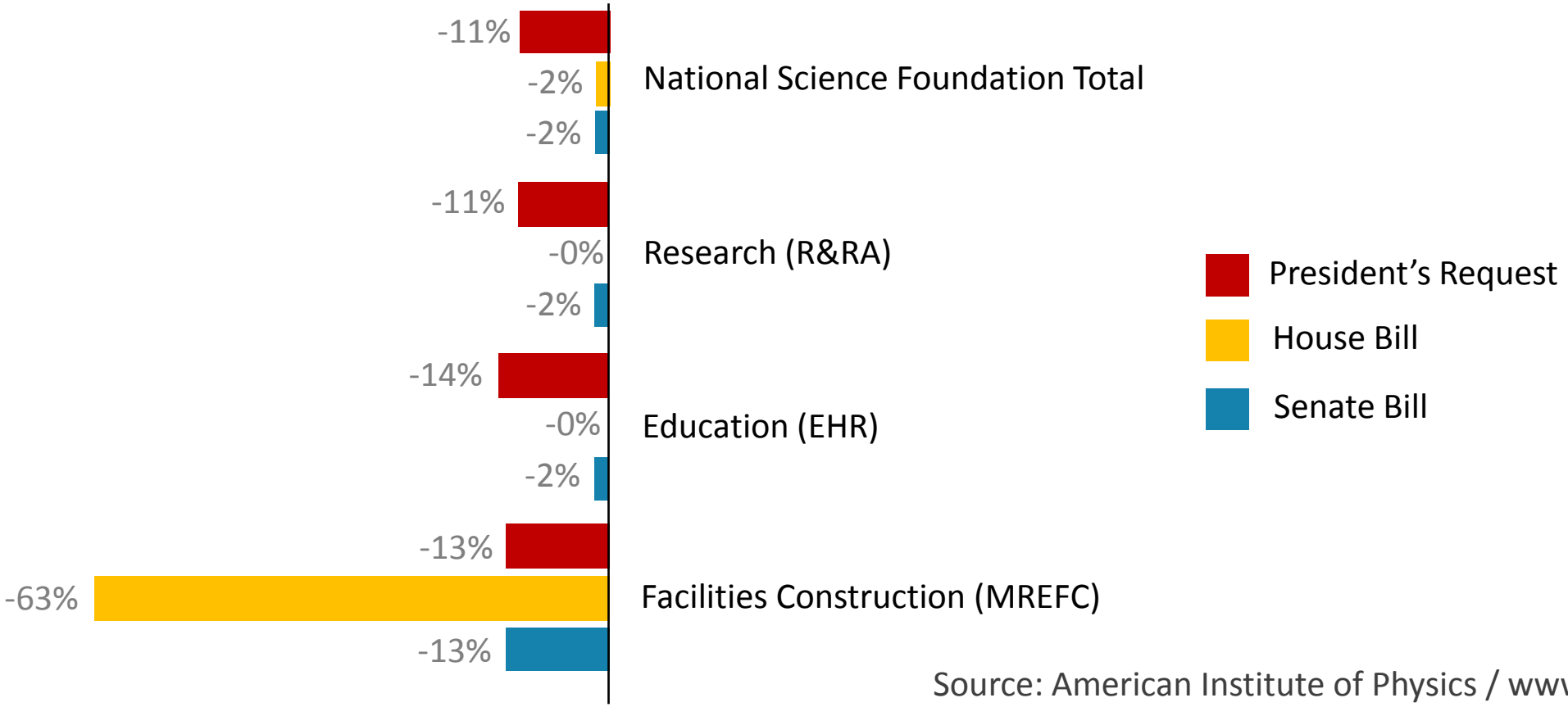
NSF Total $7,472
ENG Total $930

- ENG - other than SBIR
- ENG - SBIR
- NSF - other than ENG

FY 2018 Budget Request

NSF FY 2018 Budget Proposals

(% change from FY 2017 Enacted)



Source: American Institute of Physics / www.aip.org/fyi

NSF Big Ideas for Future NSF Investments

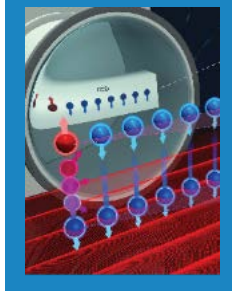
RESEARCH IDEAS

Harnessing Data for 21st Century Science and Engineering

Work at the Human-Technology Frontier: Shaping the Future

Navigating the New Arctic

Windows on the Universe: The Era of Multi-messenger Astrophysics



The Quantum Leap: Leading the Next Quantum Revolution

Understanding the Rules of Life: Predicting Phenotype

PROCESS IDEAS

Mid-scale Research Infrastructure

NSF 2026

Growing Convergent Research at NSF

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

NSF INCLUDES

SEPT. 2016

Awards for 37 Design and Development Launch Pilots

JULY 2017

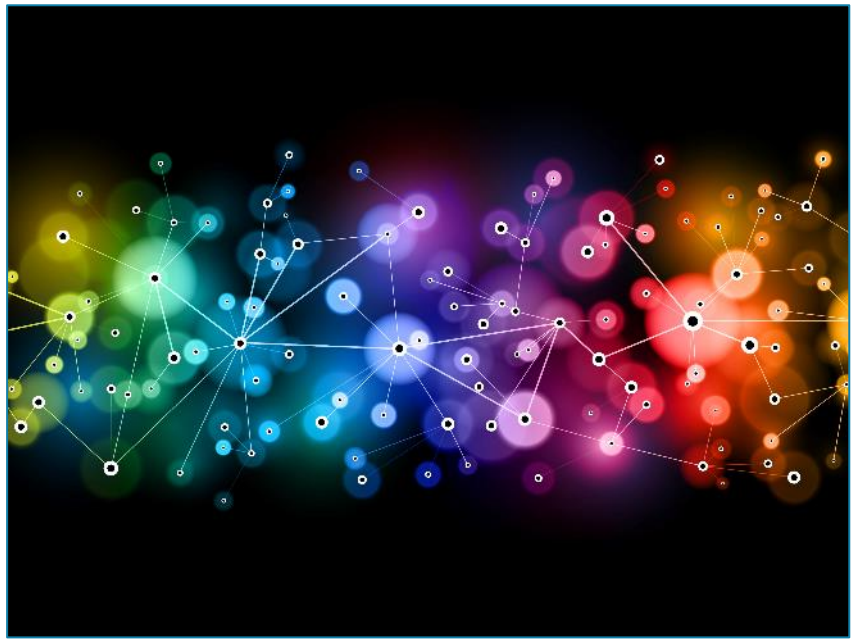
DCL for NSF INCLUDES EAGERs, supplements and conferences

SEPT. 2017

Awards for 27 Design and Development Launch Pilots

JAN. 2018

Workshop for NSF INCLUDES grantees and NSF centers



Engineering Research Centers take on complex research challenges

ERCs focus cutting-edge researchers from multiple fields to discover and launch ubiquitous future technologies

- Translate discoveries into innovations
- Strengthen U.S. competitiveness
- Prepare next generation of technological leaders

14 Generation-3 ERCs in FY 2018

4 new ERCs awarded in FY17

- Innovative and Strategic Transformation of Alkane Resources, *Purdue University*
- Cell Manufacturing Technologies, *Georgia Tech*
- Cellular Metamaterials, *Boston University*
- Precise Advanced Technologies and Health Systems for Underserved Populations, *Texas A&M University*

Image: *National Academies Press, Copyright 2017, National Academy of Sciences*

A New Vision for Center-Based Engineering Research

May 2017: National Academies report

Summer 2017: Working group

October 2017: ENG AdCom discussion

November 3, 2017: Workshop

Spring 2018: Solicitation for GEN-4 ERC

Innovation Corps spurs entrepreneurship

Trains teams of faculty, students/postdocs, and business mentors

Translates NSF discoveries into new technologies

Involves people across NSF

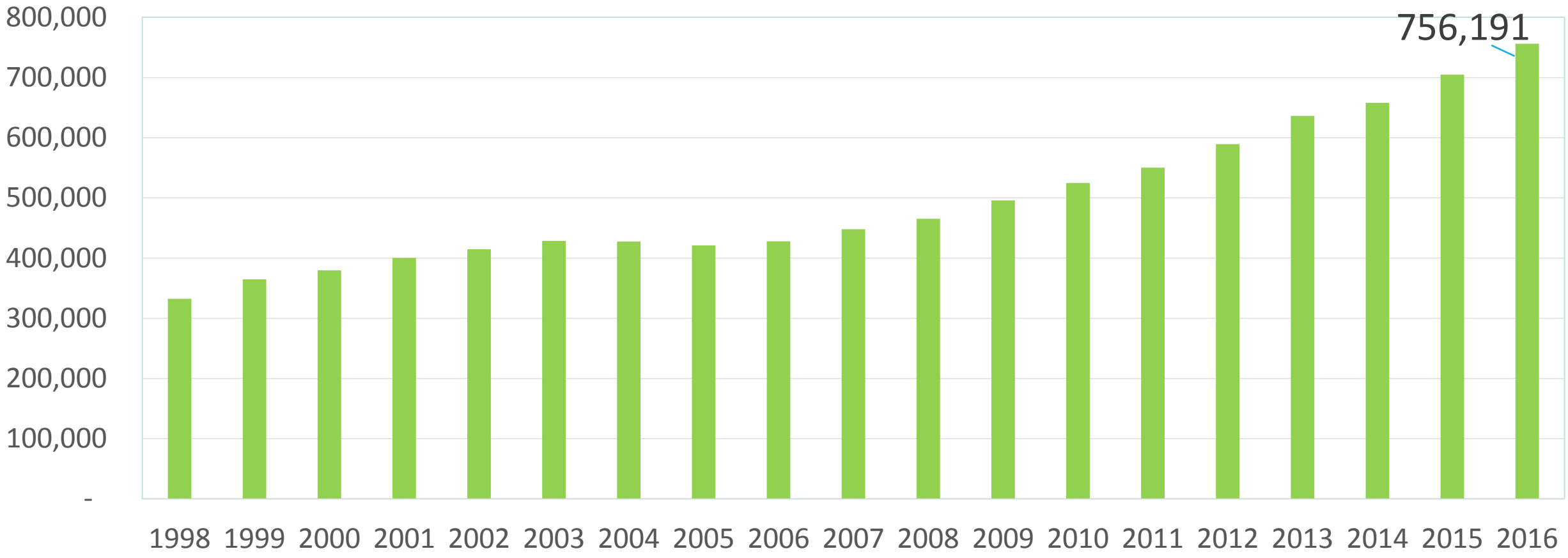
Since 2011:

- **1000+ teams**
- **50+ cohorts**
- **360+ startups**

NSF Responds to Hurricanes Harvey, Irma, and Maria

- Deadline extensions
- Mobilization of Geotechnical Extreme Events Reconnaissance (GEER) Association and Natural Hazards Engineering Research Infrastructure (NHERI) teams
- Funding of Rapid Response Research (RAPID), Early-concept Grants for Exploratory Research (EAGER) and supplements
- https://nsf.gov/naturaldisasters/

Burgeoning US Undergraduate Enrollment in Engineering



Data courtesy ASEE

Nearly 77% growth in 10 years!

Strategic Challenges and Opportunities

Struggling with diversity and inclusion despite increasing enrollment; uneven distribution across engineering disciplines

Flat or decreasing budgets

- Leading Engineering for America's Prosperity, Health and Infrastructure (LEAP HI)
- Partnerships
  - Industry (SRC, IUCRC, and other IIP programs)
  - Government (INFEWS USDA/NIFA, AFOSR, I-Corps)
  - International (Ireland, UK, China, Israel; CASIS)