

# COLLEGE OVERVIEW

2017

Amr Elnashai



**PennState**  
College of Engineering



# **COLLEGE OVERVIEW**

**2017**

*Accomplishments*



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# Percent Completion of Strategic Goals

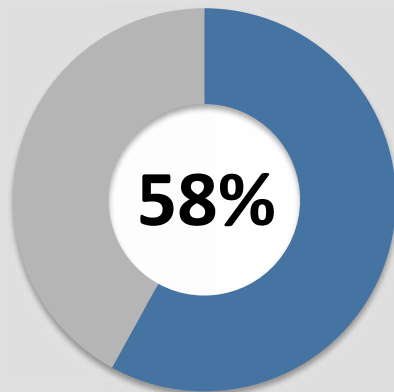


ACCOMPLISHMENTS

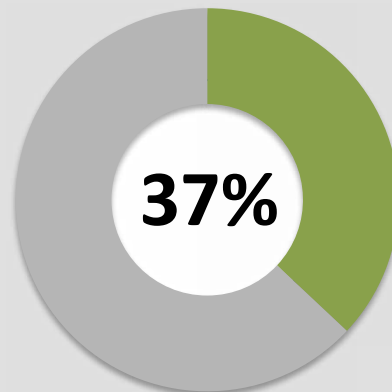
CHALLENGES

ASPIRATIONS

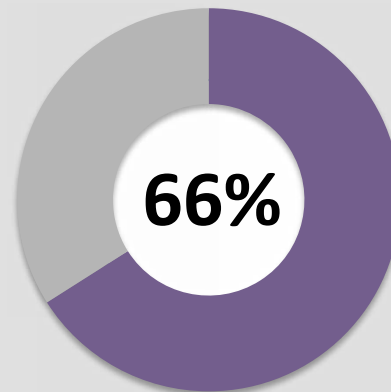
## Governance



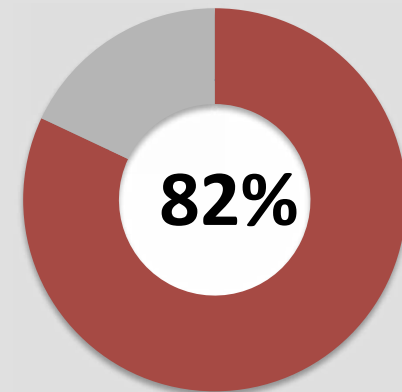
## Education



## Research



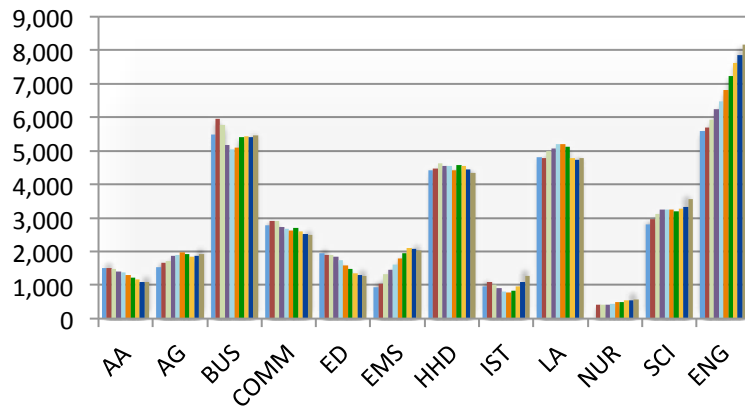
## Service



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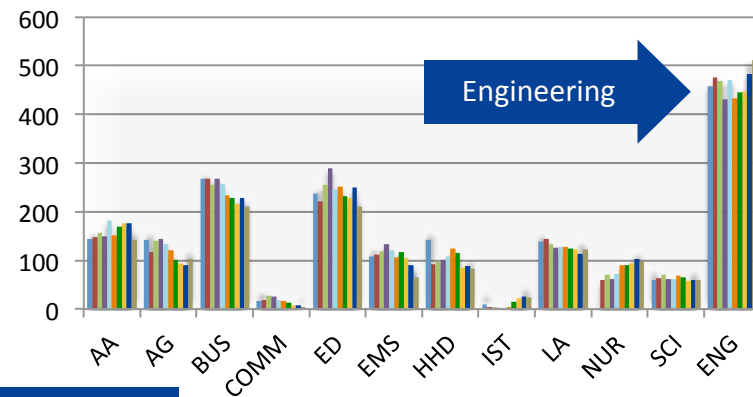
# Fall Headcount

10-Year Comparison: Fall UG Headcount



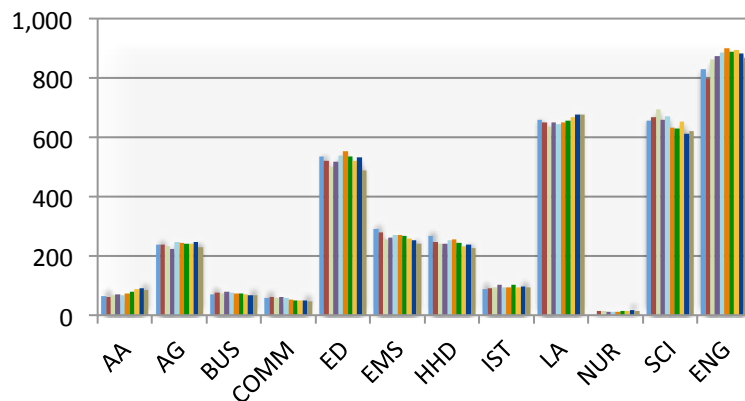
Engineering

10-Year Comparison: Fall Masters Headcount



Engineering

10-Year Comparison: Fall Ph.D. Headcount

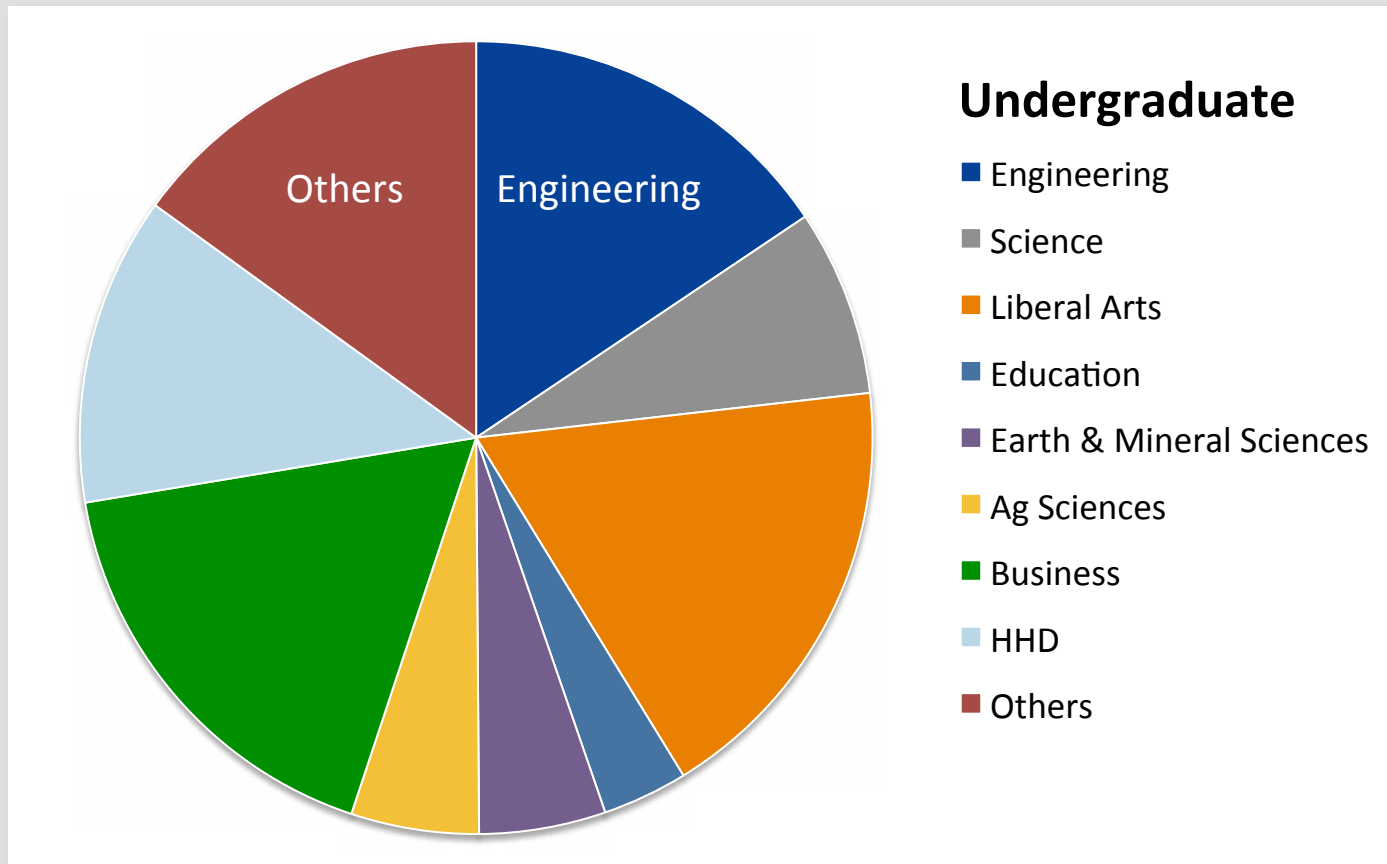


Engineering





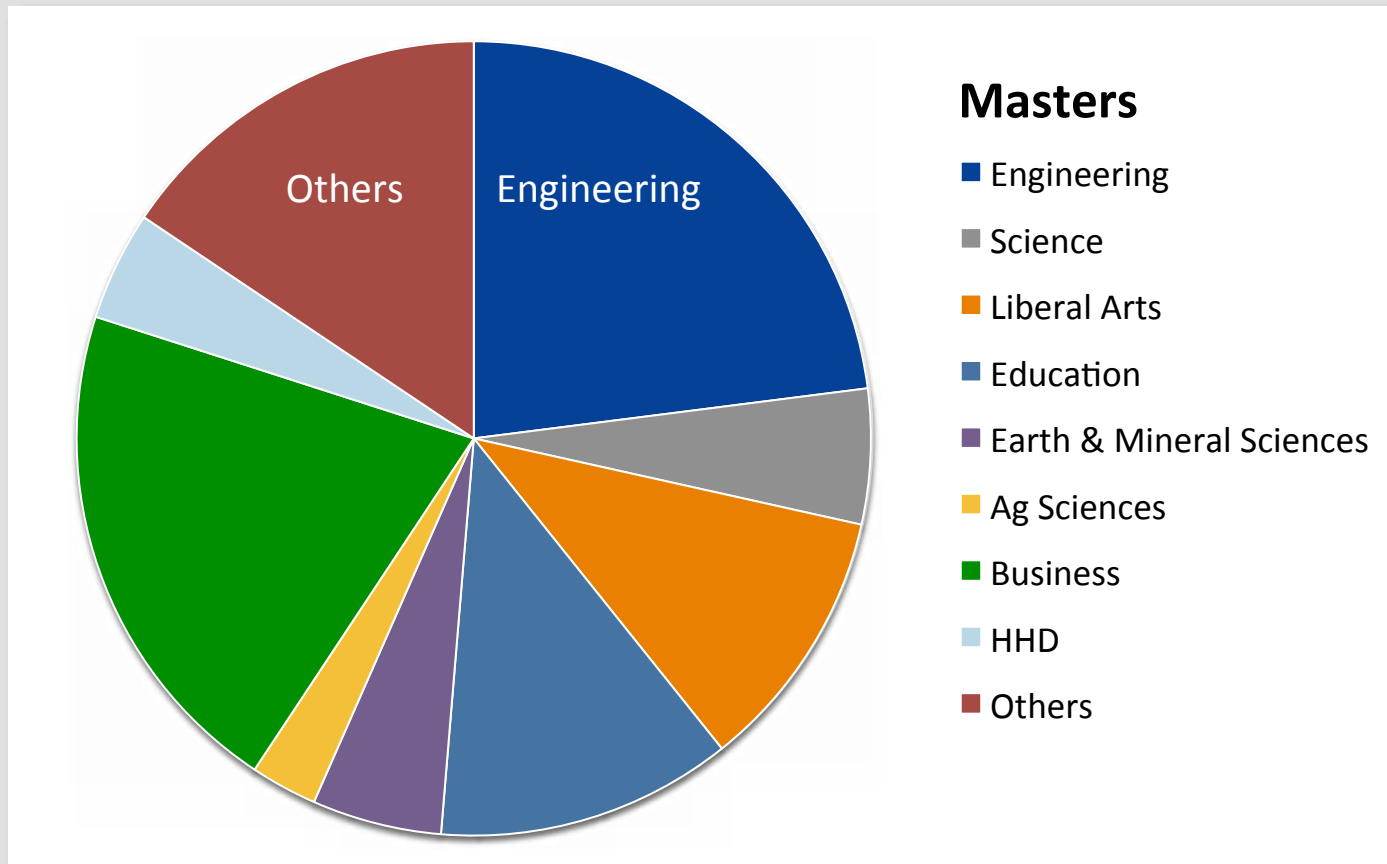
# Degree Comparison by College



Percentage of degrees awarded by University Park colleges in 2015-16.



# Degree Comparison by College

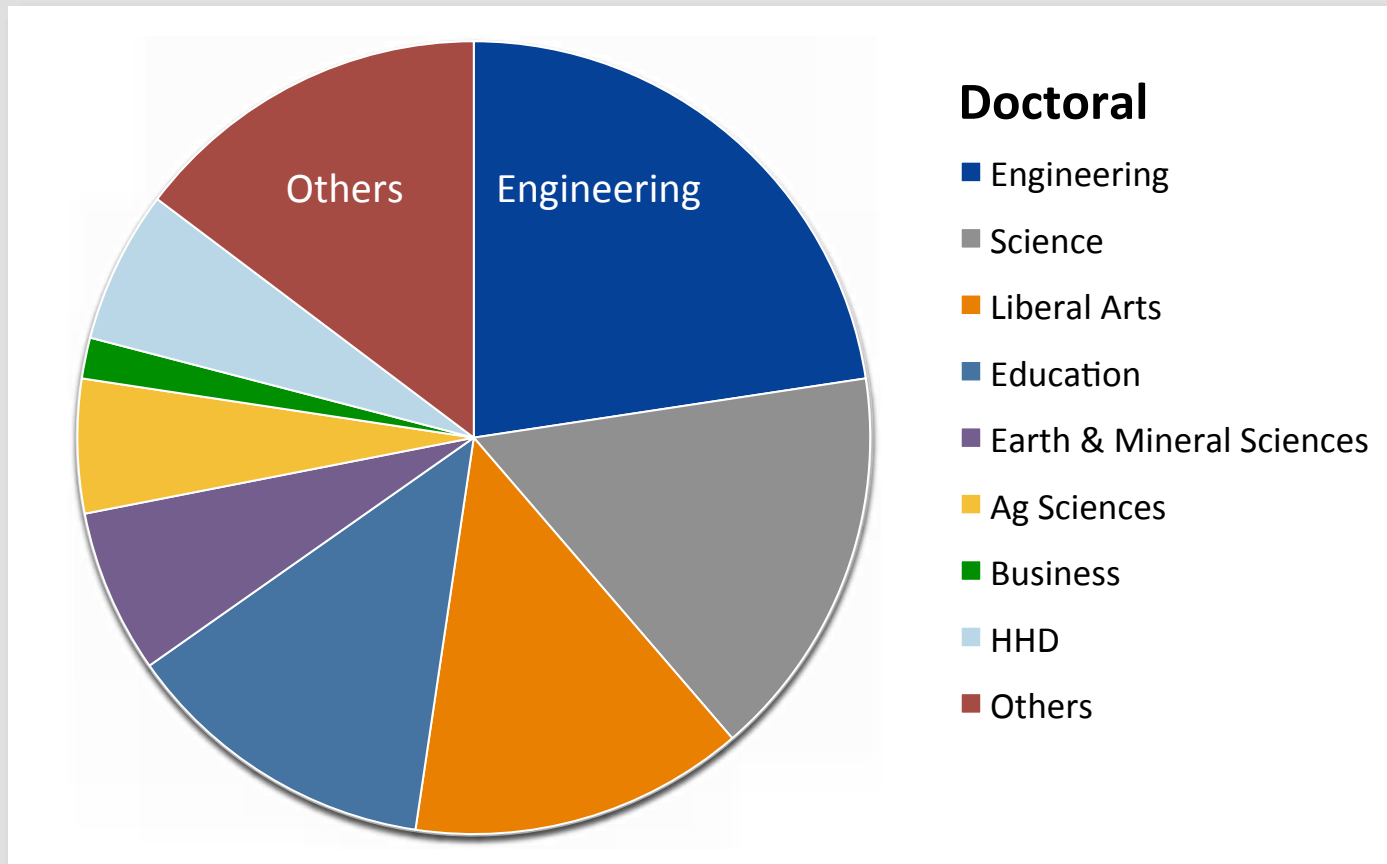


Percentage of degrees awarded by University Park colleges in 2015-16.





# Degree Comparison by College

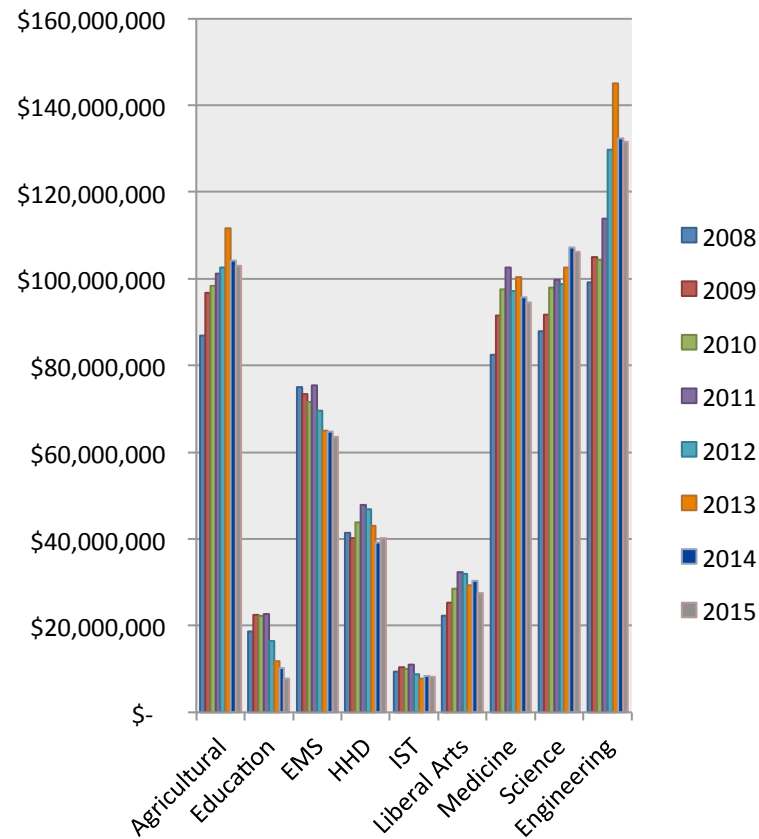


Percentage of degrees awarded by University Park colleges in 2015-16.



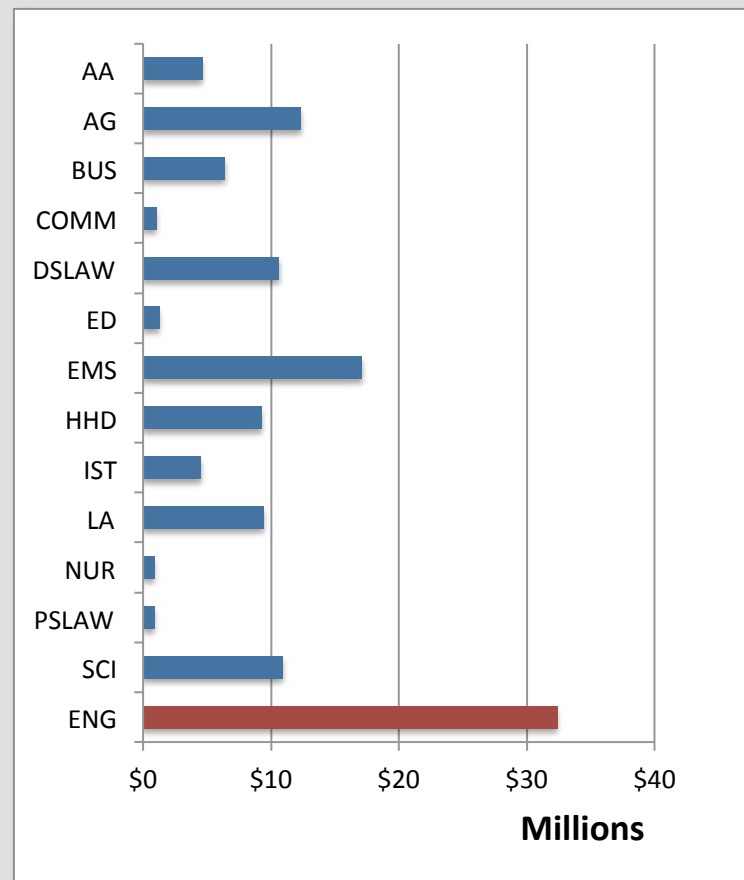
# Around Penn State

## Annual Research Expenditures



Data are based on PSU Annual Report of Research Activity

## Annual Gifts 2015-16





# People

ACCOMPLISHMENTS

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ASPIRATIONS



**THOMAS LA PORTA**

*Head of School of  
Electrical Engineering and  
Computer Science*



**CHITA DAS**

*Head of Computer  
Science and  
Engineering*



**KEVIN PARFITT**

*Interim Head of  
Architectural  
Engineering*



**PHILIP MORRIS**

*Interim Head of  
Aerospace Engineering*



**Erin Tench**

*Director of Alumni  
Relations*



**JENNIFER WU**

*Director of  
Data and Assessment*



**PRIYA BABOO**

*Director of Industry  
Innovation and  
Development*



**LIZ LARSEN**

*Interim Senior Director  
of Development*



**DIONTRE EARL**

*Major Gifts Officer*



**JEFFREY SAPP**

*Major Gifts Officer*



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# People



31 ADDITIONAL SEARCHES UNDERWAY



39 new professors

*(including co-hires with Huck, Rock, ICS, Science, Medicine, MRI)*



21 new staff

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# Female Students

8,371

Percentage of females in incoming class:

24%

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# Education

One-Year M.S. and M.Eng.  
Degrees Launched



16<sup>+</sup>

Students:

2014

0

2015

99

2016

147



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# Education

## Research Experience for Undergraduates

154	235	10	12
Multi-Campus	CERI	BEU	TAMU

### RESEARCH AT THE CAPITOL EVENT:

10 projects will represent Penn State

3 projects came through these programs



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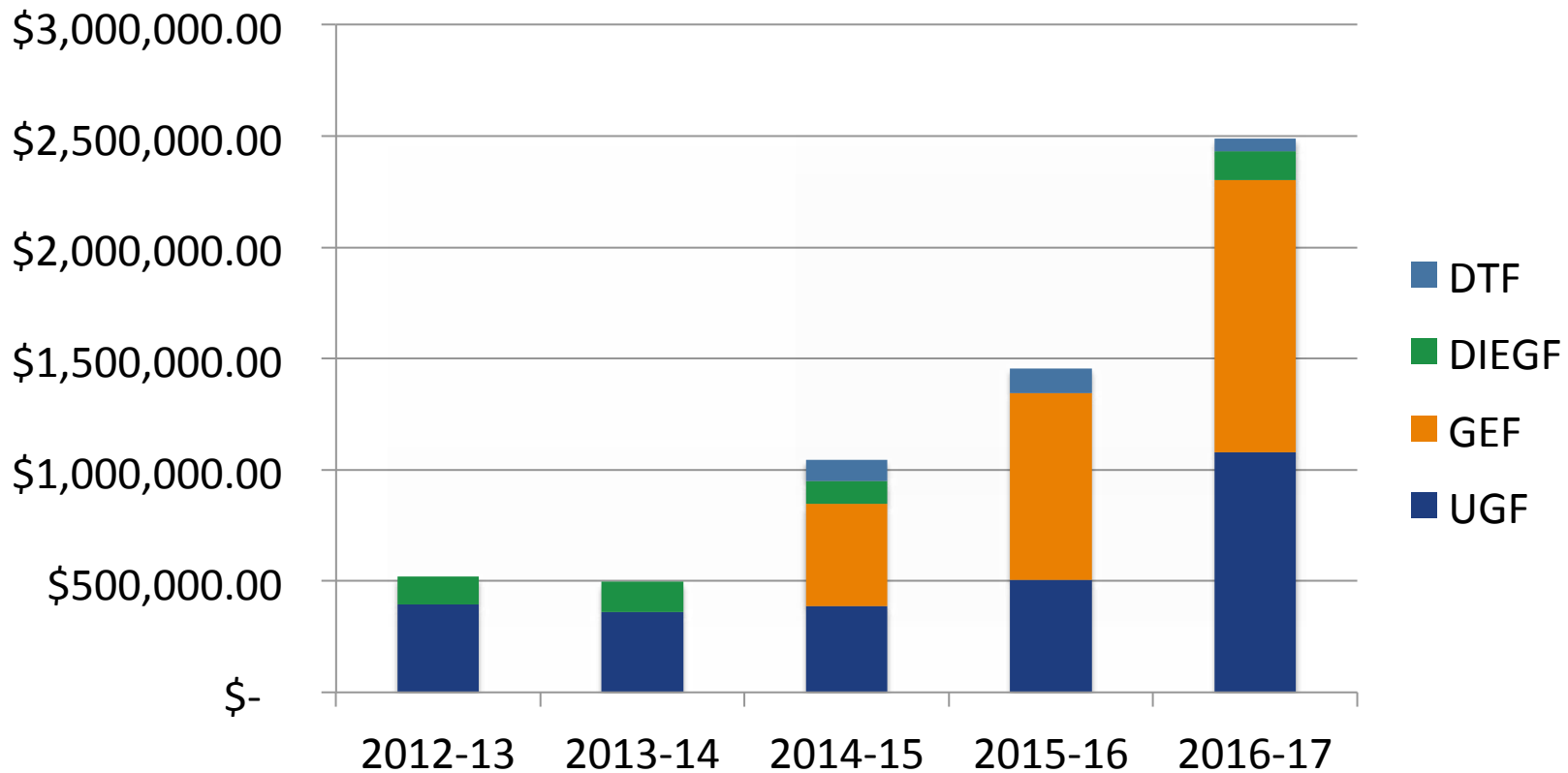
ASPIRATIONS

# Fellowship Funding

ACCOMPLISHMENTS

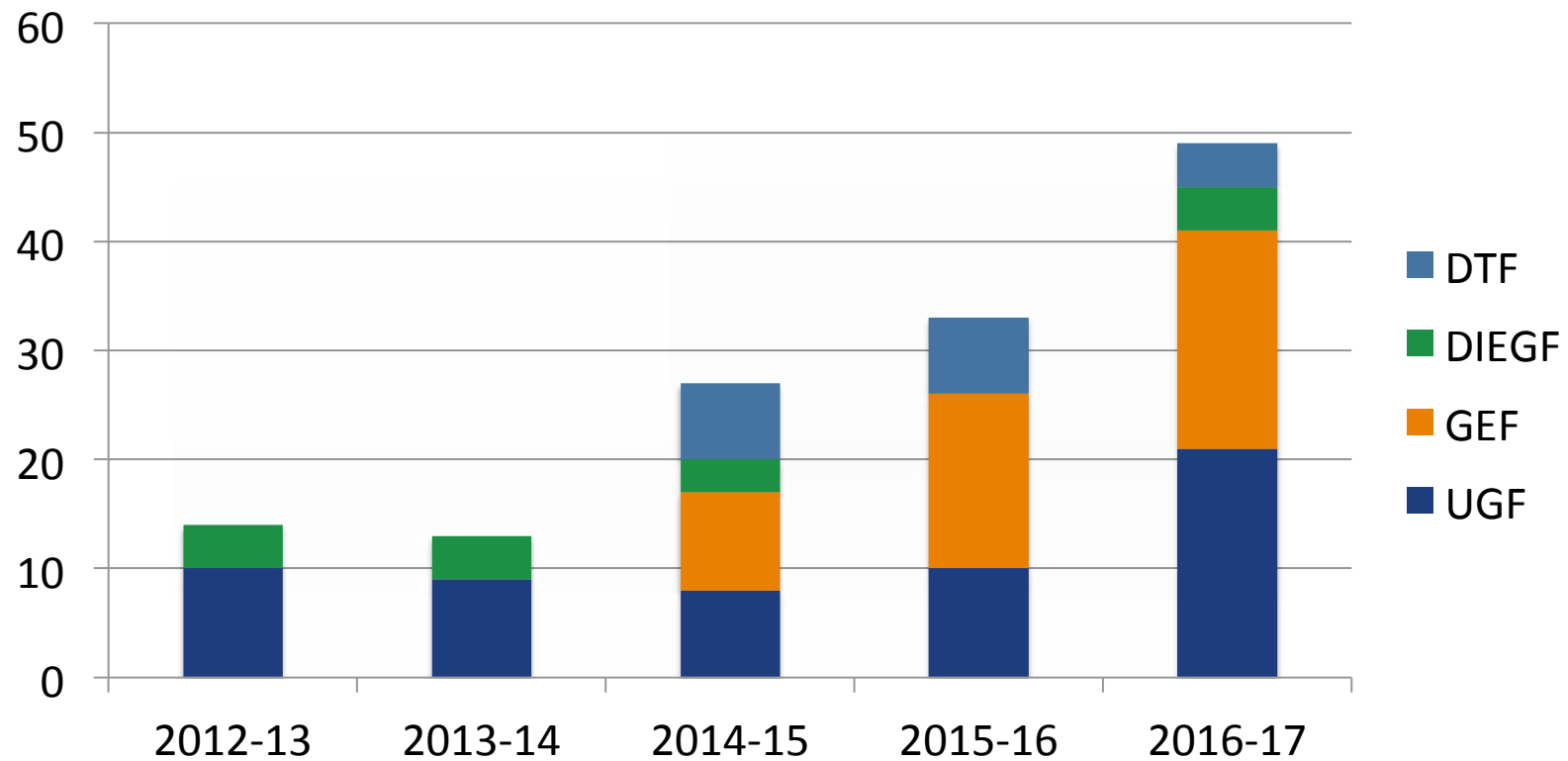
CHALLENGES

ASPIRATIONS





# Students Funded by Fellowships



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# Education



Progress in  
M.S. Definition



Expanded  
Online Program



New Digital  
Learning Office



National  
Grand Challenge  
Engineers

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# Research

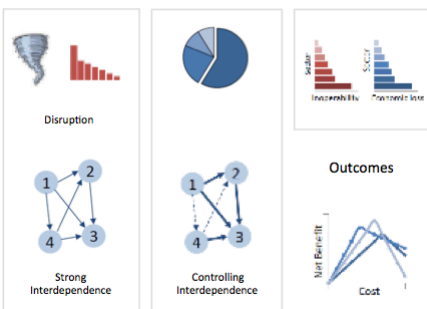
## Food-Water-Energy



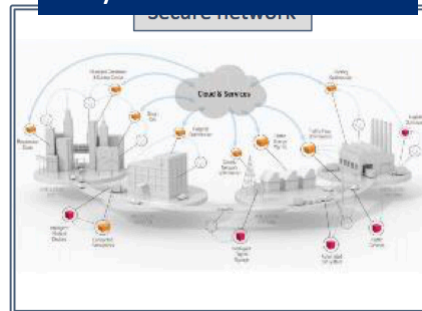
## Advanced Manufacturing



## Resilient Infrastructure



## Cyberenvironments



## Junior Faculty Research Mentoring

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# Accolades

**Lyle Long wins AIAA Aerospace Software Engineering Award »**  
12/16/2016

**Alex Rattner named 2016 Howes Scholar »**  
6/21/2016

**Joan Redwing named American Association for the Advancement of Science Fellow »**

**Engineering student, faculty receive ASME best paper award »**  
8/12/2016

**Computer Scientist's 'Musical Minds' earns him fellowship »**  
7/28/2016

**Long-Qing Chen named a Minerals, Metals and Materials Society Fellow »**  
2/2/2017

**with named American Institute of Aeronautics and Astronautics Associate Fellow »**

**Conrad Tucker named ASME Best Paper Award Winner »**  
10/24/2016

**ENGINE grants support innovation and entrepreneurship »**  
1/27/2017

**Akhlesh Lakhtakia elected Royal Society of Chemistry Fellow »**  
7/26/2016

**State road research center earns state training excellence award »**  
9/2/2016

**Engineering professor named one of five inaugural Moore Inventor Fellows »**  
11/14/2016

**Michael Tonks named Presidential Early Career Award winner »**

**Phillip Savage named CIC Department Executive Officer Fellow »**  
5/12/2016

**Patricia A. ... named ASME Best Paper Award Winner »**  
10/27/2016

**Penn State named one of five inaugural Moore Inventor Fellows »**  
8/26/2016

**Gül E. Kremer honored with prestigious engineering design award »**  
8/2/2016

**Six faculty named Dean's Fellows »**  
1/12/2017

**Pak Kin Wong named Society of Laboratory Automation and Screening Fellow »**  
10/24/2016

**Four Distinguished Teaching Fellows selected in the College of Engineering »**

**Penn State father and son win Canadian Society for Civil Engineering awards »**  
7/22/2016

**Bruce Logan named a Thomson Reuters 'Highly Cited Researcher' »**  
2/7/2017

**Two biomedical engineering faculty members named AIMBE Fellows »**  
1/18/2017

**Three Penn State researchers win Rustum and Della Roy Awards »**  
11/1/2016

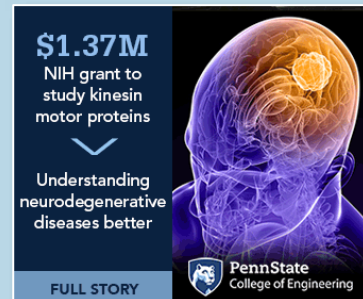
**Sumeet Gupta named ASME Best Paper Award Winner »**  
11/1/2016

**Farshad Rajabipour named American Concrete Institute Fellow »**  
1/9/2017



# Communications

## COLLEGE ONLINE MAGAZINE



## E-NEWSLETTER AD CAMPAIGN

## VIDEOS



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# Communications

## COLLEGE AND DEPARTMENT MONTHLY E-NEWSLETTERS



Students use 3D printing, milling, drilling, and newspaper to construct the held February 22, 2017, in Kurko Lounge as part of Engineers' 50.

MARCH 2017

### FEATURE

#### NSF CAREER Award for Rui Ni

Rui Ni, assistant professor of mechanical engineering at the Fluid Transport Lab, has received a National Science Foundation Early Career Development award to further understanding of the behavior of deformable liquid droplets in turbulent flow, the most common state of fluid nature, yet the least understood. >>

#### Department of Defense Awards Stuart (Shizhuo) Yin \$3M for Laser Research

Stuart (Shizhuo) Yin, professor of electrical engineering, has received a DoD funding to lead a multidisciplinary team to representatives from government and industry, to develop energy solid-state laser. >>

#### U.S. Geological Society Funds Study on Pollution of Oil/Gas Wastewater Spread on Roadways



FALL 2016

### FEATURES

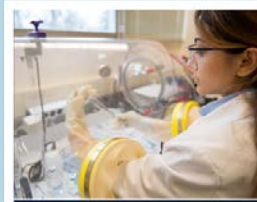
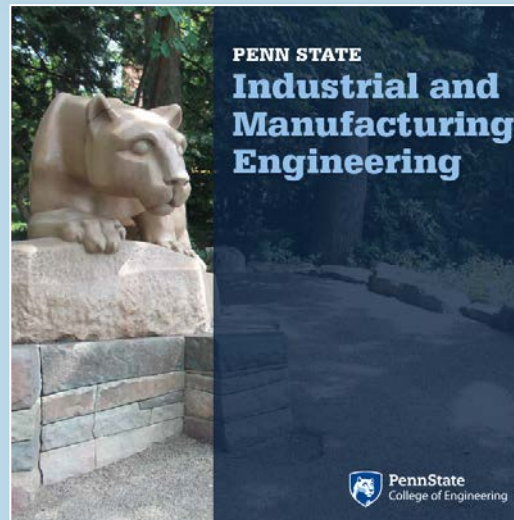
#### DOE awards \$1M to Penn State researchers to create composites for solid lithium conductors

A team of Penn State researchers led by Enrique Gomez, associate professor of chemical engineering, has received a \$1M U.S. Department of Energy ARPA-E award to develop solid ion conductors using the novel process, "cold sintering." >>

#### Growing ties and feeding nations

Wayne Curtis, professor of chemical engineering, is combining his love of plants and expertise in engineering to improve agricultural practices around the world.

Through a collaborative grant issued by the National Science Foundation's Basic Research to Enhance Agricultural Development (BREAD) program, he is working to assist African farmers with the production of agricultural food staples. >>



### Academic Units

- Acoustics
- Aerospace Engineering
- Agricultural and Biological Engineering
- Architectural Engineering
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Civil and Environmental Engineering
- Electrical Engineering and Computer Science
- Engineering Science and Mechanics
- Industrial and Manufacturing Engineering
- Mechanical and Nuclear Engineering
- Engineering Design, Technology, and Professional Programs

### Facilities

Buildings on Campus	48 (15 in core area, 33 nearby)
Buildings off Campus	Philadelphia, Pa.
Square Footage	739,000 sq ft
Class Labs	74,000 sq ft
Research Labs	210,000 sq ft

### Enrollment



### One-Year M.S./M.Eng. Programs

- Acoustics
- Aerospace Systems and Technology
- Architectural Engineering
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Computer Science and Engineering
- Electrical Engineering
- Engineering at the Nano-scale
- Engineering Design
- Engineering Leadership and Innovation Management
- Engineering Mechanics
- Engineering Science and Mechanics
- Environmental Engineering
- Facilities Engineering and Management
- Industrial Engineering
- Structural Engineering



### GRADUATE PROGRAMS IN Civil Engineering

Ready to work one-on-one with some of the best faculty in the country to broaden your expertise through hands-on research?

Our graduate programs will give you a stronger foundation in civil engineering and prepare you to apply your skills across a broad range of disciplines in both academia and industry. Participants join more than 150 current students, visiting scholars, and scientists from all over the world who are actively involved in research in areas such as geomechanics, materials, structures, transportation, and water resources.

Many of our graduate school alumni have become world-class leaders in their field or found positions as tenure-track faculty at leading universities.



#### Program Options

We offer a variety of educational and research programs to fit your goals.

- Graduate Degree Options:
  - M.Eng. in Civil Engineering
  - M.S. in Civil Engineering
  - Ph.D. in Civil Engineering

## MARKETING TO PROSPECTIVE GRAD STUDENTS



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# In the News

CNN

Money

Forbes



WIRED



YAHOO!  
FINANCE

GEN

Genetic Engineering & Biotechnology News



3D PRINTING  
INDUSTRY

SEMICONDUCTOR ENGINEERING



NGT News | Next-Gen  
Transportation®

MIT  
Technology  
Review

NETWORKWORLD  
FROM IDG



Newsweek

GCN

iQ

SCIENTIFIC  
AMERICAN

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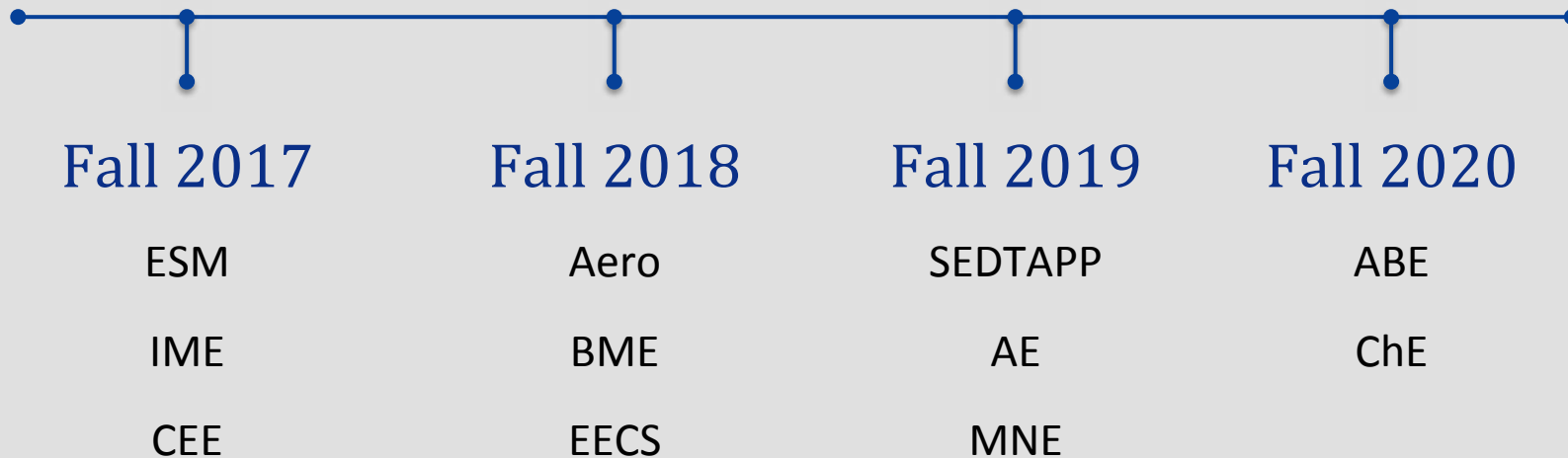


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## DEPARTMENTAL REVIEWS

Related to education and research, to add to finance and personnel reviews of spring 2016



# Governance

1

Raise awareness of the challenges

2

Help College build inclusion skills

3

Build new infrastructure

4

Address resource-based issues



*Enhancing the Learning & Working  
Environment at Penn State Engineering*

**SURVEYS COMPLETED**

**2,466**

**RESPONSE RATE**

**25%**

Undergraduate: 20%

Graduate: 30%

Faculty: 45%

Staff: 69%

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CHALLENGES

ASPIRATIONS



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# Governance

**\$144M**  
ESTIMATED TOTAL COST

**194k+**  
ESTIMATED SQ. FT.

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CHALLENGES

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# Governance



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# Governance



E-knowledge Commons Groundbreaking



Agricultural Engineering Building



## The Collaboratory

90,000 sqft / \$110M

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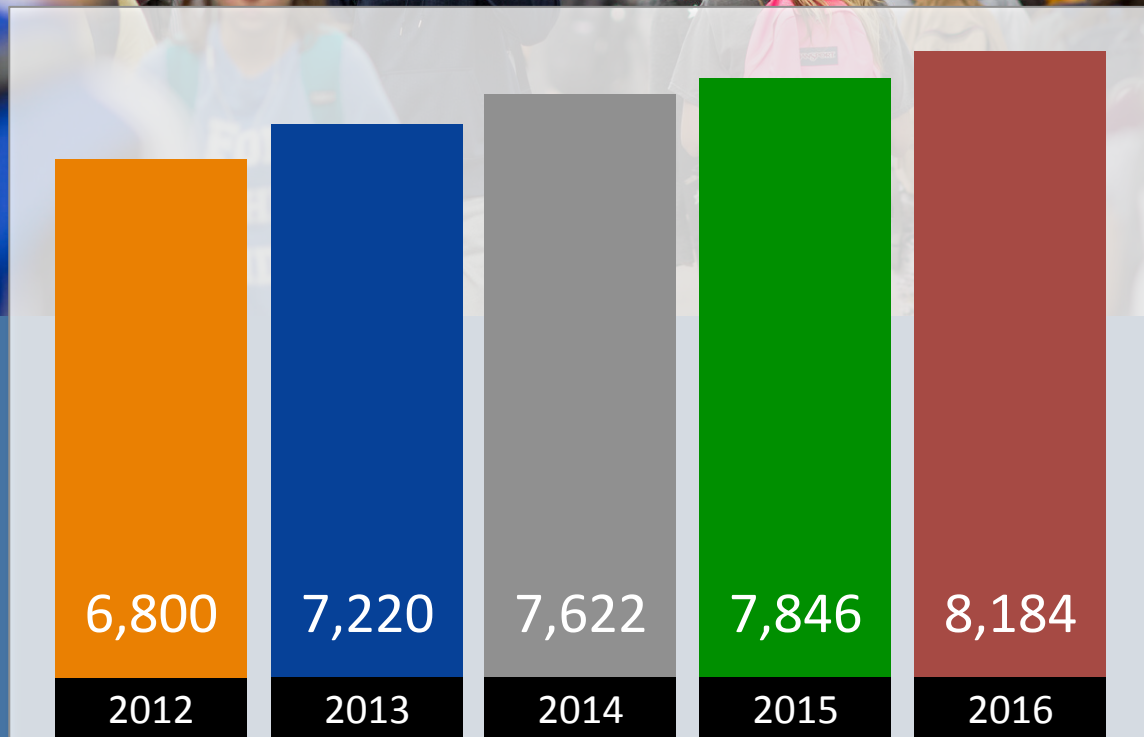
*2017*

*Challenges*



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# Undergraduate Fall Enrollment



FA2007-FA2015 data based on iTwo Official Enrollment dashboard data. FA2016 data based on official enrollment data provided by the University Budget Office.



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# Research

## CHALLENGES

- 800 proposals valued at \$350M (typical number is 700)
- Retention of research admin staff members due to stressful deadline-driven activity, over-burden of volume, and opportunities elsewhere
- Growth in proposal numbers and complexity
- Demand for research admin professionals elsewhere due to retirements, central SIRO
- Long Penn State contract negotiation times

## SOLUTIONS BEING EXPLORED

### Organizational structure

- Assistant director
- Load-level via staff cross-training
- 'Right-size' coordinator staff
- Creating career progression model

### Proposal submission process

- Improve tools and processes
- Allow faculty and departments to draft budgets
- Allow some aspects to slide until time of award
- Stream-lining of proposal submission
- Sharing effort with Central (at cost)





# Comparison with Top 12 (2015)

Ratio of PSU ENGR Metric-to-Average of Top 12

79%

T/TT Faculty

166%

Undergraduates (per faculty)

28%

Masters

59%

Ph.D.

34%

Research \$

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# Challenges



Management of  
non-tenure track  
careers



Achieving a  
balanced budget



Modernizing our  
IT teams



Expanding the  
graduate program



Increasing UG  
students with  
global experience



Increasing  
fundraising income

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ASPIRATIONS



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# Unsuccessful Efforts



Increasing permanent budget consistent with college's contribution



Expanding staff to address stress and retention issues



Securing support for 5-year resource allocation plan

(Blueprint for Global Preeminence in Engineering, November 2015)

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# **COLLEGE OVERVIEW**

*2017*

*Aspirations*



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# Aspirations / 2017-18



Hiring an excellent dean of engineering



Collaboratory, refurbishment funds, Hammond, Sackett, Units, EE West



Expand corporate engagement in research, education, and fundraising



Concluding discussions to change Entrance-to-Major



Create interdisciplinary majors/minors



Taking full advantage of size and capability of alumni base



Strengthening the residential tuition-based M.S. and MEng;  
Create new societal challenge-based M.S. and MEng

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CHALLENGES

ASPIRATIONS



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# Dean's Score Card

## EDUCATION

Enhance the fundamental undergraduate educational experience	B-/C
Initiate residence/online cross-Department/cross-College UG majors and minors	C/D
Offer and expand one-year, non-thesis MS and MEng degrees	A+
Strengthen and expand Ph.D. programs	A
Identify and address issues affecting the environment	A+/?

## RESEARCH

Develop innovative, interdisciplinary research groups	A
Increase research collaborations within Penn State	A
Increase college-wide research collaborations with universities, industry, and global partners	B
Enhance the quality of key laboratories and infrastructure	F

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CHALLENGES

ASPIRATIONS



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# Dean's Score Card

## SERVICE

Increase faculty contribution/influence in national and international technical and policy-making committees

D/F

Raise the profile of and facilitate engaged service on college and campus committees as well as in support of the Commonwealth, the U.S., and international committees

B

## GOVERNANCE

Enhance business operations, fiscal management, and administrative/academic tasks by faculty and staff

B

Align committees and sub-units with the College priorities

B+

Recast the financial system to directly support the fundamental functions

F

Strengthen institutional affiliation and effectiveness

C/D

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CHALLENGES

ASPIRATIONS



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