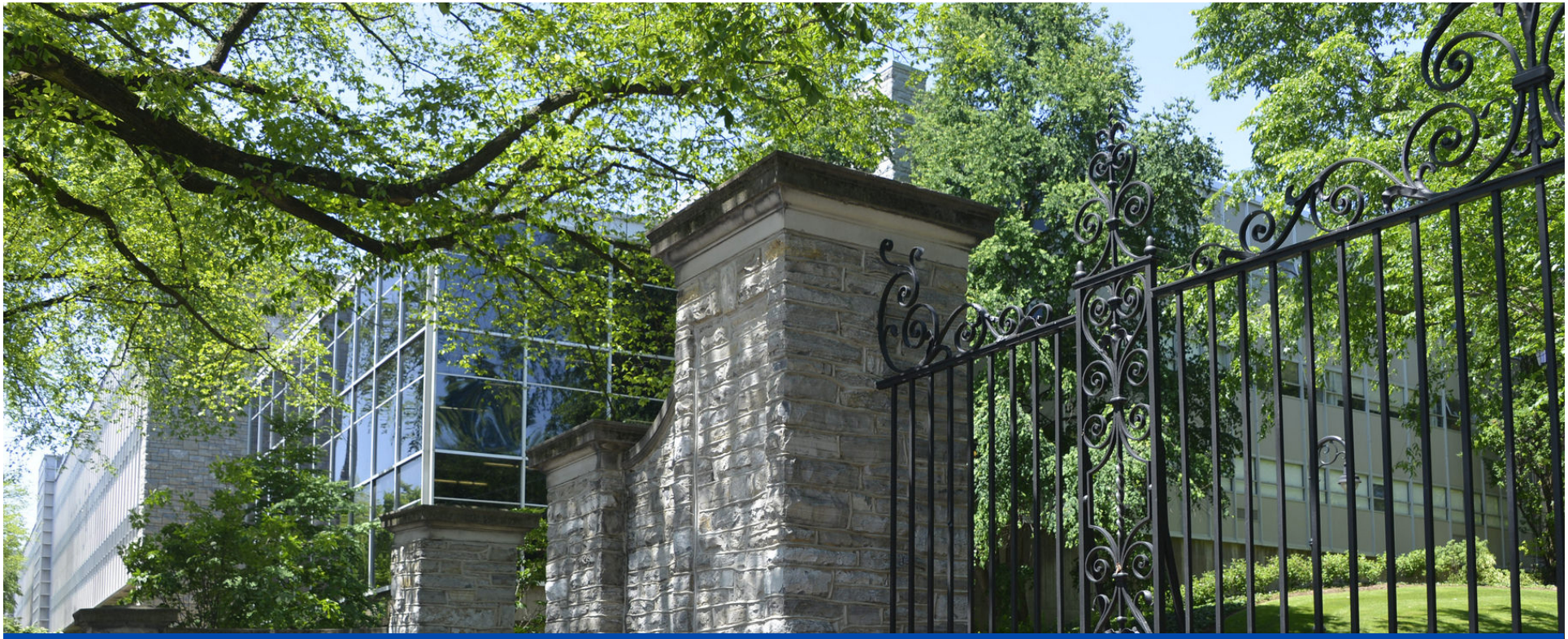
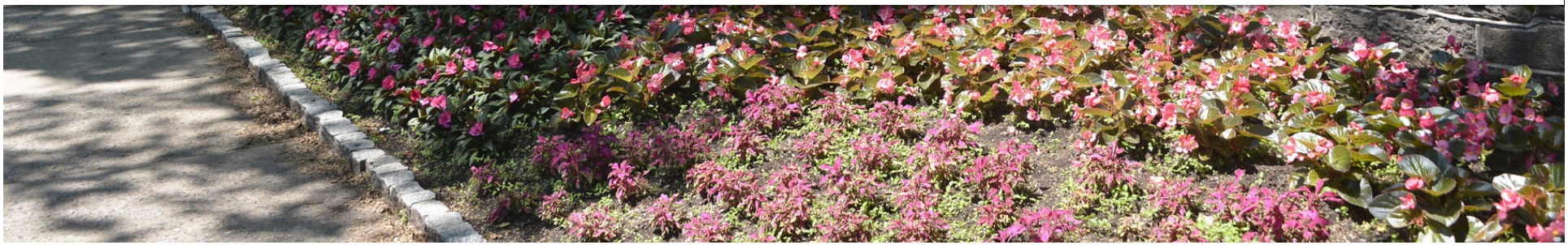


2014 Overview of the College

Amr Elnashai

PennState
College of Engineering



Good-to-Great

"Every institution has its unique set of irrational and difficult constraints, yet some make a leap while others facing the same environmental challenges do not."

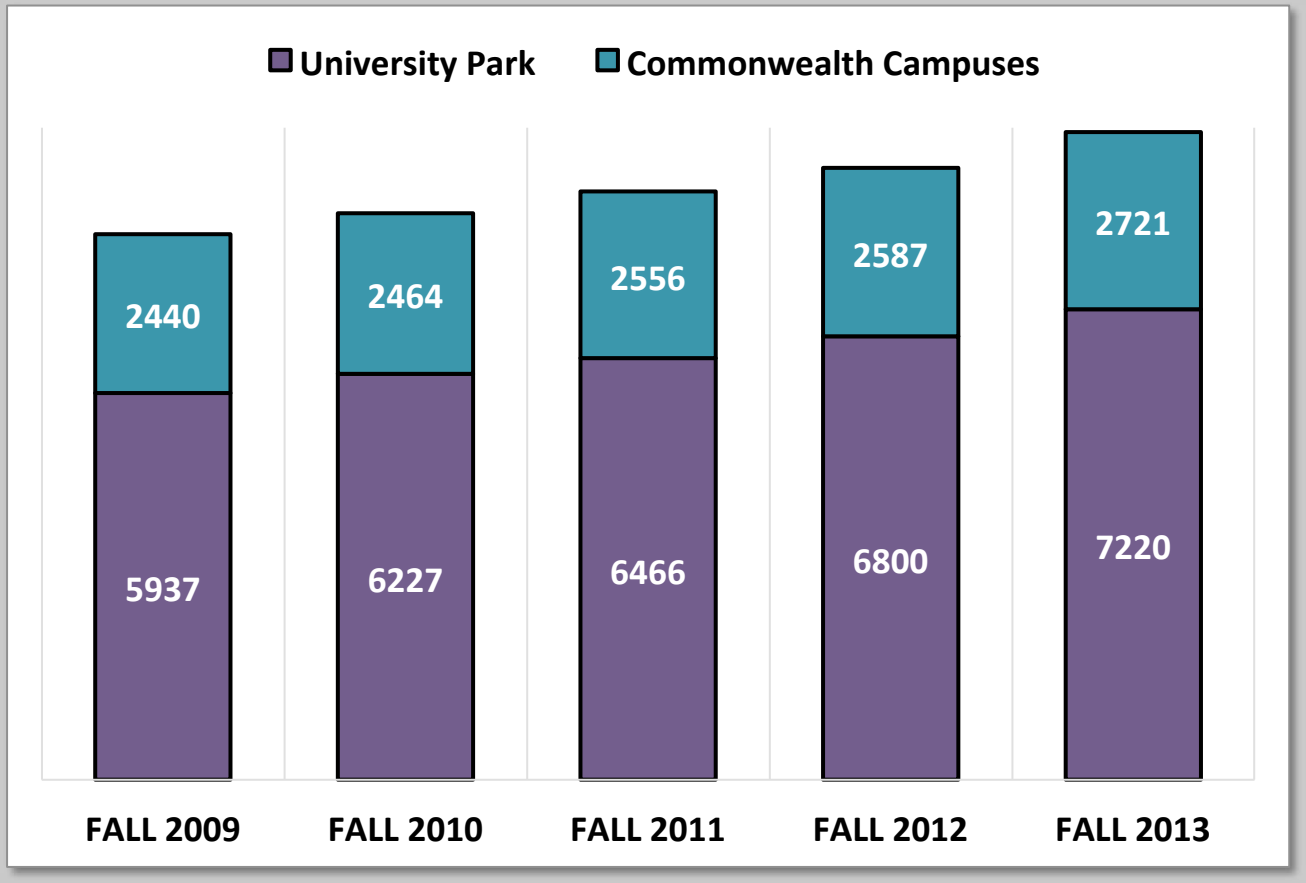
– Jim Collins in 'Good-to-Great and the Social Sector'

PennState
College of Engineering

State of the College

PennState
College of Engineering

Undergraduate Enrollment



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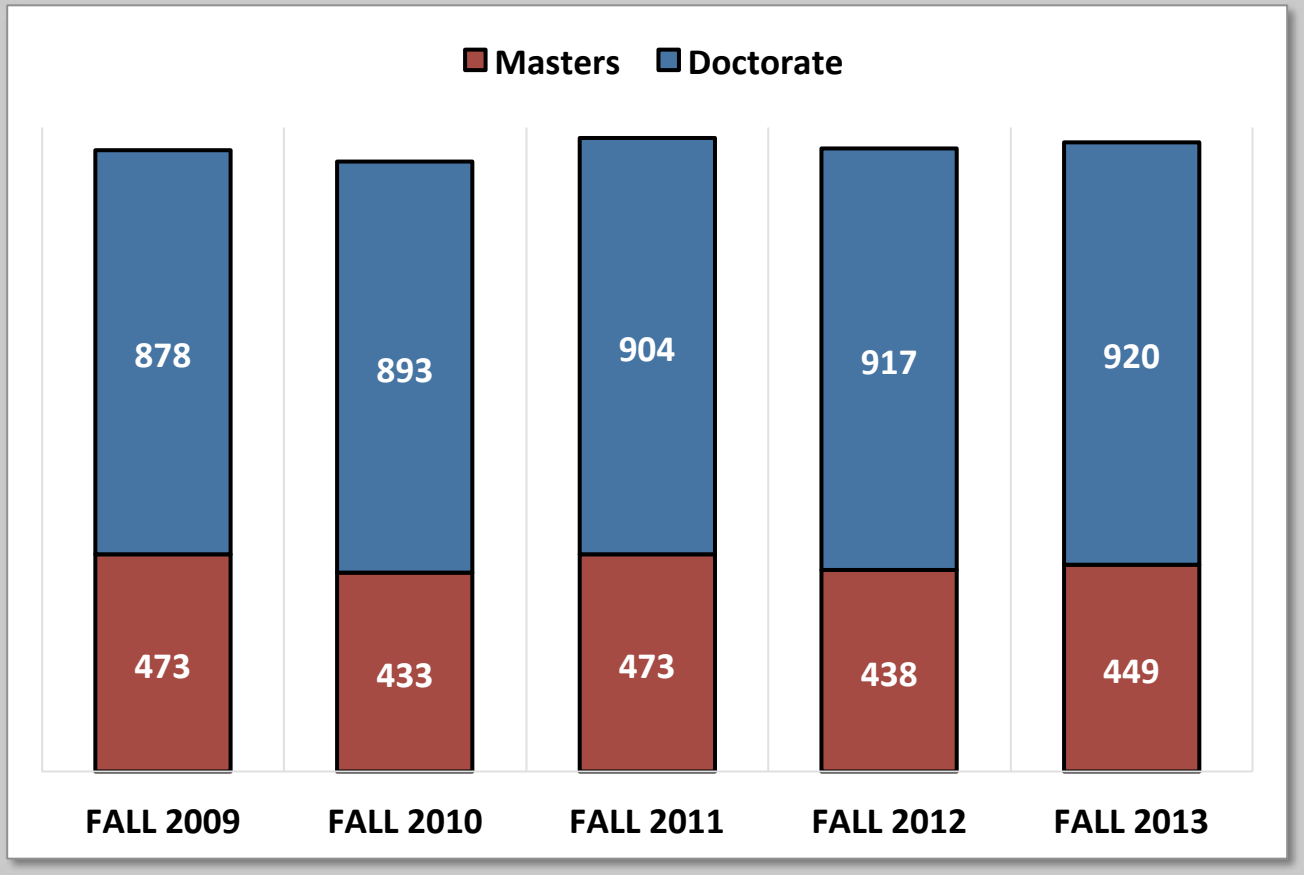
Graduate Enrollment



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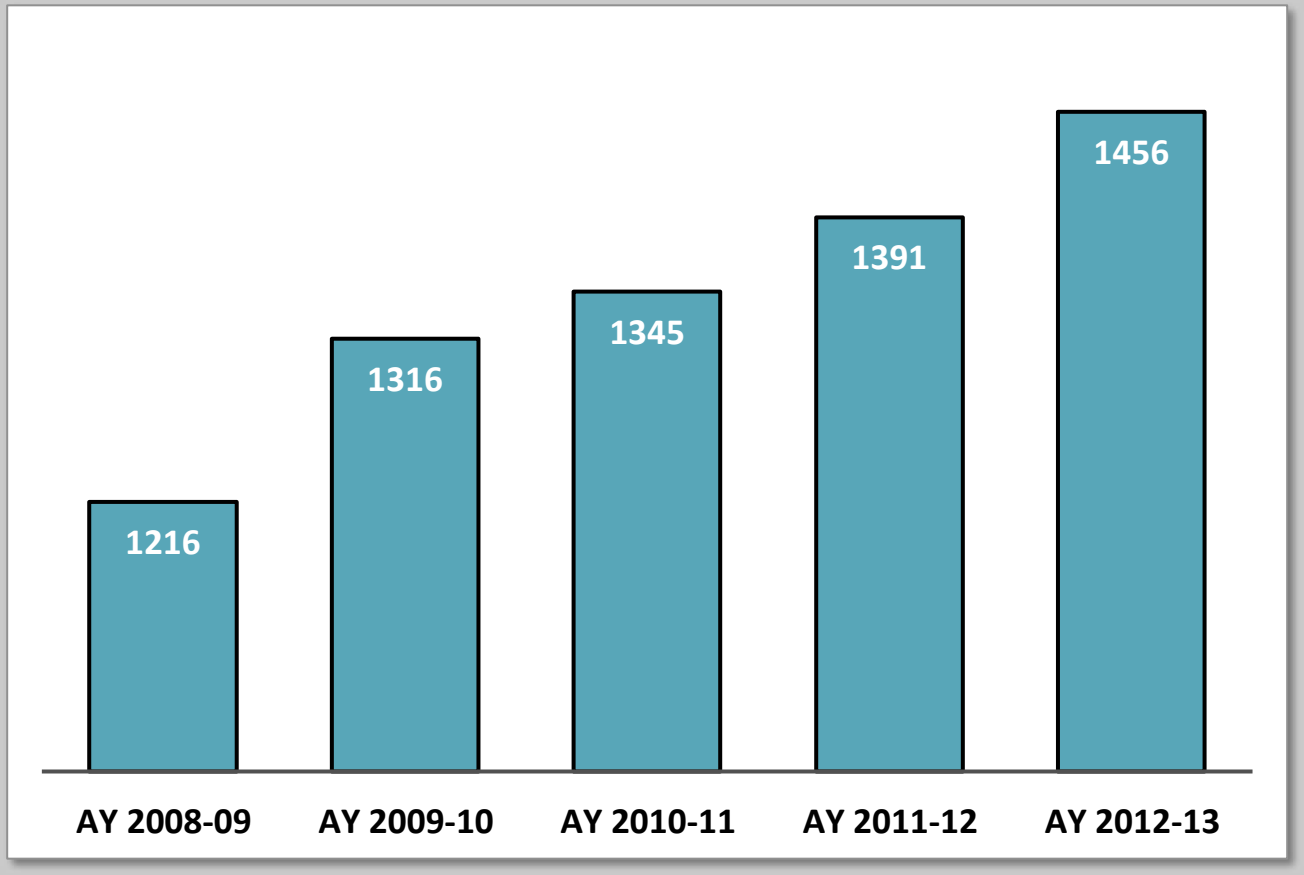
Baccalaureate Degrees Conferred



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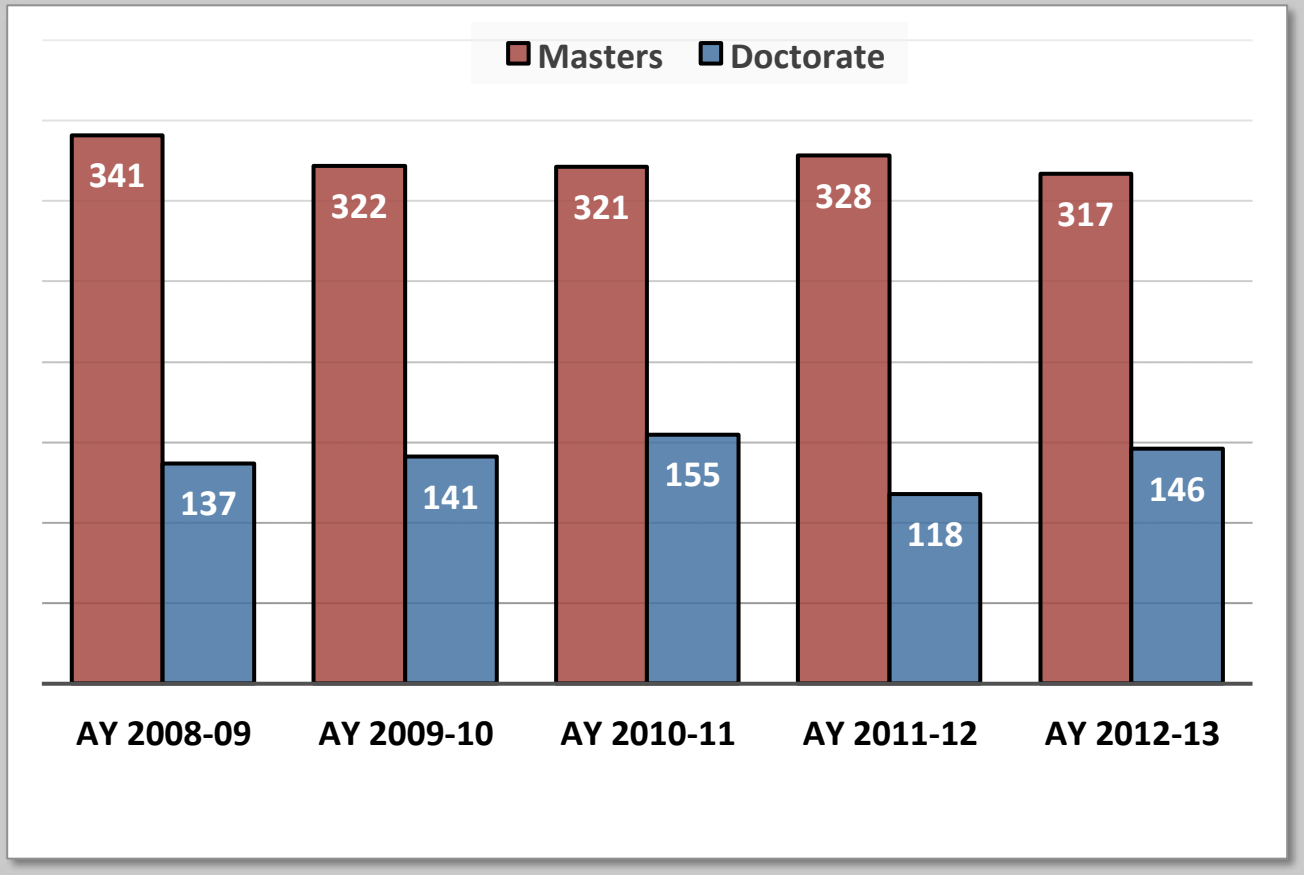
Graduate Degrees Conferred



PennState
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Enrollment - University Park Colleges

College	% Change	Change	Fall 2013	Fall 2012	Fall 2011	Fall 2010	Fall 2009
Agriculture	12%	201	1911	1965	1904	1861	1710
Arts and Architecture	-17%	-243	1228	1291	1365	1411	1471
Business	-6%	-368	5405	5092	5029	5164	5773
Communications	-7%	-206	2691	2618	2672	2720	2897
Division of Undergraduate	27%	691	3256	3152	3079	2814	2565
Earth, Mineral Sciences	49%	640	1959	1801	1617	1457	1319
Education	-22%	-414	1482	1589	1743	1837	1896
Engineering	**22%**	**1283**	**7220**	**6800**	**6466**	**6227**	**5937**
Health, Human Dev.	-1%	-43	4572	4427	4544	4547	4615
Information Science, Tech.	-18%	-181	823	775	817	910	1004
Liberal Arts	2%	111	5111	5197	5196	5074	5000
Nursing	18%	75	496	483	443	427	421
Science	2%	71	3201	3255	3235	3251	3130
TOTAL UP Colleges	*4%*	*1617*	*39355*	*38445*	*38110*	*37700*	*37738*

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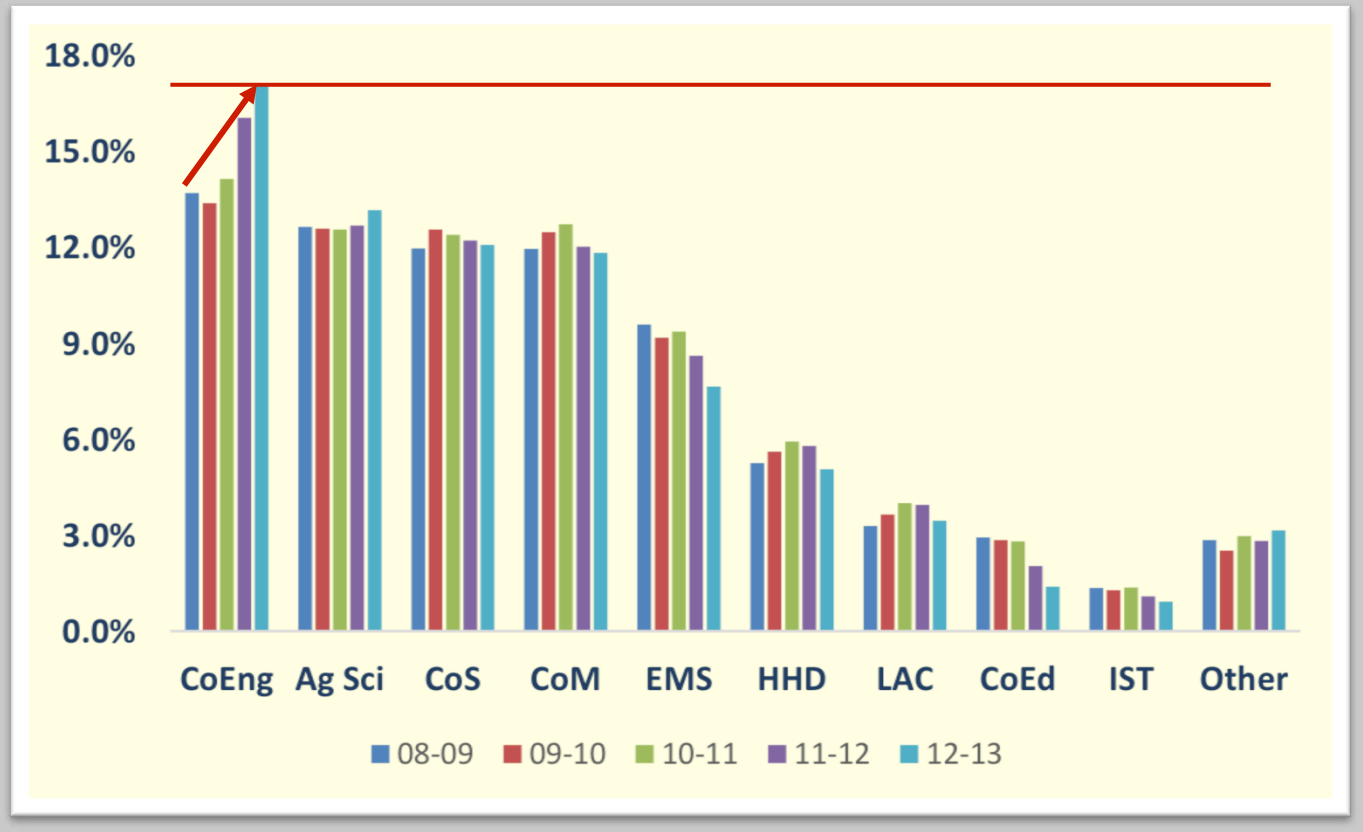
UP Colleges – Research Expenditure



Percentage of UP Total

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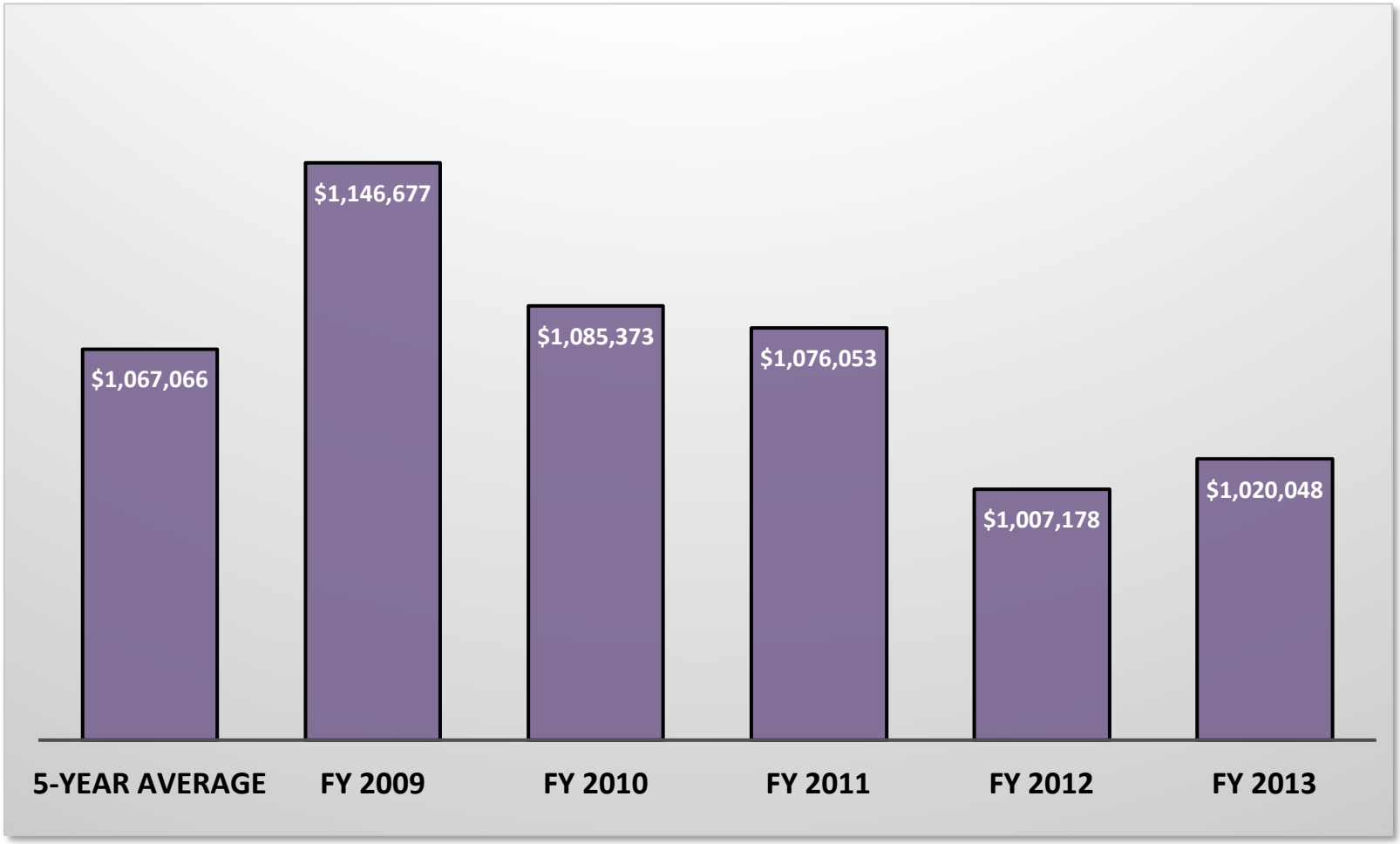
Development – Annual Gifts



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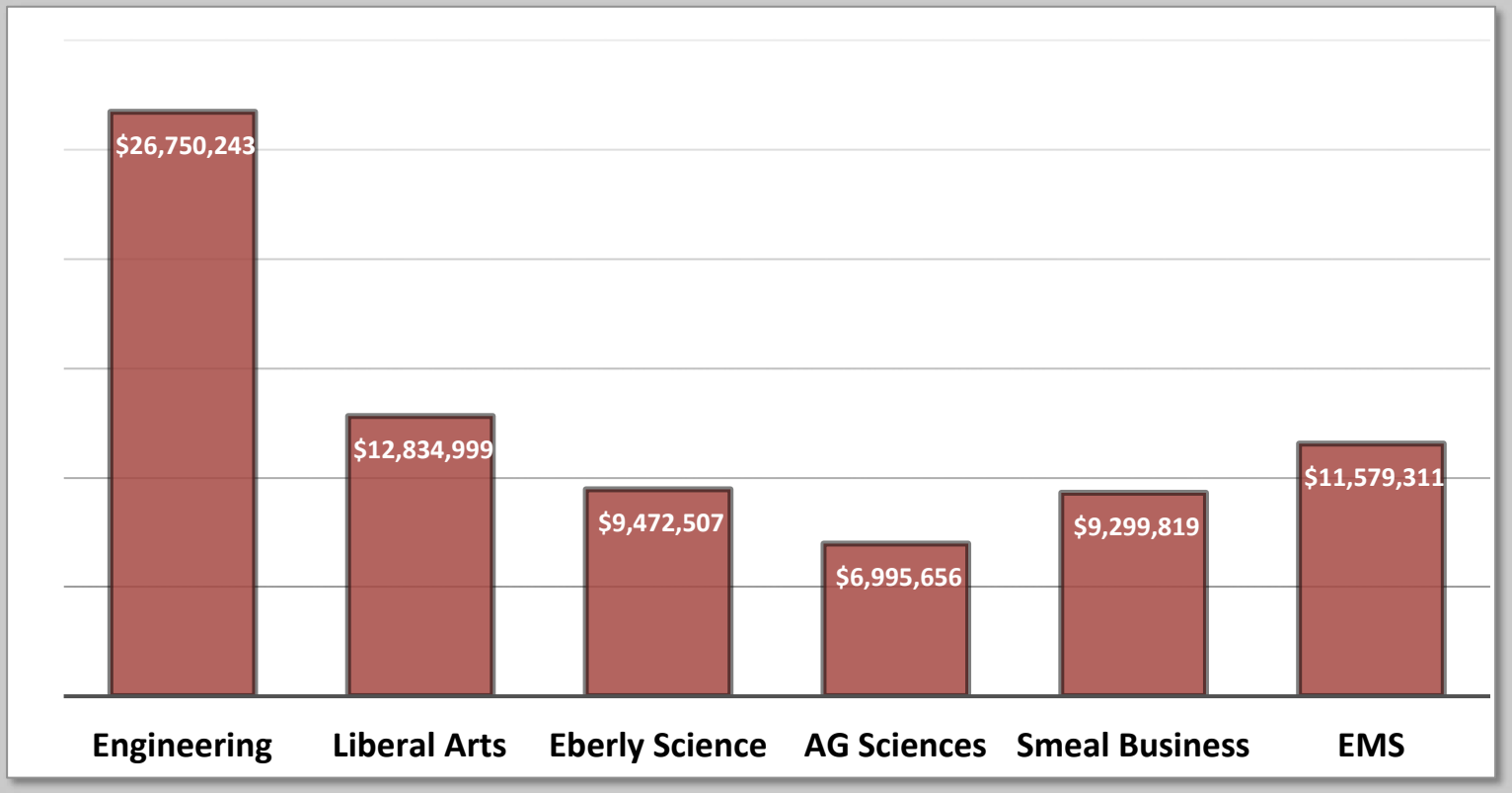
Endowment Comparisons



Annual Average of 5 Years

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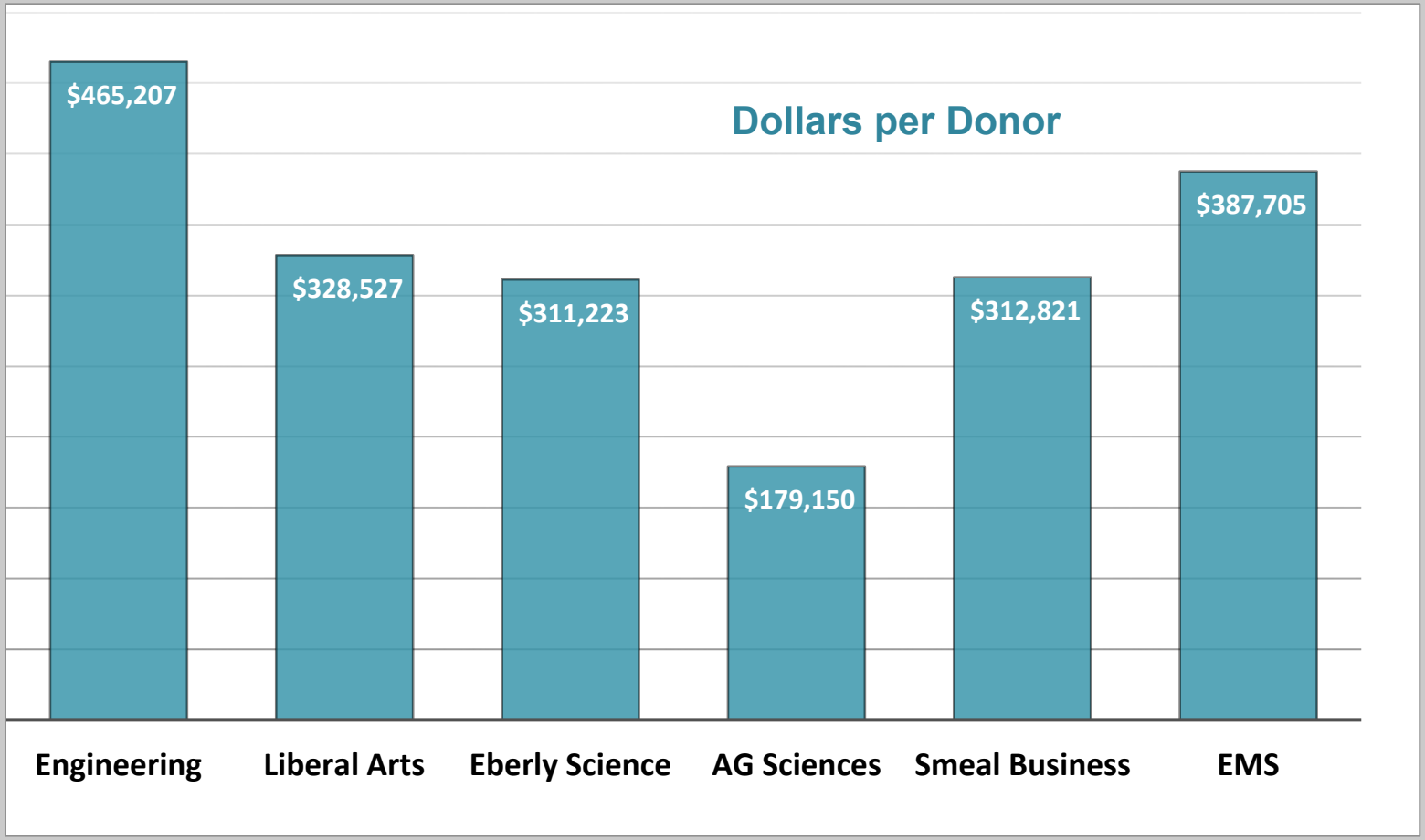
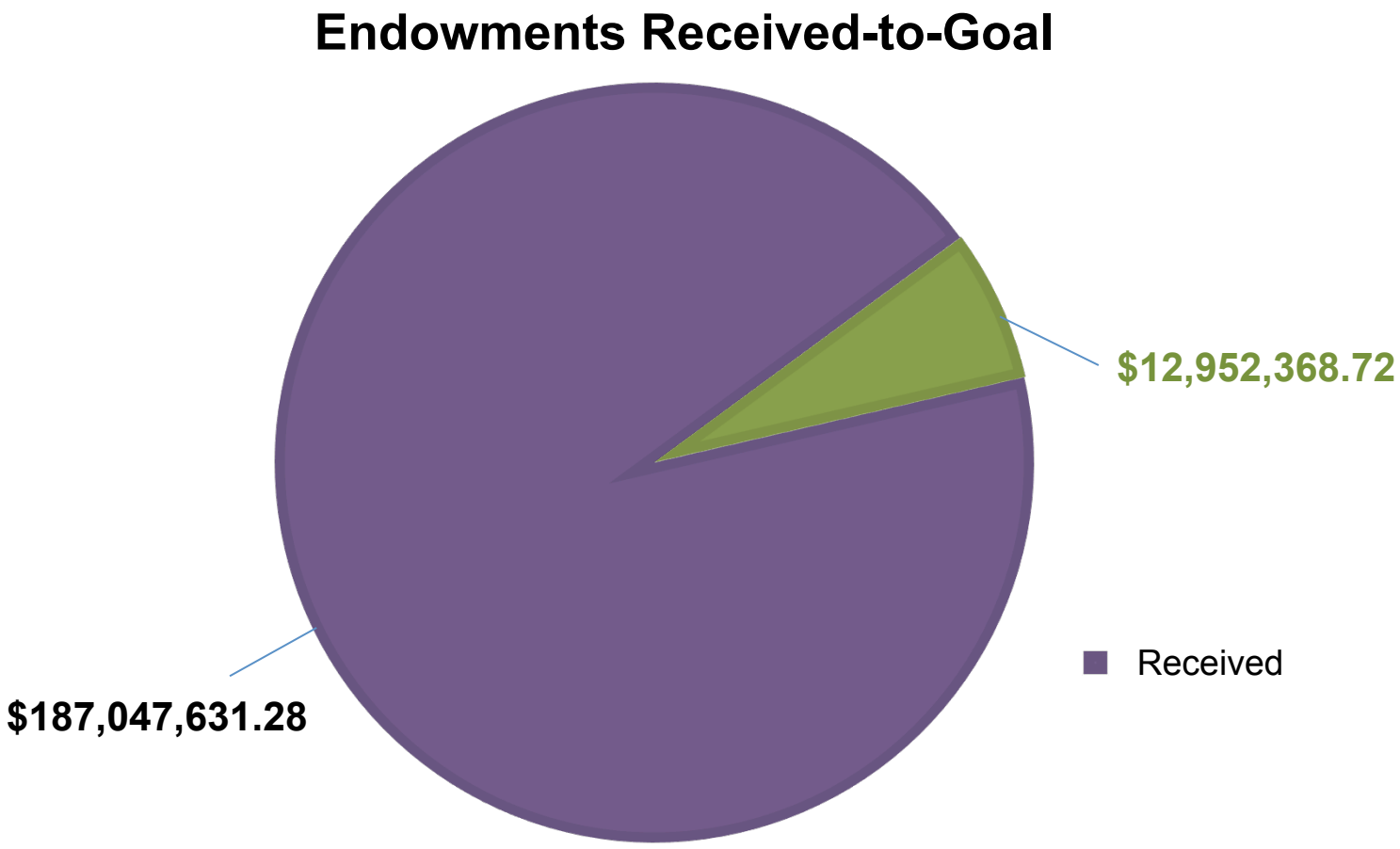
Comparison of Academic Units



Average of 5 Years

PennState
College of Engineering

Campaign Goal $200 Million



PennState
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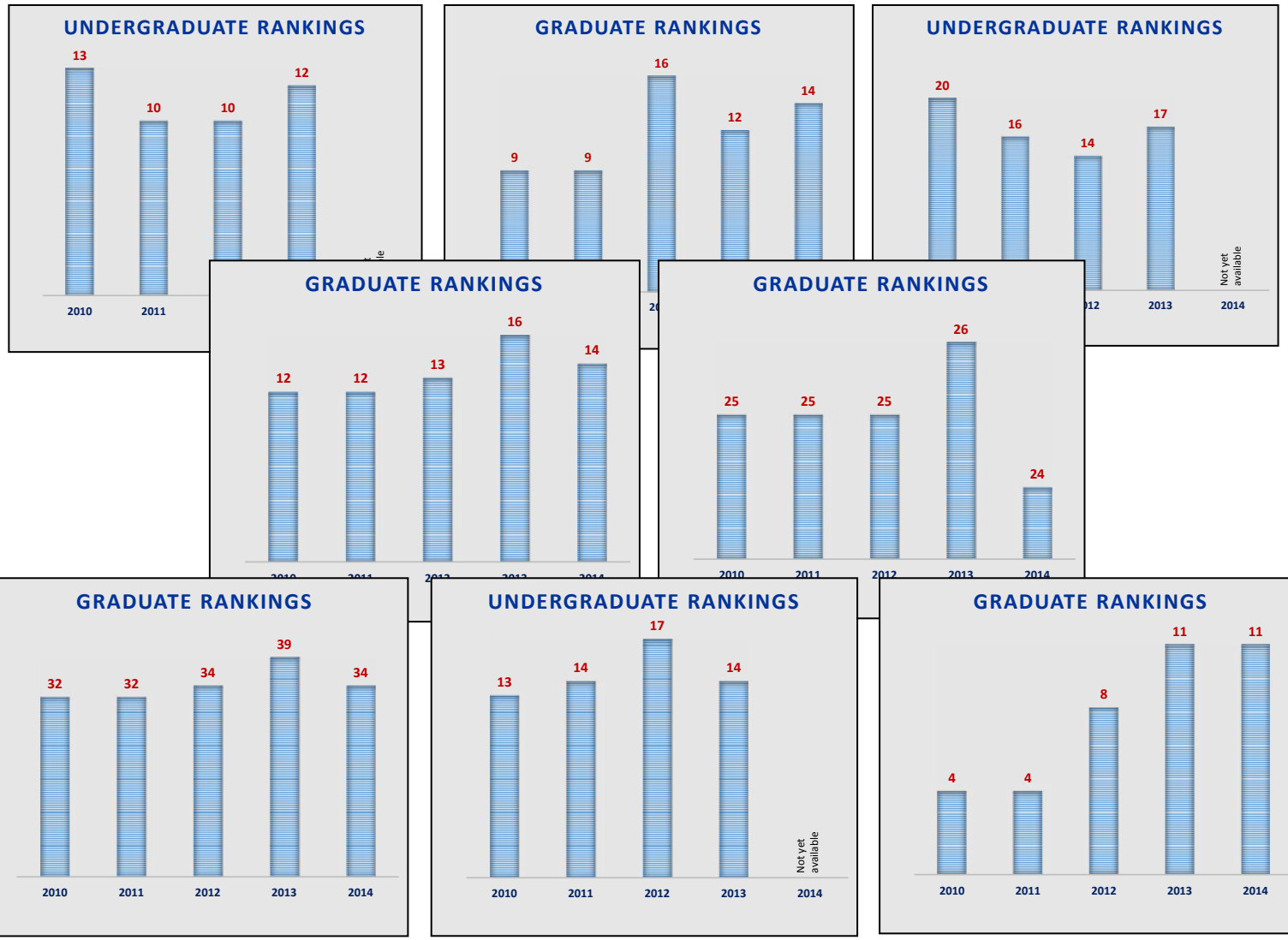
Departmental Ranking



PennState
College of Engineering

College Metrics

College of Engineering	UG Ranking	Grad Ranking	T/TT Faculty	UG Students	MS	UG/Fac.	MS/Fac.	PhD	PhD/fac.	Research $	$/faculty
MIT	1	1	371	2706	1071	7	2.9	1740	4.7	$332,463,000	$896,127
Stanford	2	2	217	2914	1479	13	6.8	1770	8.2	$197,409,000	$909,719
Berkeley	3	3	225	3469	330	15	1.5	1466	6.5	$192,495,000	$855,533
CalTech	3	4	92	489	22	5	0.2	565	6.1	$88,955,000	$966,902
GT	5	5	462	8597	1142	19	2.5	1958	4.2	$195,419,000	$422,985
UIUC	5	5	403	7558	1114	19	2.8	1696	4.2	$236,410,660	$586,627
UMich	7	9	366	5665	1360	15	3.7	1561	4.3	$196,024,000	$535,585
CMU	8	5	153	1722	1001	11	6.5	780	5.1	$204,380,028	$1,335,817
Cornell	8	13	242	3192	768	13	3.2	922	3.8	$132,414,000	$547,165
UT Austin	10	11	274	5276	519	19	1.9	1295	4.7	$163,883,000	$598,113
Purdue	10	8	297	7497	790	25	2.7	1499	5.0	$222,250,000	$748,316
Averages			**282**	**4462**	**872**	**16**	**3.1**	**1387**	**5.2**	**$196,554,790**	**$763,899**
Penn State	**16**	**25**	**335**	**8523**	**521**	**25**	**1.6**	**1091**	**3.3**	**$152,322,978**	**$454,695**
Percent Comparison					60%	161%	49%	79%	63%	77%	60%
Target Change					**40%**	**-61%**	**51%**	**21%**	**37%**	**23%**	**40%**

Note that to compare similar numbers, PSU Engineering includes engineering degrees in other colleges and Commonwealth campuses - 2012

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Observations and Implications

- Undergraduate Program Size
- Faculty Size
- Graduate Program
- Research Expenditure
- Technical Fields
- Intellectual Footprint
- Quo vadimus?

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Academic Management Through Strategic Planning and Implementation

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Research Universities

"We must strive to be sure that research universities fulfill their promise as a learning environment that is remarkably well suited to the coming era – one in which undergraduates, graduate students, and faculty alike share in the discipline, joy and continual renewal of original research and scholarship."

– Chuck Vest, late president of the National Academy of Engineering, past president of MIT, from 'Pursuing the Endless Frontier'

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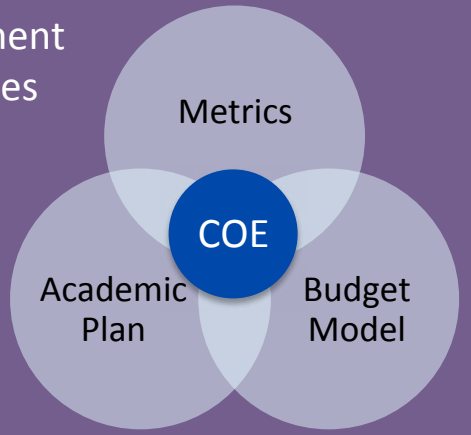
Academic Management

THE USUAL

- Most of academe have no multiyear budget planning
- Strategy documents are not turned into plans
- Funds are historically and reactively allocated
- No relationship between goals and expenditure

BENEFIT OF OPERATIONAL MODEL

- Support academic strategy through investment
- Increase transparency and accountability
- Plan for investment and contingencies



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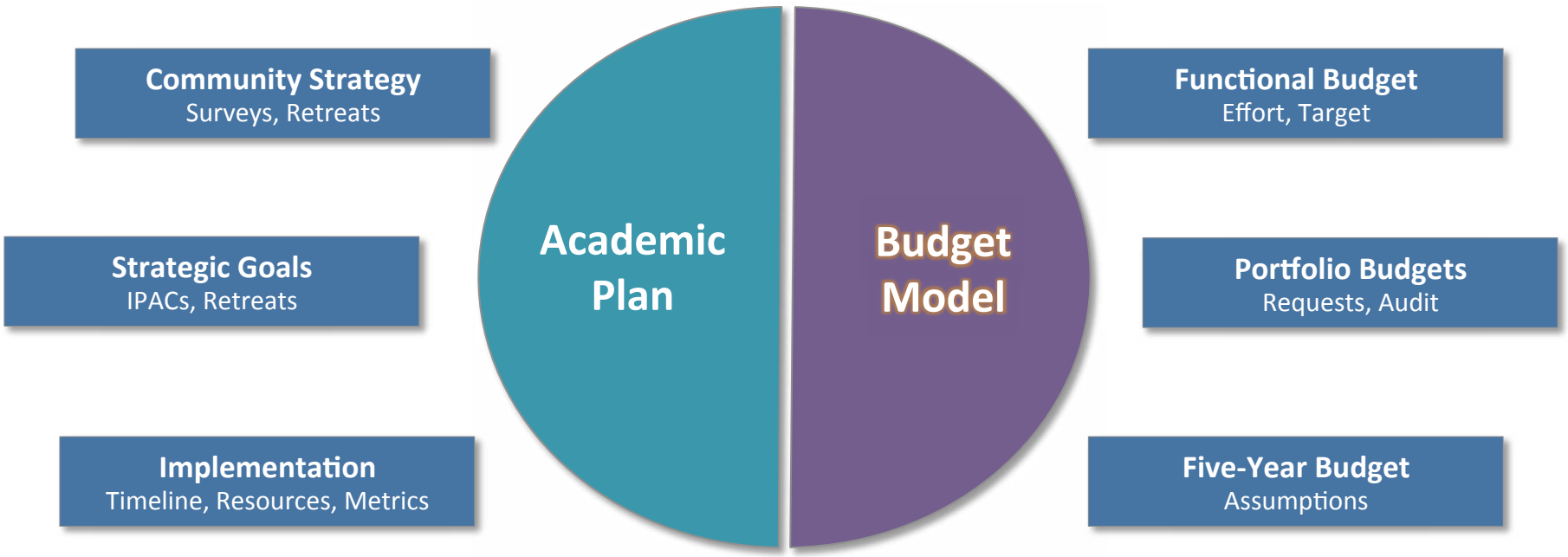
Penn State Engineering Operational Model



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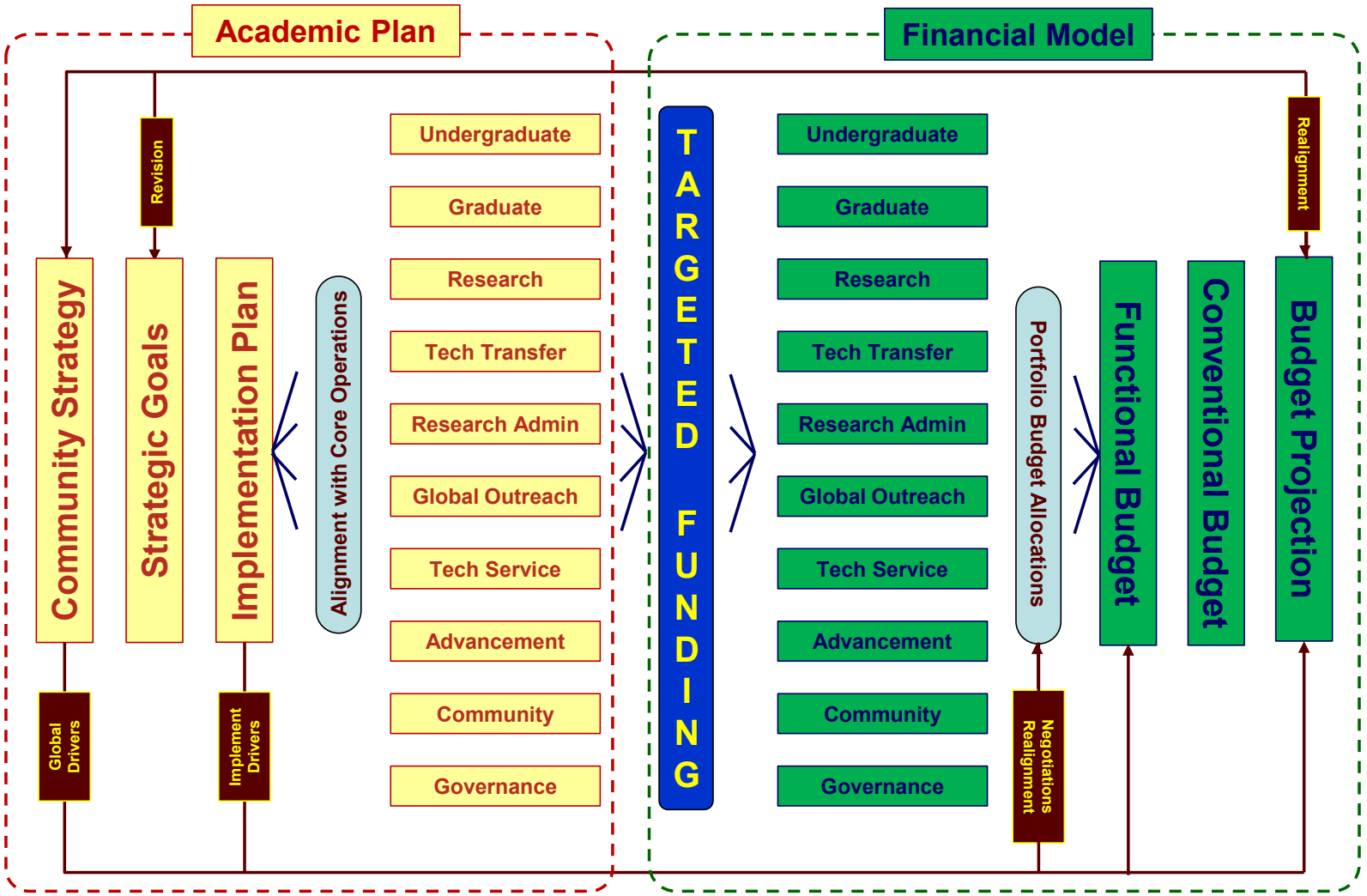
Coupled Academe and Finance



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Metrics

INPUTS

The resources (human, space, infrastructure, finance) and management (policies, oversight) required to operate the academic unit

e.g., students, professors, staff, funds, guidelines

OUTCOMES

The results that fulfill the mission and objectives, and contribute to stakeholders and society

e.g., graduates, scholarship (i.e., publications, inventions), ranking, recognitions

IMPACTS

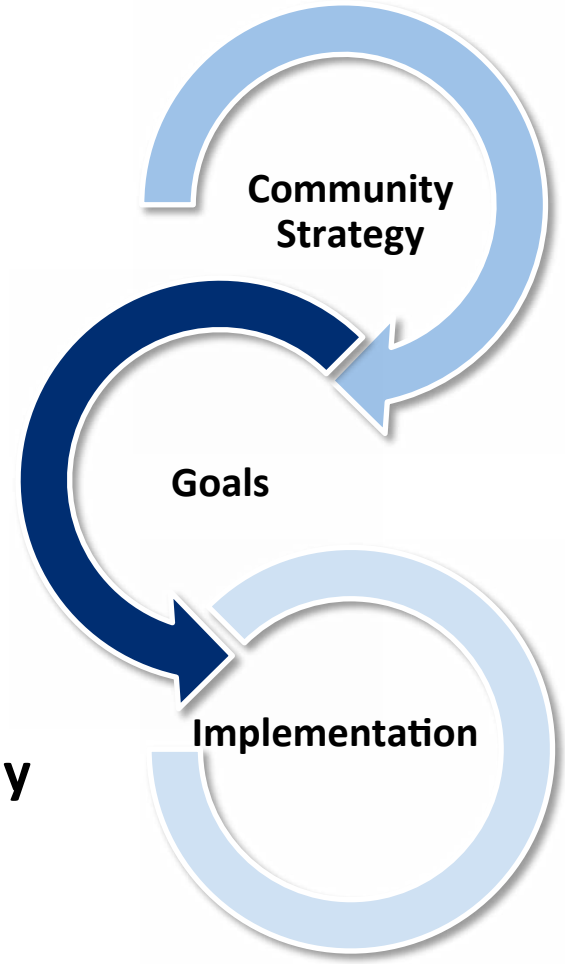
Positive change over time (10+ years) resulting from the outcomes above

e.g., healthier population, abundant water, safer optimized societal system of systems

PennState College of Engineering

Current Strategy Development Process

- Existing 11 strategy documents
- Strategy Snapshots
- High Level College Strategy
- Priority Goals – College, Departments
- Implementation Plan
  - Goals
  - Responsibilities
  - Resources
  - Time lines and Metrics
- Implementation-steered budget
- Finalize, share, implement, continuously review, and refine



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Short-term Stimuli and Enablers

Core Mission of Universities

"The core business of the university is learning, and the most fundamental aspect of that learning is the education of undergraduates."

– Frank Rhodes, President Emeritus, Cornell University, in 'The Creation of the Future'

PennState College of Engineering

Enrichment and Invigoration

Projects

Opportunities for efficiencies

Enabling mechanisms for initiatives

Accountable business culture

Streamlined, efficient organization capable of implementing academic initiatives

Space Utilization	Functional Budget	Spendable Resources	Dean's Office
College Teams	Leadership Committees	External Reviews	Assessment Metrics
Professional Masters	Online Degrees	College/Unit Strategies	Media Presence
Responsive Action	Communications Plan	Social Calendar	Staff Development
Community Retreats	M+N Global Outreach	International Internships	Alumni Engagement
International Alumni	Baseline Corporate	Corporate Partners	Department Needs

PennState College of Engineering

Enrichment and Invigoration

Initiatives

Strengthening the Undergraduate Program

Expanding the Graduate Program

Broader UG experience; Larger and higher-quality Grad program

PennState College of Engineering

Enrichment and Invigoration

INITIATIVES

Distinguished Teaching Fellowships

Ten fellowships for senior Ph.D. students

Teach one regular course under professional supervision

Engage with award-winning educators

Better prepared, more competitive Ph.D. graduates

PennState College of Engineering

Enrichment and Invigoration

INITIATIVES

Frontier Faculty Lines

Six interdisciplinary hires on frontier topics

At the intersection of societal challenges, faculty interests, and existing/short term research infrastructure

To create further synergies between departments, centers, institutes, Penn State colleges, and other universities

Uniquely branded UG and Grad programs; Better S/F Ratio

PennState College of Engineering

Enrichment and Invigoration

INITIATIVES

Innovation Grants

Twenty one-year research grants

Interdisciplinary topics meshing with Penn State priorities

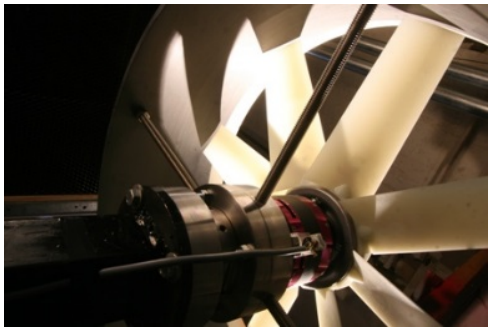
Research gems nearing completion

Increased competitiveness of Penn State engineering faculty

PennState College of Engineering

Enrichment and Invigoration

INITIATIVES



Excellence Graduate Fellowships

Twenty-five full 3-year offers

Targeted at top incoming graduate NSF fellowship-caliber

Accompanying specific academic and social programs

Enhanced Ph.D. program quality

PennState College of Engineering

Enrichment and Invigoration

INITIATIVES

One-year Course-based Masters

Ten grants for complete proposals

Non-thesis residential M.S. degrees

August-to-August format

Enlarged M.S. program; Feeder into Ph.D. program; Revenue generation

PennState College of Engineering

Enrichment and Invigoration

INITIATIVES

Research Experience for Undergraduates

Fifty+ eight-week embedded opportunities

Attendance in research methods seminars

Participation in professional conferences

Broader UG experience; Feeder to Grad program

PennState
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Enrichment and Invigoration

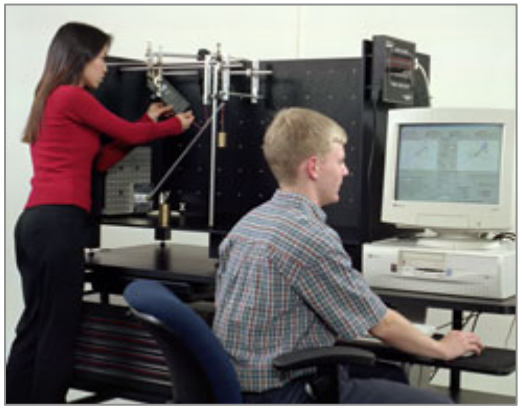
INITIATIVES

Instructional and Research Equipment Grants

Fifteen grants for instruction and research

Innovative content on both education and investigation

State-of-the-art instruction; Top research infrastructure



PennState College of Engineering

Human Resources

Job Description Updates

- Review and complete Job Review Worksheets
- Track JRW completion and updates
- Work with Department Heads to assess job needs
- Create final inventory for compensation review
- Communicate final outcome to staff

Compensation Analysis

- Develop timeline with Compensation Analyst
- Compile data to conduct salary analysis of all positions
- Develop plan for communication to staff upon completion

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Human Resources

Staff Career Development

- Collect input from Department Heads
- Communicate support for training to supervisors
- Make training part of review process
- Communicate available resources
- Develop annual tracking mechanism

Staff Awards

- Review current programs
- Conduct staff survey to determine what is of value
- Develop new programs based on feedback

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CoE e-Newsletter - Overview

Engineering PENN STATE
News from the Penn State College of Engineering

MARCH 2014

PSU Engineering Wins 5 NSF CAREER Awards
Students Assess Drone Security
AE Faculty Receive Patent
Graduate Students Win Big
Making an Impact: The Engineering Leadership Program

Learn more about this month's cover photo.

PennState College of Engineering
WORLD-CLASS ENGINEERING
Learn more ▸

In the News
Project featured on BBC MORE>>
MNE's Fathy featured as Newsmaker in recent ASME publication MORE>>
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Faculty member wins local design award MORE>>

Recognitions and Awards
Lesieutre delivers conference keynote MORE>>
ESM professor named ASME Fellow MORE>>
Bioengineering society names William Hancock a Fellow MORE>>
Bakis elected American Society for Composites president MORE>>
ChE PhD candidate awarded Doctoral Fellowship MORE>>
Shanbhag wins best paper at Winter Simulation Conference MORE>>

Five Penn State Faculty Earn 2014 NSF CAREER Awards
Recipients show diversity in research topics, departments

The National Science Foundation (NSF) has recognized five outstanding young Penn State College of Engineering faculty members with the NSF Early Career Development Award.

This prestigious award, which provides each awardee with five years of research funding, is designed to support junior faculty who have shown exceptional promise in teaching and research.

LINK TO FULL STORY>>

Students Implement Defenses Against Drone Attacks
Learning Factory capstone project for Raytheon

A team of engineering students were given the opportunity to research and develop cyber attacks against a consumer unmanned aerial vehicle and suggest ways to correct the vulnerabilities that allowed them - all as part of a capstone project with Learning Factory at Penn State corporate partner Raytheon BBN Technologies. LINK TO FULL STORY>>

First E-Newsletter sent March 13-14, 2014

- Branding on World-Class Engineering
- Sent monthly
- Five highlighted accomplishments
- Monthly features

Mailing List (55,000) Includes

- Alumni
- Deans and department heads of ABET-accredited engineering programs
- Corporate contacts
- Industry CEOs
- PSU senior administration
- College of Engineering faculty and staff

PennState College of Engineering

CoE e-Newsletter - Design

Familiar magazine Engineering Penn State header for brand recognition

Powerful College of Engineering branding and references – through color, graphics, and content

Engineering PENN STATE
News from the Penn State College of Engineering

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Clean format using white space, engaging photos, and attractive colors in order to maximize readability and engagement

Clear calls to action

PennState College of Engineering

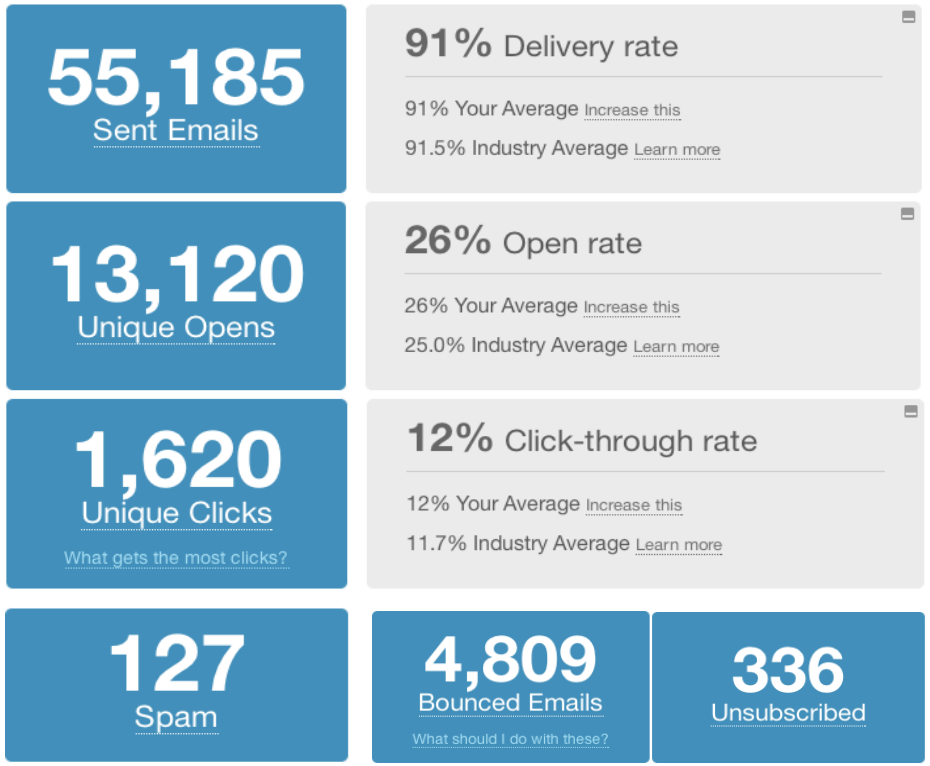
CoE e-Newsletter - Statistics

Open rates by audience segment

• Faculty	67%
• Staff	67%
• Penn State administration	64%
• Deans	36%
• Department Heads	35%
• Alumni	23%
• CEOs	22%
• Corporate contacts	14%

Top five links

• NSF CAREER Awards	1,093 clicks
• Drone Attacks	229 clicks
• Graduate Students Win $10,000	177 clicks
• A Grand Experiment	116 clicks
• Patent Issued	107 clicks



PennState
College of Engineering

NSF CAREER Award Announcement

Penn State: World-Class Engineering through Exceptional Faculty

The National Science Foundation (NSF) recently recognized these outstanding Penn State College of Engineering faculty members with the NSF Early Career Development (CAREER) Award. This prestigious award, which provides each awardee with five years of research funding, is designed to support junior faculty who have shown exceptional promise in teaching and research.

KYLE BISHOP

Assistant Professor of Chemical Engineering

Bishop's $437,000 CAREER award focuses on *Contact Charge Electrophoresis for Mobile Microfluidics*, which explores a new method where a particle or droplet oscillates continuously between two electrodes. This ability to manipulate small particles could have an impact on a number of technologies, including electronic displays and DNA sequencing. Bishop has been on faculty since 2008.

HOSAM FATHY

Assistant Professor of Mechanical Engineering

A member of the Penn State faculty since 2010, Fathy will use his $400,000 grant for *Identifiability Optimization in Electrochemical Battery Systems*. The ultimate goal of his research is to improve the useful life, health, and safety of lithium-ion batteries by building better algorithms for battery testing and health diagnosis. A key portion of Fathy's project includes developing educational modules for STEM education.

SCARLETT MILLER

James F. Will Career Assistant Professor of Industrial & Manufacturing Engineering
Assistant Professor in the School of Engineering Design, Technology & Professional Programs

Miller's $400,000 grant is titled *From Risk Aversion to Innovation: Transforming the Concept Selection Process to Maximize Product Success* and seeks to explore the balance between an organization's need to innovate to avoid economic failure and the desire to reduce risk associated with creativity and novel ideas. She joined Penn State in 2011.

GORDON WARN

Assistant Professor of Civil Engineering

A Performance-Based Multi-Objective Optimization Framework to Define Innovative Structural Concepts and Support the Seismic Design of Critical Buildings earned Warn a $400,000 NSF CAREER award. His work seeks to develop a computational framework that simultaneously identifies innovative structural concepts and trade offs between conflicting design objectives to support decision-making.

TAK-SING WONG

Assistant Professor of Mechanical Engineering

Wong, a Penn State faculty member since 2013, received a $400,000 grant for *Nature's Mix and Match: Designing Omniphobic Surfaces with Multi-Functional Characteristics*, which looks to design and develop a new class of biologically inspired liquid-repellent materials with multi-functional characteristics that have various industrial and medical applications.

PENNSTATE College of Engineering engr.psu.edu

U.Ed. ENG 14-17

First widely distributed announcement of College-wide award winners

- Sending to over 1,000 deans of ABET-accredited engineering programs
- Most clicked-on story in March e-newsletter
- Repetition will reinforce this important and news-worthy message
- Beginning of a series of messages that will call attention to the excellent faculty, programs and research across the College

PennState College of Engineering

Ongoing Communications Projects

- Redesign all College websites
- Expand College mementos and souvenirs
- Redesign Penn State Engineering magazine
- Expand persistent social media presence
- Create e-newsletters for departments
- Expand and reconfigure Communications team
- Commission promotional videos

PennState College of Engineering

Closure

Academic Administration

"Being a university president is no way for an adult to make a living."

– Bartlett Giamatti, late president of Yale,
from 'The University and the Public Interest'

PennState
College of Engineering

Objectives

Expansion of Faculty Size

Enlargement of Graduate Programs

Renovation of Laboratories

Enhancement of Faculty, Students, Staff Diversity

Approaching, Breaching Academic Frontiers
EXCELLENCE IN EVERYTHING!

PennState
College of Engineering

Recap

Exceptional College of Engineering with tremendous strength across the board

Opportunities for further excellence and a steep upward trajectory

Development of a business model for the College is underway

Short term enrichments and invigoration measures showing early promise

Short term enrichments and invigoration measures showing early promise. The present is very good, the future is GREAT.

PennState College of Engineering