College of Engineering
State of the College

Engineering Advisory Council: October 11, 2013
Leah H. Jamieson
The John A. Edwardson Dean of Engineering
Outline

- Leadership Updates
- Fall 2013 Statistics
- Rankings
- 3 Strategic Plan Highlights
- Purdue Big Moves
- Engineering’s Strategic Growth
- Outline for Today
Leadership Updates

College of Engineering

• Tyson Pinion, Director of Advancement

Purdue

• Dan Hasler named President of the Purdue Research Foundation

• Suresh Garimella, R. Eugene & Susie E. Goodson Distinguished Professor of ME, named Purdue’s Chief Global Affairs Officer

• Joe Pekny, Professor of ChE, named Interim Director of the Burton D. Morgan Center for Entrepreneurship
The College of Engineering Today

- 11 schools and 3 interdisciplinary divisions
- 15 ABET-accredited undergraduate degree programs; ABET review this month
  - First BS Environmental & Ecological Engineering degrees awarded May 2013
- Graduate degree programs in 12 disciplines, including a multidisciplinary engineering degree
- 10,855 students: 7,743 undergrads, 3112 graduate students
- 84,910 living alums
- 369 faculty
- FY12-13 sponsored research expenditures of $167M
- 1,068,476 asf in 45 buildings
CoE in Context

Total Student Enrollment by College: Fall 2013

- Eng'g: 27%
- HHS: 12%
- Sci: 11%
- CLA: 10%
- Tech.: 9%
- Agri.: 9%
- Mgmt.: 8%
- Exp/ISP/Temp: 5%
- Pharm Edu: 4%
- Vet. Med.: 3%
- Edu: 3%
- Vet. Med.: 2%
- Exp/ISP/Temp: 5%
- Pharm: 4%
How much STEM? Comprehensive or technical institute

% STEM - AAU Public Campuses

Big Ten or Peer Institutions

What happens here?
Purdue 2011/12 - 54%

From Pam Horne, Associate Vice President for Enrollment Management, July 2013
CoE Students - Fall 2013

10,855 students

- 7,463 undergraduates + 280 ABE = 7,743

<table>
<thead>
<tr>
<th>% women</th>
<th>% URM</th>
<th>% resident</th>
<th>% int’l</th>
<th>Avg SAT</th>
<th>Avg GPA</th>
<th>Top 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>22.5%</td>
<td>6.3%</td>
<td>34.8%</td>
<td>23.8%</td>
<td>1314</td>
<td>3.66</td>
</tr>
<tr>
<td>Purdue</td>
<td>42.8%</td>
<td>8.5%</td>
<td>56.9%</td>
<td>16.9%</td>
<td>1199</td>
<td>3.51</td>
</tr>
<tr>
<td>National Eng’g</td>
<td>19.3%</td>
<td>17.0%</td>
<td>91.4%</td>
<td>8.6%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

- 3,016 graduate students + 96 ABE = 3,112
  - 1,596 PhD (51%); 1,410 Masters (45%); 106 Other (3%)
People Growth 2006-2013
Diversity: Women 2006-2013

Women 2006-2013

Strategic Growth

- GR
- UG
- Faculty
- Named & Distinguished
Diversity: Underrepresented Minorities

URM 2006-2013

Strategic Growth

- GR
- UG
- Faculty
- Named & Distinguished
*Includes ABE and CoE research in Discovery Park. Expenditures include sponsored research and cost sharing. Dollar amounts are in millions; years are fiscal years.
CoE Reputation & Rankings

- #2 among recruiters in the aerospace and defense industries – *Aviation Week* August 2012 workforce study
- #2 in preparing students for the workforce – *Wall Street Journal*, September 2010 recruiter ranking
- #2 place for graduate study of engineering – *National Hispanic Business Magazine*, in top 5 since 2006; #2 in 6 of the 7 years
- #8 in USN&WR graduate rankings, #4 among public universities
- #10 in USN&WR undergrad rankings, #5 among public universities
- #10 in Shanghai Jiao Tong Academic Ranking of World Universities in the field of Engineering
#8 in USN&WR *Graduate* Rankings

#4 among public universities

<table>
<thead>
<tr>
<th>School</th>
<th>Ranking</th>
<th>Ranking among publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE</td>
<td>#1</td>
<td>#1</td>
</tr>
<tr>
<td>AAE</td>
<td>#6</td>
<td>#3</td>
</tr>
<tr>
<td>CE</td>
<td>#6</td>
<td>#5</td>
</tr>
<tr>
<td>ME</td>
<td>#8</td>
<td>#5</td>
</tr>
<tr>
<td>NE</td>
<td>#8</td>
<td>#8</td>
</tr>
<tr>
<td>CmpE</td>
<td>#10</td>
<td>#6</td>
</tr>
<tr>
<td>EE</td>
<td>#10</td>
<td>#5</td>
</tr>
<tr>
<td>IE</td>
<td>#10</td>
<td>#6</td>
</tr>
<tr>
<td>ChE</td>
<td>#13</td>
<td>#9</td>
</tr>
<tr>
<td>EEE</td>
<td>#17</td>
<td>#11</td>
</tr>
<tr>
<td>MSE</td>
<td>#17</td>
<td>#9</td>
</tr>
<tr>
<td>BME</td>
<td>#23</td>
<td>#10</td>
</tr>
</tbody>
</table>

Published March 2013.
#10 in USN&WR *Undergrad* Rankings

#5 among public universities

<table>
<thead>
<tr>
<th>School</th>
<th>Ranking</th>
<th>Ranking among publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE</td>
<td>#1</td>
<td>#1</td>
</tr>
<tr>
<td>IE</td>
<td>#5</td>
<td>#4</td>
</tr>
<tr>
<td>AAE</td>
<td>#6</td>
<td>#4</td>
</tr>
<tr>
<td>CE</td>
<td>#7</td>
<td>#5</td>
</tr>
<tr>
<td>EE</td>
<td>#7</td>
<td>#5</td>
</tr>
<tr>
<td>ME</td>
<td>#7</td>
<td>#5</td>
</tr>
<tr>
<td>CmpE</td>
<td>#12</td>
<td>#6</td>
</tr>
<tr>
<td>EEE</td>
<td>#12</td>
<td>#7</td>
</tr>
<tr>
<td>ChE</td>
<td>#13</td>
<td>#9</td>
</tr>
<tr>
<td>BME</td>
<td>#15</td>
<td>#6</td>
</tr>
<tr>
<td>MSE</td>
<td>#17</td>
<td>#10</td>
</tr>
</tbody>
</table>

Published September 2013.
NE programs are not ranked every year and were last ranked in 2004.
1 Vision

*We will be known for our impact on the world.*

3 Goals

*Graduates Effective in a Global Context*
*Research of Global Significance*
*Empowering Our People; Enriching Our Culture*

4 Stories

*Always@PurdueEngineering*
*ChangeTheWorld@PurdueEngineering*
*Innovate@PurdueEngineering*
*OurPeopleOurCulture@PurdueEngineering*
4 Stories

*Always@PurdueEngineering*

- *Leadership Minor*
- *Celebration of Faculty Careers*
- *Staff of 2020*

*ChangeTheWorld@PurdueEngineering*

*Innovate@PurdueEngineering*

*OurPeopleOurCulture@PurdueEngineering*
OurPeopleOurCulture@PurdueEngineering: Engineering Leadership @ Purdue

- Leadership Minor: 16 credits in courses + experiential leadership, faculty coaching, and technical leadership
- Concentrations in Ethics, Global and Societal Impact, Creativity and Innovation, and Communication
- Engages students in developing professional skills during their undergraduate careers
- Formalizes and documents their leadership in real-world experiences for future employers and graduate programs
Grew out of strategic plan discussions

Championed by Monika Ivantysynova, Jim Litster, Kathleen Howell, Alyssa Panitch, Arvind Varma, and Klod Kokini
OurPeopleOurCulture@PurdueEngineering: Celebrating Faculty Careers

- Recognizes and celebrates the diverse accomplishments of all our senior faculty past promotion to full professor
- Gives faculty the opportunity to share their accomplishments with colleagues across the college and plan for the future
- Provides feedback and resources for the next phase of their development
- Pilot with three faculty S’2013
Every 7 years after promotion to full professor, faculty present to their peers a colloquium on their career (first time) or 7-year (steady-state) achievements and impact, and plans / anticipated impact for the next 7 years.

Colloquium is followed by a planning discussion for these faculty members with the dean and their school head.

Starting full implementation in 2013-14

~22 colloquia per year
OurPeopleOurCulture@PurdueEngineering: Staff of 2020

- Professional Development Initiatives
  - Staff Development Plans – Implementation Phase
  - Developing internal talent for Engineering Expansion
  - COE 101 – goal of engaging all staff

- Career Pathways Initiatives
  - Establishing career pathways for staff & succession planning

- Recognitions and Rewards
  - Implementation of newly established University Bravo Award and the CoE Innovation Award

- Strategic staff growth including the creation of new staff positions
OurPeopleOurCulture@PurdueEngineering: CoE 101

Monthly professional development class available to all CoE staff

Goals
- Provide information about college enterprises
- Highlight how staff contribute to reaching institutional goals
- Strengthen our common language
- Share resources for success
- Provide rewarding networking opportunities

Semester Topics
- Who we are and how staff impact our success
- Communicating engineering careers to our constituents
- Professional development opportunities
- Understanding Gen Y
- Speed networking

115 staff registered to attend at least one session
Participation recorded in staff development plan
Strategic Plan
Strategic Growth
Big Moves

STEM Leadership

- College of Engineering Expansion
- College of Technology Transformation
- Strengthening and Growing CS

World Changing Research

- Investing in Drug Discovery
- Advancing Plant Science Research
Big Moves

Transformative Education

- Changing the way learning occurs
- Engaging students with international experiences
- Increasing success and value:
  Living on campus
- A year-round option

Affordability & Accessibility

- The Value of a Purdue education
CoE Strategic Growth Update

❖ Status

❖ Major components
  • Students/enrollment
  • Faculty hiring
  • Staff hiring
  • Space
  • Budget
  • Development
  • And more ...

engineering.purdue.edu/Engr/AboutUs/StrategicGrowthInitiative

Intranet: engineering.purdue.edu/Intranet/Groups/Committees/StrategicGrowthPlanningImplementationCommittee
Status

❖ Board of Trustees:
  • Update by Provost Sands in May 2013
  • Approved funding for years 2 & 3 (this biennium)
  • One of 10 “Big Moves” coming out of the July 2013 BoT retreat
  • Approved lease of 58,996 ft² in Wang Hall for swing & surge space; now goes to ICHE
  • September 2013: Approved $70M budget for renovations, with $62.5 to come from University funds

❖ President Daniels:
  • Spring 2013: 6 meetings w/ President Daniels
    Alum/donor visits in Silicon Valley
  • “My goal is to be supportive without being in the way. To a large extent, the future of your expansion project is Purdue's future, and it is our single highest priority for the next few years. From now on, you let me know when an update meeting would be useful to you.”
  • September 2013: MED “Big Moves,” including further expansion of Engineering
Parameters of the Expansion

5-Year Strategic Growth Plan: 2012-2016 ............. and beyond

- National call for 10,000 more engineering graduates a year – *Purdue will account for over 5% of the total increase by 2016*
- Enrollment increases by ~1,500: half undergrad, half grad
- Undergrad enrollment grows by 700 to 7,778 ....... 10% growth; 27% since 2006
- Grad enrollment grows by 750-800 to 3,500 ........ 25% growth
- Faculty grows by 107 to 465 ............................. 30% growth
- Undergrad-to-faculty ratio goes from 21.2 to 17.6
- TAs increase by 88 half-time TAs
- Staff increases by 105 ......................................... 30% growth
- Space increases by 220,000 ASF – renovated, leased & new space: increase space and energy efficiency, enhance quality of space, foster collaboration
- $150M from Purdue in first 5 years, $150M development goal
• 2011-2016: 10% undergraduate enrollment growth, from 7,087 to 7,778; 27% since 2006
• 2011-2016: 15% grad enrollment growth, from 2,738 to 3,114; then to ~3,500
• Undergraduate applications increased by 55% from 2006 to 2012
• Incoming students in top quartile of their class jumped from 77% (2006) to 92% (2012)
• National call to graduate 10,000 more engineers each year
Faculty Hiring

- 2011-16: 30% faculty growth, from 358 to 465 – increase of 107 faculty

- 2012-13:
  “Immediate needs, immediate opportunities”
  • ~30 searches authorized
  • 78 candidates interviewed
  • Offers made to ~1/3 of those interviewed
  • 24.25 offers accepted – 6.25f (27%), no URM
    • Grad student research workshop focused on minority students
  • Handful of offers still in play

- Analyzing the past year’s experience
  • Recent focus groups with faculty about efficiency and effectiveness of faculty searches
  • Planning for search committee training for the coming season
Faculty Hiring Strategy

2013-14 and beyond: 4-part strategy

- **Discipline Hires**: Heads encouraged to start explorations with candidates; faculty invited to submit nominations.
- **Opportunity Hires**: 2013-14: 33 searches authorized.
- **Game Changers**: Intent to pitch deadline 8/23; First-round pitches 9/5, internal panel; Second-round pitches 10/10, internal + external panel.
- **Preeminent Teams**: https://engineering.purdue.edu/Intranet/Groups/Administration/FacultyHiring
Principles/Criteria for Preeminent Teams

- Strong leadership
- Promise of preeminence (top 1-5)
- Promise of transformative impact
- Potential for collaboration
- Potential for diverse sources of research funding
- Contribution to educational enterprise
- Contribution to innovation and entrepreneurship
- Leveraging existing strengths and infrastructure
Pitching Preeminent Teams

- Teams of 4-6 current + new faculty
- 3-5 teams to be selected in 2013-14
- Process to continue in future years
- Faculty lines, resources, space

Round 1: 5 minute pitch + 5 minute Q&A
- Faculty panel
- Open to all faculty to attend

http://www.inc.com/christine-lagorio/sxsw-day-1-startup-buses-take-texas.html
2013-14 Faculty Hiring Summary:
57-66 Searches Authorized/Projected

33 Discipline Hire Searches

5-10 Opportunity Hires

9-12 Preeminent Team Searches

1-2 Game Changers

9 Provost Cluster Hire Searches
Staff Hiring

๏ 2011-16: 28% staff growth – increase of 105

๏ Background and brainstorming for staff growth
  • Survey of heads & directors
  • Focus groups with CoE staff award winners

๏ Two hiring tracks
  • **Growth-driven** hiring:
    Year 1 RFP to heads & directors early F13
  • Hiring for **Transformational Change:** ~6 initial top candidates being explored – e.g., faculty search concierge, online teaching technology experts, award nomination and proposal writing support, support for developing grad student technical writing skills, shop & lab managers, visa processing expert

๏ 2011-16: Add 88 half-time TAs
Space Planning

- Additional space needed – 220,000 ft²
  - 1/3 renovation, 1/3 leased, 1/3 new
- Faculty survey by Brian Lamb School of Communication
- Office/space design
  - Steelcase/Business Furniture selected
  - A/E firms hired for individual projects
- Principles/opportunities
  - Increase space efficiency
  - Increase energy efficiency
  - Enhance quality of space
  - Enhance collaboration
- Facilities master planning
  - SLAM Collaborative
  - Immediate, 5-year, and 20-year horizons
  - Master Plan Committee and Steering Committee
  - Plan to be completed by Feb 2014
Space Growth Projects

- **Wang Hall Leased Space**
  - Hope to lease ~60,000 asf in Wang for swing space
  - EPE/ProSTAR – professional education
  - Move in Summer 2014

- **First R&R Projects**
  - BOWN Lab – Fall 2013 - Grad student space
  - GRIS – Fall 2014

- **Next R&R Projects**
  - EE including Duncan, HAMP, ME, MSEE, POTR, RAIL
  - Guided by the master plan

- **Other Projects**
  - Zucrow, MJIS, IDC, IN-MaC, Flex Lab

*R&R = reinvigorate, repurpose, reconfigure, revitalize, rethink, reenvision reinvent, ...*
College of Engineering Strategic Growth - BUDGET

CoE Strategic Growth Recurring Funding Plan

- Recurring university investment of ~$20M for faculty/staff growth
- Recurring Engineering differential fees of ~$6.6M for faculty/staff growth
- Recurring university investment of $5M for facilities effective 2013-14
- Recurring funds reserved to address the impact of CoE undergraduate and graduate student enrollment growth on other colleges
- Over $150M investment in the first 5 years
Development

- Development needs estimated at ≥ $150M
  - $45M to Support Growth in Number of Students
    - Scholarship endowments $35M
    - Grad student fellowship endowments $10M
  - $30M to Support Growth in Number of Professors
    - New Professorship endowments $21M
    - Rising Star Faculty endowments $9M
  - $75M to Support New & Enhanced Space
    - New capital projects $50M
    - Development component of R&R projects $25M

Development goal for Growth is in addition to $530M Strategic Plan investment target
Also ...

- Provocative Conversations on the Future of Higher Education to continue in 2013-14
- Communication
  - Focus group discussions – Leading/Game Changing Faculty, Preeminent Teams, Efficiency & Effectiveness of Faculty Searches, Staff Hiring, Space, ...
  - Fall retreats & faculty meetings
  - Engineering Impact
    - MED Distinguished Speaker at NAE Annual Meeting, October 2013, Keynote Speaker at ASEE Annual Conf. June 2014
  - Integrated Strategic Plan & Strategic Growth
- Continual monitoring of growth metrics
- Continual attention to transformation
- Continual pulse checks with our stakeholders: faculty, students, staff, alums, Purdue leaders, industry, ...
- Continual examination of our contexts: Purdue, Indiana, national, global, higher education, technological, societal, political, economic, ...
1. **Contribute to the national capacity for innovation and economic development:**

We will be an important part of the national call to graduate 10,000 more engineers per year.
Amplify our impact:
Using our growth targets and assuming others will stay the same size they are now, we will be:

- The second largest College of Engineering in the U.S. as measured by number of faculty
- Third largest in number of undergraduates
- Third largest in number of graduate students
3. Enhance Engineering’s reputation, rankings: Target is top 5 or better in both undergrad and grad – currently #10 in undergrad, #8 in grad
Impact: *Transformation*

**4 Lead in engineering education innovation; lead in enhancing students’ experience**

- Enhance quality of interactions between faculty and students
- Expand our capacity to innovate in education
- Purdue can be *the* leader in demonstrating how hands-on experiential learning can happen at scale
Impact: Transformation

5 Sharpen the focus on what Purdue Engineering is known for

• Preeminent Teams that will position Purdue for recognized leadership
• Accelerate ground-breaking discoveries
• Expand delivery of inventions to the marketplace
Impact: Transformation

6 Become the partner of choice for industry, the university of choice for entrepreneurs, and the national model for economic development in the State
EXTRAORDINARY PEOPLE
GLOBAL IMPACT

You must be the change you want to see in the world.
— Mahatma Gandhi

EXTRAORDINARY
PEOPLE GROWTH IMPACT
Agenda for the Day: Scenario Planning
This growth will shape
how we educate,
how we influence,
who we are.

Where could the College of Engineering and Purdue be in 15-20 years if we are successful in developing and implementing bold plans for growth?
Agenda for the Day: Scenario Planning

❖ Meeting theme – Transformative Growth: Exploring Engineering’s expansion through the lens of higher education disruptors. Stretching our thinking beyond the “next step.”

❖ Overarching question – What decisions can we make now to make our expansion more robust in the face of future disruptions to higher education?
Looking at Alternative Futures

Educational Drivers & Disruptors – from 7/13 ELT retreat
“Think-pair-share”

1. What is missing?
2. What are the five drivers that are likely to have the greatest impact on our most relevant stakeholders? For each of your five top drivers, who are those stakeholders?

Impact on how we do business – Table discussion

1. For each of your top five drivers and stakeholders, how might this affect how we do business?
2. What unspoken assumptions drive our current way of thinking, operating, and decision-making?
3. Where are blind spots that we need to reveal to challenge our thinking?
Lunch with New CoE Faculty

Questions:
1. What are your hopes/dreams/aspirations for the next 5, 15, 25 years?
2. What will enable them?

Report out from each table after lunch
Key Drivers for Change in Higher Education

Implications for Growth and Transformation

1. What might the drivers/disruptors mean for Engineering's expansion?

2. What decisions can we make now to make our expansion more robust in the face of future disruptions?
This growth will shape 

how we educate, 

how we influence, 

who we are.

Where could the College of Engineering and Purdue be in 15-20 years if we are successful in developing and implementing bold plans for growth?