College of Engineering Update

Engineering Advisory Council: April 4, 2014
Leah H. Jamieson
The John A. Edwardson Dean of Engineering
Extraordinary People
Purdue Leadership Updates

- Provost Tim Sands (Basil S. Turner Distinguished Professor of ECE and MSE) was named the President of Virginia Tech effective June 1, 2014

- Provost search underway; campus visits in April
Engineering Leadership Updates

- Arvind Raman, Robert V. Adams Professor of Mechanical Engineering, named Associate Dean of Global Engineering Programs, effective May 1

- Beth Holloway named Assistant Dean for Undergraduate Education
EAC Member Update

- In February 2014, Bill Dudley was named President and Chief Operating Officer of Bechtel Group, Inc.
National Academy of Engineering

- Jan Allebach, the Hewlett-Packard Distinguished Professor of Electrical and Computer Engineering, elected to the NAE
PECASE: Presidential Early Career Award for Scientists and Engineers

- Tamara Moore, Associate Professor of Engineering Education, received the PECASE Award from President Obama

Cox, Pawley, Moore
Sutherland, Dyke, Culurciello, Bahr
(D. Adams) (Evangelou)
Elmqvist: how to use the existing system of networked devices to make sense of and exploit massive amounts of data anywhere and at any time. – sensemaking environments

Jesiak: how engineering degree programs can enable students to act as "boundary spanners" who can communicate, collaborate and coordinate across organizational, disciplinary, geographic, demographic, stakeholder and other boundaries.
Marais: causes of systems engineering failures in large projects

Qiao: understanding the mechanisms of spontaneous combustion of hydrogen and oxygen mixtures in nanobubbles generated by water electrolysis - bridging the gap between nanoscience and traditional combustion science

Zavattieri: structure-property relationship of extremely tough biological composites found in some marine organisms
AFOSR Young Investigator Award

- Michael Sangid, Assistant Professor of Aeronautics & Astronautics, received the Air Force Office of Scientific Research (AFOSR) Young Investigator Award
Outstanding Young Engineer

- Dimitrios Peroulis, Professor of Electrical and Computer Engineering, received the Outstanding Young Engineer Award from the IEEE Microwave Theory and Techniques Society.
Early Career Award

- Nicole Key, Associate Professor of Mechanical Engineering, received the ASME Dilip R. Ballal Early Career Award
Manufacturing Technology

- John Sutherland, Fehsenfeld Family Head of Environmental and Ecological Engineering, received the ASME Manufacturing Technology Award
Fellows: National Academy of Inventors

- Rakesh Agrawal, Winthrop E. Stone Distinguished Professor of Chemical Engineering

- Mike Ladisch, Distinguished Professor of Agricultural and Biological Engineering
Fellows

- Ahmed Hassanein, the Paul L. Wattelet Professor and Head of Nuclear Engineering, elected an Optical Society of America (OSA) Fellow

- Professor Joerg Appenzeller, Barry M. and Patricia L. Epstein Professor of Electrical and Computer Engineering, elected an American Physical Society Fellow
American Institute for Medical and Biological Engineering Fellows

- Joseph Irudayaraj, Professor of Agricultural & Biological Engineering, elected to the AIMBE College of Fellows

- Ji-Xen Cheng, Professor of Biomedical Engineering and Chemistry, elected to the AIMBE College of Fellows
Fellows of the American Institute of Aeronautics & Astronautics

- Alina Alexeenko, Associate Fellow, Associate Professor of Aeronautics & Astronautics, named an AIAA Associate Fellow

- Robert Lucht, Ralph and Bettye Bailey Professor of Combustion in Mechanical Engineering, named an AIAA Fellow
Fellows

- Ernest (Chip) Blatchley, Professor of Civil Engineering and Environmental and Ecological Engineering, elected Fellow of ASCE

- Wenbin Yu, Associate Professor of Aeronautics & Astronautics, elected Fellow of ASME
CoE 2014 Team Excellence Award

- Juan Ernesto de Bedout is a member of the Colombia Purdue Institute for Advanced Scientific Research (CPIASR) team that will be recognized tonight as winner of the College of Engineering 2014 Team Award
Greater Lafayette YWCA
Mary Keller Ade Woman of Wisdom Award

- Leah H. Jamieson, the John A. Edwardson Dean of Engineering
State of the College:
Engineering’s Expansion
How we will “engineer change” through the expansion of Purdue’s College of Engineering.

Approved by the BoT 1.5 years ago (April 2012), embraced by President Daniels, and reaffirmed and expanded over the summer and fall by the President and BoT under the Big Moves
OUTLINE

1. Drivers and contexts
2. Goals for impact
3. Expansion by the numbers
4. Components of the expansion
   • Student growth
   • Faculty hiring
   • Preparing faculty of the future
   • Staff growth
   • Space
   • Finances
5. Opportunities for the future

Presentation at the President’s Forum, November 7, 2013
Integration of our *strategic plan* and our plan for *strategic growth*

Since 2006, we’ve seen a 62% increase in # applications

% of students in top quartile of their graduating class: 77% (2006) to 93% (2013)

10% growth in undergrad since 2011; 27% since 2006
25% growth in graduate 2006-2011
DRIVERS FOR GROWING ENGINEERING

EXTERNAL DRIVERS

- Central to innovation, economic development, and jobs creation
- Central to addressing the 21st century Grand Challenges
- National call to graduate 10,000 more engineers/year

BY 2016 PURDUE WILL GRADUATE OVER 5% OF THESE ENGINEERS
By graduating at least 1 out of 20 of the 10,000 more engineers per year, we will contribute in a significant way to ...
2 Amplify our impact

- 3rd largest College of Engineering: both # undergrads and # grad students
- More ground-breaking discoveries
- More inventions delivered to market

... in many dimensions

#3 in undergrads: Penn State and Georgia Tech – now we’re #4
#3 in grad students: USC and Georgia Tech – now we’re #11
#2 in faculty: Georgia Tech – now we’re #9
Starting point was realigning our student-to-faculty ratio with Purdue’s average and with our peers, which gives us the capacity to enhance ...
Estimated Undergraduate-to-Faculty ratio is expected to be 20.5 by F14 and continues our trajectory towards our goal of 17.6. (19.4 is midpoint)
4 Increase our diversity

Faculty hiring and student growth at this scale is an opportunity to make dramatic gains in our diversity, which in turn transforms everything we do.

... because the quality of our innovation is directly tied to the quality of the diversity around our table.
The growth will touch every aspect of what we do.

Learning:
Sharpen the focus on what Purdue Engineering is known for

Preeminent research teams that will position Purdue for recognized leadership

Discovery
Many dimensions of Engagement

Become the partner of choice for industry, the university of choice for entrepreneurs, and the national model for statewide economic development
8 Enhance reputation of Engineering and Purdue
2011 is baseline
Baseline is 2011; approval was April 2012, so the first year of deliberate growth is reflected in the F2013 numbers (i.e., this year). Estimated Undergraduate-to-Faculty ratio is expected to be 20.5 by this fall and continues our trajectory towards our goal of 17.6.
UNDERGRADUATES

- Applications to Engineering up 40%, due in large part to University’s switch to the Common App
- Engineering applications are more diverse
  - 61% increase in apps from Asian Americans
  - 65% increase in apps from Hispanic Americans
  - 44% increase in apps from African Americans
  - 45% increase in apps from women
- Incoming First Year Engineering student target of 1820 for F2014
- Additional growth will come from increase in transfer students and increased retention
  - 1st-to-2nd-year rate increased to 87.9% for 2012 cohort (was 79.9% for 2006 cohort)
  - 1st-to-3rd-year rate increased to 74.1% for 2011 cohort (was 66.4% for 2006 cohort)
Faculty Hiring

- Discipline Hires
- Provost Cluster Hires
- Preeminent Teams
- Opportunity Hires

33^ Discipline-Centered Searches in 2013-14

Provost Cluster Hires: 9 searches
Preeminent Teams: 11 searches
12^ Special Opportunity/Dual Career
FACULTY HIRING STRATEGIES
WHAT WOULD CATAPULT YOUR RESEARCH AREA TO INTERNATIONAL PREEMINENCE?

1. Strong leadership
2. Promise of preeminence
3. Promise of transformative impact
4. Potential for collaboration
5. Potential for diverse sources of research funding
6. Contribution to educational enterprise
7. Contribution to innovation and entrepreneurship
8. Leveraging existing strengths and infrastructure

Preeminent Teams
Round 1: 13 panelists
Round 2: half external

Selected for faculty lines and investment of resources and space
Beaudoin: bombs, explosives – detect from a safe
distance for defense, but also for security in airports,
schools, gathering places such as stadiums and theaters

Love: potential impending crisis in ability to support the
continually growing number of mobile phones and
communication devices

Shalaev: research that could change, on the most
fundamental level, the way in which computers are built
and operate; with similar potential impact on medical &
communication devices
Irazoqui hires: BME + EE or ME
Beaudoin hires: ChE/MSE/Chem, EE, ME, AAE
Love hires: ECE, IE/Kran/Political Science – potential impending crisis in ability to support the continually growing number of mobile phones and communication devices
Shalaev hires: EE + Physics – research that could change, on the most fundamental level, the way in which computers are built and operate
PREPARING FOR THE FUTURE
FUTURE FACULTY WORKSHOPS

• Invited to apply
  • Postdocs and advanced Ph.D. students
  • Seeking faculty careers
  • From top 10 schools in each field

• Selected 30 from 130 applicants

• Program
  • Mornings – sessions on skills faculty needed
  • Afternoons – interaction with faculty, tours

• Results – interest in faculty position at Purdue
  • Before: 3.08 out of 5.00 (2 extremely interested)
  • After: 4.24 out of 5.00 (14 extremely interested)
STAFF GROWTH
HIRING POSITIONS APPROVED THIS YEAR

• Student Focused (18.50 FTE)
  • Instructional laboratory staff, academic advisors, student recruitment and retention, technical writing skills

• Faculty Support (8.00 FTE)
  • Dual career and faculty search, proposal writing and award nomination, visa processing, research infrastructure support

• Facility Management (5.00 FTE)
  • Support for college-wide space growth and new facilities

• Overarching Support (9.00 FTE)
  • IT, marketing and communications, financial management, secretarial support
PROGRAMMING SPACE
MASTER PLANNING

- Began Summer 2013
- Objectives
  - Short-term Growth
  - Long-term Growth
- Develop Program
  - Leasing
  - Renovations
  - New Construction
- Completion Summer 2014
REINVISIONING SPACE

PROJECT UPDATES

- Bowen Lab graduate student space
  - Completed Feb 2014
  - Open floorplan, hot desk protocols designed by grad students
- Wang Hall
  - EPE (ProEd), ENE Labs, Innovative Swing Space
  - Completion Summer 2014
  - 76,400 LSF - $20/ft² lease
- Grissom Hall
  - Detailed design underway
  - Construction begins Fall 2014
  - 52,000 GSF (38,500 ASF) - Estimated $12M - $15M
- Electrical Engineering & MSEE Buildings
  - Planning begins Spring 2014
  - Holistic evaluation of entire EE building
  - Evaluation of 1st floor MSEE

LSF = leasable square feet
REINVISIONING SPACE

FUTURE STEPS

• Renovations
  • Forney Stacked Labs
  • ME Building including RAIL
  • Hampton Hall
  • A.A. Potter Engineering Center

• New Construction
  • Addition to Jischke Hall of BME
  • Zucrow Test Cells
  • Flex Research Laboratory
  • Classroom Building?
Presented to BoT May 2013
Compared to FY12 base:
- 42% growth in 10-fund if take fringe out of the $33.5M number
- 53% if use raw numbers (but we will have to pay fringe going forward)
$35M scholarships, $10M grad fellowships
$21M professorships, $9M rising stars
$50M new capital projects, $25M development component of R&R projects
ENGINEERING EXPANSION
AN OPPORTUNITY FOR PURDUE

- Reputation
- Pioneer new approaches to faculty hiring
- Explore high quality, efficient, energy efficient, flexible, and collaborative space
- Anchor Purdue’s STEM education “Big Moves”
- Leadership in experiential education at scale
- Preeminence through research collaborations
- Grounded in innovation and impact
Extraordinary People, Global Impact

- Reputation
- Pioneer new approaches to faculty hiring
- Explore high quality, efficient, energy efficient, flexible, and collaborative space
- One of the anchors of STEM education
- Leadership in experiential education at scale
- Preeminence through research collaborations
- Grounded in innovation and impact