College of Engineering
“State of the College”
Faculty and Staff Meeting

Peter Kilpatrick
McCloskey Dean of Engineering
March 9, 2011
Announcements

- Garv Khandelwal
- Joe Buzz Mendel
- John Renaud
Overview

- Student Enrollments (UG: 1170 to 1400+; Grad: 360 to 420+)
- Faculty and Staff Growth (20-30%)
- New Space and Plans for Future (MRB)
- Growth in Named Professorships (24 to 39)
- Website (Syndicated Plone Site)
- Strategic Funding Committee
Presenters

- Bob Cunningham, Senior Director of Business and Finance, Budgets and Facilities
- Jay Brockman, Associate Dean of Academic Programs, New Undergraduate Programs and Outreach
- Brian Blake, Associate Dean of Research, Research Overview and Graduate Programs
College of Engineering
Financial Overview
Grant Expenditures

*FY11 are estimated expenditures
F&A Payout to Faculty
FY09-FY11 YTD Discretionary Spending

- Faculty startup packages (junior Faculty), $1,875,117
- Laboratory and Facility renovations, $2,897,202
- Center, Faculty, or staff support, $1,274,815
- Equipment and proposal cost sharing, $559,567
- Graduate fellowship, $399,289
- F&A Return to Faculty, $1,135,980
- Miscellaneous, $54,950
- Undergraduate program, $33,735
- Program support, $43,711
- Faculty startup packages (senior hires), $1,710,617
- Miscellaneous, $54,950
Discretionary Account Revenues
FY09 - YTD FY11
($10,461,000 total)

F&A, 8,243,513
Robbie, 86,421
Hank, 519,885
Dean's, 196,650
Obien, 313,349
Rice, 355,002
Martell Nano, 30,233
Facilities
Lab Square Footage available per year

Year

2003 2004 2005 2006 2007 2008 2009 2010 2011

Sq-Ft

100000 110000 120000 130000 140000 150000 160000 170000 180000

Total
By end of year 2011, the College of Engineering will be out of space
Renovation Strategy objectives for Fitzpatrick/Cushing and Hessert

- Renovation of older facilities to include updates to meet present day compliance (ADA, Americans with Disabilities Act), energy efficiency and security.
- Moderately Improvements to the aesthetics of the building interior.
- Create necessary office and research space for the strategic areas, Biomedical Sciences and Engineering, Environmental Sciences and Technology, Personal and national security and Sustainable energy.
Cushing/Fitzpatrick Renovation
(Listed in order of Priority) – Total estimated cost = $9,541,547

1) Engineering Library (estimated cost $262,710)
2) Technology Improvements (estimated cost $270,000)
3) Energy Improvements (estimated cost $2,075,000)
4) ADA Compliance (estimated cost $245,000)
5) Conversion of space to Support growth (estimated cost $1,985,250)
6) Faculty Offices (estimated cost $900,625)
7) Aesthetic & Modernization Improvements (estimated cost $3,803,000)

Stinson-Remick  (estimated cost $732,000)

Engineering North (MRB) (estimated cost $189,000)

Hessert    (estimated cost $175,000)

Total Cost  $10,637,547
Undergraduate Program and Community Engagement

Jay Brockman
Associate Dean, Educational Programs
From a letter of
THE REV. EDWARD SORIN, CSC
Founder of the University of Notre Dame
to the
VERY REVEREND BASIL MOREAU, CSC
Founder of the Congregation of Holy Cross

It will be one of the most powerful means for good in this country.

The College of Engineering
at the University of Notre Dame
McCourtney Learning Center in Stinson-Remick Hall

- Creating opportunities for Active and Engaged Learning
Courses in Stinson Remick

AME 30334, Heat Transfer
AME 40462, Aerospace Senior Design
AME 40463, Mechanical Engineering Senior Design
AME 40510, Numerical Methods
CBE 20258, Computer Methods
CBE 31358, Chemical Engineering Laboratory 1
CSE 20221, Logic Design
CBE 41459, Chemical Engineering Laboratory 2
CBE 41910, Bio-molecular Engineering Lab
CSE 20212, Fundamentals of Computing I
CSE 40462, VLSI Design
CSE 40543/60543, Algorithms for Biological Networks
EE 41430/40, Electrical Engineering Senior Design
EG 10111/112, Introduction to Engineering
ENVG 20200-01, Mineralogy and Optical Mineralogy

... plus others
Section 7
Group 7

State 0: Start/End State
- Light sensor reads high value

State 1: Wait for Sound or Object
- Sonar sensor reads high value
- Sound sensor reads high value

State 2: Talk
- Sound sensor reads high value

State 3: Waddle
- Sonar sensor reads high value

State 4: Object Avoidance
- Sonar sensor reads high value

State 5: Fly south for the winter

State 6: Hungry
- Rotation sensor reads high value
- Touch sensor pressed

Movement arrows between states indicate transitions based on sensor readings.
Theory, Data, and Uncertainty

Tower Displacements Across All Trials

force, (N) vs. displacement, (mm)
Design and Modeling

May 2: EG112 Poster Session

First-Year Engineering’s “Next Top Model”
Today: Programming Challenge

- Begin when indicated by your instructor.
- If you are stuck on a part, comment out the source of error and skip to the next part.
- Use line-by-line commands as necessary.
- Print and sign your name at the bottom and return the challenge statement to the next part.
- Do not discuss the challenges with anyone.
- Do not leave until you are sure you have finished.
- Remember there is still lecture Friday.

Make your signature worth something; honor the agreement you are signing.
Well-Rounded Engineer

- Analytical and Problem Solving Skills
- Define and Understand Engineering Concepts
- Organizational Skills
- Understand Technical Problems
- Creativity and Independence
- Communication Skills

Find your vocation

Plan your path to get there
My name is Hannah Skinner and I am currently a sophomore Chemical Engineering major at the University of Notre Dame in Denver, Colorado, and in the future I would love to return to Colorado for my career. I am currently involved in undergraduate research opportunities, so that I may continue to explore the field of Chemical Engineering in my future.

After I receive my intended Bachelors of Science in Chemical Engineering degree from Notre Dame, I am interested in completing a research project for the U.S. Department of Energy or a similar facility. I am interested in energy-related research, as Chemical engineering has the capacity to impact many facets of everyday life, particularly when it comes to energy. I am intrigued by the innovation occurring in the energy field and the socioeconomic impacts of energy improvements.

For the purposes of this e-Portfolio I have presented my competencies, future goals and artifacts of my work, knowledge of engineering concepts, ability to apply concepts to a societal context, analytical skills, communication skills, and creativity.

- Chemical and Biomolecular Engineering Pilot
- Personal statement for all EG112 students this year
- Committee looking at expansion across university
Authentic Professional Experience

- Reinforce/motivate concepts learned in classes
- Critical to “finding vocation” and “planning path”
- Should be early and often

Curricular

- Undergraduate Research
- Course Projects
- Senior Capstone Design

Extra-Curricular

- Internships
- Overseas Programs
- Community Engagement
- Field Trips/Site Visits
Civil Engineering New Orleans Trip
Strategic Priorities

• No compromise on technical excellence—introduce key ideas early and reinforce throughout

• Promote active and engaged learning

• Students realize themselves as engineers through authentic experiences
  – Produce distinctive work
  – Well-rounded
  – Can choose their path to their vocation and navigate it
Graduate Student Recruitment and Research Accomplishments

M. Brian Blake
Associate Dean of Engineering, Research & Professor of Computer Science and Engineering
Overview: Notable Accomplishments

• Historical high of $58.5 million in sponsored research awards in 09-10...
  • In AY11, $25.85 million at the end of the second quarter...

• A 15% increase in the number of PhD students confirmed for Fall 2010 versus the previous year...
  • 6.5% increase in PhD Applications for Fall 2011
Research Highlights: Trends

** Top 12 Awards constitute over $42 Million in FY10 **

3-Yr Trend(Awards)
FY08 - $33.87 Million
FY09 - $26.11 Million
FY10 - $58.51 Million (Historical High)

- Energy: $17.5 Million
- Biomedical and Bioengineering: $7.457 Million
- Environmental Eng: $2.26 Million
- Personal and National Security: $11.4 Million
- Nanotechnology: $9.55 Million
Where are we now?

- Productivity: \( \sim 0.6 \) PhDs/FTE/yr
- Attrition Rate: 40%

Indicators of Success

1. Number of applications
2. Acceptance rate & yield
3. Graduate students(%) from top ranked undergraduate programs
4. Average time to graduate

Where do we want to be?

- Productivity: 0.8 PhDs/FTE/yr
- Attrition Rate: 30% or less
- Increased quality/ placement
- Increased domestic, minority, & mission-centered students

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2015</th>
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<tbody>
<tr>
<td>Tenure Faculty</td>
<td>110</td>
<td>125</td>
</tr>
<tr>
<td>Productivity</td>
<td>X.55</td>
<td>X.8</td>
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<tr>
<td>PhDs per Year</td>
<td>61</td>
<td>100</td>
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<tr>
<td>Retention Rate</td>
<td>60%</td>
<td>70%</td>
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<tr>
<td>Class Size</td>
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<td>143</td>
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### Graduate Highlights: Application Pool

#### 2008-2010

**Top 3 Domestic**
Notre Dame, Purdue, & University of Florida

**Top 10 (not ND)**
Purdue, University of Florida, Michigan, Univ. of Washington, UIUC, Rose-Hulman, Texas A&M, Berkeley, IIT, & Michigan State

**Top 25 US News Apps (By Department, 2008-10)**

<table>
<thead>
<tr>
<th>Department</th>
<th>2008-2010</th>
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<tbody>
<tr>
<td>AME</td>
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<tr>
<td>EE</td>
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<td>CSE</td>
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<td>Bio</td>
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<tr>
<td>CBE</td>
<td>21</td>
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<tr>
<td>CEGEOS</td>
<td>10</td>
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**3-Yr Trend (Confirmations)**

<table>
<thead>
<tr>
<th>Year</th>
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<tbody>
<tr>
<td>AY08</td>
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<tr>
<td>AY09</td>
<td>94</td>
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<tr>
<td>AY10</td>
<td>109</td>
</tr>
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**International Apps**
Mostly Mainland China
Graduate Highlights: Strategy 1

**ND-Synergy**

Actively engage targeted institutions (waive admission fees, visitation/career fairs, personal attention to students, etc.)

*During the fall 2011, sent personalized recruitment e-mails to over 30 domestic institutions reaching well over 2500 students*

Collect and organize graduate recruiting activities across the College

Support engaging COE speakers to visit 4 institutions per year

Develop a website that shows beneficial outcomes with respect to target universities
Graduate Highlights: Strategy 2

**ND-Connection**

Team with industrial partners (via COE Advisory Committee) and conduct regional recruiting events in geographical regions with a large number of targeted institutions

*Currently planning a regional event in Washington, DC at IBM’s demonstration center...*

Conduct **2-3 regional events per year** in different areas

*Considering Atlanta, Houston, and Los Angeles*
Graduate Highlights: Strategy 3

Assist Departmental & College Initiatives

- ND-Nano’s Undergraduate Research Competition (A. Seabaugh)

- Increase REU Supplements and Support Summer Undergraduate Research Initiatives (J. Brockman)

- International Student Exchange/Research Programs in CSE (S. Hu), CEGEOS (R. Nerenberg), AME, CBE
Questions?