What I will cover this morning

• A little about myself
• Faculty transitions
• ABET
• Observations from my first two months
• Things we need to do this year

A little about myself

• Delighted to be at Baylor and have the opportunity to work with all to continue building ECS
• I am here to serve and lead through my service
• In my first two months, I’ve spent more time outside of my office than in my office
  • Visiting ECS departments
  • Meeting Board members
  • Orientations
  • Meeting companies

From California to Qatar, I rarely turn down an opportunity to play a good golf course

How the Lord got me to Baylor
My most recent assignments

• Associate dean of engineering at TAMU and deputy director of the Texas Engineering Experiment Station (2011-2012)
  – TEES had ~$150m in research expenditures
  – Worked with engineering programs across the TAMU system
• Department head, mechanical engineering at TAMU (2003-2011)
  – 60+ faculty, 1200 undergrads, and 400 grad students
  – $15m/yr in research expenditures

New faculty in ECS

• Dr. Mack Grady
  – Electrical and computer engineering
  – Ph.D. Purdue University
  – Prior faculty experience at UT-Austin
  – Electrical power grid
  – Integration of Photovoltaic Systems
  – Impact of high altitude nuclear weapons

• Dr. Michael Poor
  – Computer Science
  – Ph.D. Tufts University
  – Prior faculty experience at Bowling Green State University
  – Human-Computer Interaction
  – Game Development

ABET Update

• ABET evaluated all three of our engineering programs
  – Engineering
  – Mechanical Engineering
  – Electrical and Computer Engineering
• Evaluators saw plenty of strengths in our programs
  – Interdisciplinary junior and senior design classes
  – Good communication with rest of campus
  – Provide unique opportunities for our students
    • ECS learning and living center
    • Engineers with a mission

ABET update – Cont’d

• The evaluators also found some issues...the program needing the most work was BSE
  – It was considered “deficient” with respect to evaluating student outcomes
• All programs had weaknesses related to their program educational objectives (PEOs)
  – Most common cited ABET shortcoming
  – Will require rewriting PEOs and doing alumni survey to assess the new PEOs
• ECE and BSE had a weakness related to assessment of outcomes in our design course

ABET update – Cont’d

• The ABET team also had several concerns
  – Lack of space for undergraduate labs and design projects in all programs
  – Lack of discrete mathematics in ECE
  – Unspecified resources for the BSE program

Observations from my first two months

• Baylor has quality leadership at the top
• Faculty are behind Pro Futuris
• ECS has a great group of faculty and staff dedicated to providing a quality education for our students
  – Concern for teaching and students
  – Volunteer for recruiting and outreach

We are optimistic that the deficiency and weaknesses can be addressed and most cleared up before the ABET final report is voted in July 2013.
Our faculty and students reach out to local schools to engage students about engineering

• Lorena Elementary School, 2nd grade – May 2012

• Lorena High School – May 2012

Observations….cont’d

• ECS provides a unique experience for students who live in the Northside LLC
  – Great interaction with faculty member in LLC and advisors
  – Retention (New students enrolled fall 2011)*
    • 78.0 % in LLC enrolled in engineering fall 2012
    • 54.5% not in LLC enrolled in engineering fall 2012
  – Grade point average for first semester
    • 3.28 for those in LLC
    • 2.78 for those non in LLC

*includes only retention in engineering. Retention in the university is much higher

Observations…cont’d

• ECS is producing excellent graduates
  – Quote from a major oil company recruiter

“All 7... interviewers thought that the best students they interviewed were comparable to the best students they’ve seen at other schools....your best ME, EE, PSCM, and Logistics students are (in our opinion) comparable to the best at Texas A&M, UT, Texas Tech, Rice, Georgia Tech, etc”

– Quote from TAMU faculty member (J. Grunlan)

The undergrad engineering program there [Baylor] is excellent, which I’m observing firsthand with David Hagen (B.S. in Mechanical Engineering in 2011).

Observations…cont’d

• ECS provides excellent experiential learning experiences for the students
  – i5 program in China
  – Engineers with a mission
  – Computing for Compassion (C4C)
  – Baja car

• Size of ECS has reached “critical mass” to attract attention of large corporate recruiters
  – Had largest ever STEM fair this fall

Observations…cont’d

• Computer Science has more visibility than the engineering programs because of the International Collegiate Programming Contest (ICPC)

We have had rapid growth over the past six years with Mechanical Engineering growing the most

Note: about 1/2 of the Engineering students eventually switch to Mechanical Engineering
The rapid growth in ECS has jeopardized the quality of our programs

- Larger classes, particularly at the lower division
- More crowded teaching laboratories – noted as a concern by ABET
- Reduction in faculty/student interaction
- Insufficient support staff for size of program
- Mechanical engineering is the program of most concern

Here’s how Mechanical Engineering compares to its Big XII peers in the undergraduate program

<table>
<thead>
<tr>
<th>School</th>
<th>Students</th>
<th>Faculty</th>
<th>Student/Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT</td>
<td>1119</td>
<td>77</td>
<td>14.6</td>
</tr>
<tr>
<td>WVU</td>
<td>1118</td>
<td>26.7</td>
<td>42.5</td>
</tr>
<tr>
<td>TCU</td>
<td>272</td>
<td>10.2</td>
<td>30.4</td>
</tr>
<tr>
<td>OU</td>
<td>576</td>
<td>13.5</td>
<td>27.4</td>
</tr>
<tr>
<td>TTU</td>
<td>941</td>
<td>21.4</td>
<td>44.5</td>
</tr>
<tr>
<td>ISU</td>
<td>674</td>
<td>14.6</td>
<td>45.5</td>
</tr>
<tr>
<td>OU</td>
<td>894</td>
<td>24.3</td>
<td>36.9</td>
</tr>
</tbody>
</table>

More observations…..Our incoming student quality has improved over the past decade

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean SAT Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1200</td>
</tr>
<tr>
<td>2003</td>
<td>1209</td>
</tr>
<tr>
<td>2004</td>
<td>1239</td>
</tr>
<tr>
<td>2005</td>
<td>1239</td>
</tr>
<tr>
<td>2006</td>
<td>1223</td>
</tr>
<tr>
<td>2007</td>
<td>1255</td>
</tr>
<tr>
<td>2008</td>
<td>1266</td>
</tr>
<tr>
<td>2009</td>
<td>1268</td>
</tr>
<tr>
<td>2010</td>
<td>1262</td>
</tr>
<tr>
<td>2011</td>
<td>1239</td>
</tr>
<tr>
<td>2012</td>
<td>1275</td>
</tr>
</tbody>
</table>

Comparison to other faith based schools: Notre Dame - 1430, BYU - 1315

Here’s how mechanical engineering compares to other private programs

<table>
<thead>
<tr>
<th>School</th>
<th>Students</th>
<th>Faculty</th>
<th>Student/Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice University</td>
<td>146</td>
<td>16</td>
<td>9.1</td>
</tr>
<tr>
<td>Northwestern</td>
<td>242</td>
<td>24</td>
<td>10.1</td>
</tr>
<tr>
<td>Notre Dame</td>
<td>336</td>
<td>21.5</td>
<td>10.7</td>
</tr>
<tr>
<td>Vanderbilt</td>
<td>296</td>
<td>14.25</td>
<td>20.8</td>
</tr>
<tr>
<td>USC</td>
<td>470</td>
<td>22</td>
<td>21.4</td>
</tr>
<tr>
<td>Baylor</td>
<td>410</td>
<td>14</td>
<td>28.3</td>
</tr>
<tr>
<td>Brigham Young</td>
<td>939</td>
<td>26</td>
<td>36.1</td>
</tr>
</tbody>
</table>

ECS has done very well in recruiting women to our programs

<table>
<thead>
<tr>
<th>Year</th>
<th>Women in Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2006</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>12%</td>
</tr>
</tbody>
</table>

National average for ME and ECE is about 13%

Observations…cont’d

- Research expenditures in all programs are modest

<table>
<thead>
<tr>
<th>Department</th>
<th>Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>$563k</td>
</tr>
<tr>
<td>Electrical and Comp. Eng.</td>
<td>$252k</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>$562k</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$1,377k</td>
</tr>
</tbody>
</table>

Other faith based schools: Notre Dame - $41.2m, BYU - $9.4m

Note: Both offer Ph.D. degrees in several engineering programs
Observations…cont’d
• Lack of Ph.D. programs in CS and ME will affect the growth of our graduate and research programs
  — Currently have 56 graduate students (10 Ph.D.)
• Research infrastructure at Baylor is still in its infancy, is improving, but needs to continue to grow
  — Important for attracting new faculty and funding

Observations…cont’d
• ECS is space constrained
  — Problem areas
    • Faculty offices
    • Student design projects
    • Undergraduate laboratory
  — By comparison
    • TCU has 40% more space for a program 1/3 our size
    • TAMU has 40 to 50% more sf/faculty than ECS
• Completion of the BRIC is vital for the growth of ECS research
  — No room for research in Rogers Building
  — BRIC will be a draw for recruiting new faculty

Observations…cont’d
• ECS is short of support staff
  — Needs assistance in laboratories, advising, and administrative assistants
• ECS endowments are insufficient for a program our size
  — Current endowments are about $2.5M
  — No professorships or chairs to attract prominent faculty to Baylor
  — No fellowships to get best graduate students

Observations…cont’d
Pro Futuris will help set the agenda for ECS during the next 10 years
• Potentially good for ECS
  — Approve new graduate programs
  — Increase Ph.D. production
  — Strengthen experiential learning and research opportunities
  — Forge collaborations with industry within the BRIC
  — Provide outstanding (research) facilities...and a supportive infrastructure

Other aspects of Pro Futuris that will impact ECS
• There will be more flexibility for ECS to manage enrollment and improve the quality of incoming students
• There will be increased focus on retention of undergraduates
• There should be more resources available for ECS as new endowments are developed
  — Vital for moving ECS forward — Our current endowments are only about $2.5 million

Strategic action we need to take this year
• Develop a strategic plan that aligns with the aspirations in Pro Futuris
  — Needs to address key areas for ECS
    • Strategic research areas for each program
    • Undergraduate programs
    • Graduate programs
    • Creation of new degree or certificate programs
    • Infrastructure to support teaching and research
    • Engagement with industry
    • Development priorities
Tactical actions we need to take this year

- Address issues raised by the ABET visit
  - Weaknesses in ME and ECE
  - Deficiency and weaknesses in EGR
- Complete proposal for design center to temporary relieve space in Rogers Building
- Complete enrollment management plan proposal
  - “Pre-engineering” or “freshmen engineering”
  - 1100 SAT minimum

Tactical actions we need to take this year

- Hire six faculty committed to quality teaching and building a research program at Baylor
- Get Ph.D. programs in both Computer Science and Mechanical Engineering approved
- Work with development to increase endowments
- Work to increase visibility of engineering programs in major industries in the state
- Develop articulation agreements with other faith based schools in state that don’t have engineering programs

THANKS FOR YOUR TIME

Questions?