Welcome

New members:

• Rich Laubhan, LSI
• Matt Bold, Lockheed Martin
Agenda

• Department Update
• Research Spotlight
• Industry Spotlight
• Overview of Aerospace & Clean Energy Park
• Break
• Recap of FA05 meeting: Engineer of 2020
• Breakout Session: Rising Above the Gathering Storm, Revisited
• Discuss Results of Breakout Session
• Lunch and Student Presentations
• Tour of Engines & Energy Conversion Lab
Department Update

Tony Maciejewski, ECE Department Head
Recognition of Service

• IAB members with 10 years of service (or more):
  – Jason Fegley
  – Grant Miller
Faculty News

• Chandra Named 2011 University Distinguished Alumnus

• Biedron and Milton Win $2 Million Grant to Support the Office of Naval Research

• Bartels, Backus Receive DOE Grant to Develop X-ray Source
• National Academy of Engineering Taps ECE Prof. Sid Suryanarayanan for Prestigious Symposium

• CSU among nation’s research leaders with $330 million this past fiscal year
  – 10% growth; 24% in past 6 years
Student News

• BC-Infill Renovation in Progress! (Tiger Team initiative)
Student News

• Best Paper Contest Winners: Nicholas Annis and Michael Gilliland, "Web Application for Enterprise Computing"

• Coffee group formed to address recruitment and retention of women in ECE (Tiger Team initiative)
Special Thanks for Equipment Gifts

• Intel (Scott Makinen)
• Agilent (Dan Ferguson)
• Vaisala (Chuck Quire)
• HP (Kevin Matherson)
COE Research Expenditures
COE Research Expenditures

2010-2011

- CIRA: 27%
- ATS: 26%
- College of Engineering: 46%
- CEE: 14%
- ECE: 20%
- ME: 8%
- CBE: 5%
ECE Research Expenditures

- 1999-2000: $0
- 2000-2001: $2,000,000
- 2001-2002: $4,000,000
- 2002-2003: $6,000,000
- 2003-2004: $8,000,000
- 2004-2005: $10,000,000
- 2005-2006: $12,000,000
- 2006-2007: $14,000,000
- 2007-2008: $16,000,000
- 2008-2009: $18,000,000
- 2009-2010: $20,000,000
- 2010-2011: $22,000,000
ECE Fall Enrollment

- PhD Systems (on-campus)
- MS Systems (on-campus)
- ME Systems (on-campus)
- PhD
- Masters
- Undergraduate

ME Systems Engineering (Distance) - 36
ECE ranked in the top 5 among CSU departments with the largest percent increase in student FTE in AY 09/10 (17%)
Enrollment Trends by Class

- Freshmen Total
- Sophomore Total
- Junior Total
- Senior Total
ECE Persistence
(not including transfers)
Percent of ECE Colorado Freshman Enrollment (2006 vs 2010)

- **Colorado State University**: 28.8% (↑ 8.6%)
- **Colorado School of Mines** (Estimate): 29.8% (↓ 9.6%)
- **University of Colorado at Boulder**: 34.6% (↓ 8.2%)
- **University of Colorado at Colorado Springs**: 12.3% (↑ 7.1%)
- **University of Denver**: 1.6% (↑ 2.1%)
Percent of ECE Colorado Total Enrollment (2006 vs 2010)

- Colorado State University: ↓ 3.4% 2006: 31.1% 2010: 27.7%
- Colorado School of Mines: ↑ 0.6% 2006: 21.5% 2010: 22.1%
- University of Colorado at Boulder: ↓ 1.9% 2006: 36.1% 2010: 34.2%
- University of Colorado at Colorado Springs: ↑ 3.1% 2006: 8.0% 2010: 11.1%
- University of Denver: ↑ 1.6% 2006: 3.4% 2010: 5.0%
ECE Freshman Enrollment (2006 vs 2010)

- **Colorado State University**: 55 (↑ 10.9%)
- **Other CO Institutions**: 136 (↓ 25.0%

- **2006**: 102
- **2010**: 102
ECE Total Enrollment (2006 vs 2010)

<table>
<thead>
<tr>
<th>Institution</th>
<th>2006</th>
<th>2010</th>
<th>Difference</th>
</tr>
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<tbody>
<tr>
<td>Colorado State University</td>
<td>272</td>
<td>256</td>
<td>-16</td>
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<tr>
<td>Other CO Institutions</td>
<td>604</td>
<td>669</td>
<td>65</td>
</tr>
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Graduate Degrees Awarded

**Full Year (Summer '10, Fall '10, Spring '11)**

- **2005-06**: 35
- **2006-07**: 35
- **2007-08**: 20
- **2008-09**: 20
- **2009-10**: 15
- **2010-11**: 25

- **ME-Systems**: Red
- **MS**: Green
- **Ph.D.**: Purple

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**Legend**
- ME-Systems
- MS
- Ph.D.
Spring Action Items

• **Action item:** Offer ECE lab tours after a future meeting.
  – **Status:** ECE Prof. Sid will lead tour of EECL after today’s meeting.

• **Action item:** Provide Mike Freeman’s contact information to the board, along with details about IEEE panel discussion.
  – **Status:** Information distributed following spring meeting. Mike recently accepted new position as CEO of the Rocky Mountain Innovation Initiative.
• **Action item:** In developing new online curriculum, focus on flexibility.
  – **Status:** Using a certificate model, the online ME in ECE will provide the highest possible level of flexibility in course offerings.

• **Action item:** Offer certificates in focus areas that are of greatest interest to the industry.
  – **Status:** Certificates established based on IAB feedback and survey results:
• **Action item:** Use feedback from the IAB and the survey to determine which courses need to be developed for online delivery.
  – **Status:** Used IAB input to determine which existing courses should be implemented first for online delivery. New courses will be developed based on market needs.

• **Action item:** Rely on industry partners to help spread the word about the online degree program.
  – **Status:** Additional details and marketing materials will be distributed this winter. The degree will launch in FA12.
• **Action item:** Consider developing case studies/testimonials to promote the online program.
  
  – **Status:** This idea will be considered as part of phase II of the marketing plan.

• **Action item:** Visit companies to spread the word about the online program.
  
  – **Status:** Carl Melle, director of CSU OnlinePlus, would like to schedule visits beginning in February. If interested, contact Andrea.
• **Action item:** Consider hosting a future IAB meeting somewhere in the Denver area.
  – **Status:** Chuck Quire recommended a possible venue for future consideration. Thoughts on hosting off-campus?

• **Previous action item:** Expand program and research in the area of Power.
  – **Status:** Drs. Liuqing Yang and Sid Suryanarayanan hired. The Power & Energy Engineering team will offer a certificate through the online degree program.
• **Previous action item:** Continue working with Math department to get mathematics courses for engineering students taught by regular faculty (not TAs).

  – **Status:** Issue is currently under review by the undergrad director for the Math dept. They are discussing implementation and like the idea of including the ECE-perspective into some of the classes, possibly taught by ECE faculty. Updates to follow.
Research Spotlight

Professor
Industry Spotlight: Arrow Electronics

Scott Evans
Overview of Aerospace & Clean Energy Park

Paul Czarnecki
Break
Recap of FA05 IAB meeting

Tony Maciejewski
Key Factors Impacting Higher Education (FA05)

1. Increased homeland security
   - Restrictive visa policies dissuading students from applying to study in the U.S.

2. Increased quality in graduate programs abroad
   - Foreign countries are building up S&E at a faster rate than the U.S. can achieve
     - China graduates more engineers than any other country in the world; the U.S. is fourth in engineering graduate production, also behind India and Japan. (IEEE, Nov. 2004)
   - The U.S. has relied heavily on foreign-born engineers
Long-term Ramifications (FA05)

• Critical need to educate students for competitive careers in a global economy
  — IAB input is key

• Ramp up recruitment

• Increase emphasis on continuing education and retraining in excessively outsourced fields
Summary of ’05 Discussions

• Board did not recommend major changes to the ECE curriculum; emphasis on core fundamental courses essential.

• Look at expanding continuing education opportunities.

• Continue to collaborate with industry and encourage the pursuit of engineering among K-12 students.
2005 Report Follow-up (Dept-level)

• Visa Impact
  – Recruitment focus shifted to U.S. born students
  – Noticeable improvements in processing times

  **2004 graduate school applicants:**
  306 total applicants – 91% international

  **2011 graduate school applicants:**
  376 total applicants – 93% international

• Research funding skyrocketed and still growing – ECE benefited from ARRA funds
  – 400% growth in research expenditures since FY02-03
2005 Report Follow-up (Dept-level)

• Continuing education initiatives underway, including online M.E. degree due to launch in FA12.

• Continuing to encourage industry involvement from senior design to K-12 outreach to special events.
  – Upcoming Design Your Future Day on Oct. 19
  – ISTeC High School Day on Oct. 21
  – Weekly seminar series underway
  – Industry partners give weekly senior design lectures
Rising Above the Gathering Storm, Revisted

“America’s competitive position in the world now faces even greater challenges, exacerbated by the economic turmoil of the last few years and by the rapid and persistent worldwide advance of education, knowledge, innovation, investment, and industrial infrastructure.”
Current State: Three Trends

1. Decreased financial wherewithal to address the competitiveness challenge

2. Progress....abroad

3. The U.S. higher education outlook
   - Other nations placing extraordinary priority on higher education, particularly in S&E
   - Due to recent financial reversal, U.S. universities are in greater jeopardy than at any time in nearly a century
Current State: Quality vs. Quantity

Engineering Colleges in India Have Tens of Thousands of Vacant Seats

- The Indian government is considering temporarily stopping the approval of new engineering schools
  - IT boom has led to thousands of new engineering colleges in the last 5 years and now tens of thousands of seats are vacant

For example:
- 30,000 seats are vacant in engineering colleges in Maharashtra state, 45,000 in Tamil Nadu.
- India’s professional-education regulator approved the establishment of more than 8,500 engineering schools from 2008 to 2010.

Chronicle of Higher Education – Sept. 2011
Current State: Priority Actions

- Provide teachers in every classroom qualified to teach the subject they teach

- Double federal investment in research – competitively awarded (largely to universities)
Innovation is Driver of Change

• Knowledge capital
  – Newly acquired knowledge, often in the form of scientific and technological advancements

• Human capital
  – Workforce education
  – Science, engineering, and mathematics
  – Production of scientists and engineers
  – Importing talent
“Second only to a weapon of mass destruction detonating in an American city, we can think of nothing more dangerous than a failure to manage properly science, technology, and education for the common good...”

--United States Commission National Security for the 21st Century
Breakout Session
Facilitators: Jim Greener, Scott Makinen
Considerations

• What steps should be taken to create a learning environment that addresses the changing face of engineering?
  • How do we plan for 2015, 2020, and beyond?
  • What should we do differently?
• If you could start with a blank slate, how would you design an electrical and computer engineering curriculum?
  • What are the skills needed for future engineers?
• What will (or should be) the relationship between industry and universities in terms of research collaboration, online/continuing education, etc.?
Discuss Results of Breakout Session

Facilitators: Jim Greener, Scott Makinen
Lunch, Senior Design Presentations
Closing Remarks, Tour of EECL at 1:15
430 N. College Ave.