IAB members present: Warner Andrews, Tim Ash, Jim Barnes, Jim Cale, Bruce Doyle, Chuck Duey, Scott Evans, Dan Ferguson, Jason Gentry, Elena Gonzalez, Jim Greener, Bob Gresham, Lance Guymon, Todd Hansell, Michael Kotson, Scott Lukes, Steve Martin, Paul Monson, John Nichols, Chuck Quire, and Fernando Tomasel.

ECE department: Randy Bartels, Andrea Leland, Tony Maciejewski, Olivera Notaros, Sudeep Pasricha, Ali Pezeshki, HJ Siegel, and Sid Suryanarayanan.

Students: A group of ECE undergraduate students and a few student teams who shared their biomedical design projects during breakfast.

Guests: Brett Beal, School of Biomedical Engineering; Matt Carlyon, College of Engineering Development Officer; Stuart Tobet, Director, School of Biomedical Engineering; Dan Zimmerle, Power Systems R&D Manager, Department of Mechanical Engineering.

1. Introduction and Welcome (Jason Gentry, IAB president)
   Jason opened the meeting by welcoming new IAB member Jim Cale, National Renewable Laboratory. He reviewed the agenda and turned it over to Tony Maciejewski, ECE department head, for the department update.

2. Department Update (ECE Department Head Tony Maciejewski)
   Tony’s update touched on the following topics.

   • College Update
     o Tony introduced the following new hires for the College of Engineering (McLean and Carlyon met with board members during the break)
       ▪ Dr. David McLean, former director of the Transportation Research Center at Washington State University, started July 1 as dean of the college
       ▪ Matt Carlyon, new development director for the college
     o Scott Bioengineering Building now open

   • New Faces in ECE
     o Sourajeet Roy, new faculty member
     o Kate Douglass, academic advisor

   • Faculty News
     o ECE professors receive NSF award to design green supercomputers
- EUV ERC named new Research Experience for Teachers site by the National Science Foundation
- Rocca featured in *Nature Photonics*
- Professor Bringi tribute held at AMS Annual Conference on Radar Meteorology
- Menoni secures grant with DOD Office of the Secretary of Defense’s High-Energy Laser Technology Office

- **Student News**
  - “Backpackable Underwater Remote Operated Vehicle” wins Best Paper Contest
    - Students on project: Rachel Dondero (EE), Sarah Romer (EE), Justin Kopacz (EE), Luke Stahler (Mech), and Michael Hake (Mech)
  - Schiltz receives highly prestigious NSF Fellowship (advised by Menoni)
  - Xiang and Rajkrishna named Young Student Fellows at IEEE/ACM Design Automation Conference (advised by Pasricha)
  - Tarplee and Friese win Best Paper at international conference (advised by Maciejewski and Siegel)

- **Recent K-12 Outreach**
  - EUV ERC outreach to Girl Scouts
  - ECE student led first STEM/Cyber Summer Camp with Northrop Grumman

- **Nice turnout for annual Design Your Future Day**
  - 32 engineers from 19 companies
  - Thanks to those IAB members/companies that participated

- **ABET Update**
  - Site visit scheduled for early November
  - Evaluators may call on IAB members for participation and input
  - Thank you for your participation – IAB feedback is invaluable

- **IAB Survey Results for ABET**
  - Input from the SP06 survey was compared with SP13 survey results. For the most part, scores improved since the ’06 survey.

- **Charts and data**
  - College of Engineering research expenditures
  - ECE research expenditures
  - ECE ranks high in research (based on 2009 NSF data)
    - ECE faculty rank 28th (out of 370 programs) in the country for research expenditures per faculty member
      - ECE is 36th overall for total research funding
    - ECE outranks:
      - Purdue
      - Princeton
      - U. CA, Davis
      - Texas A&M
      - CU Boulder
  - Top ECE institutions and peers based on US News and World Report and as identified by CSU Board of Governors
  - ECE research expenditures per tenured faculty member: CSU & peer institutions
National enrollment trends
ECE fall enrollment
Undergraduate degrees awarded
Freshman enrollment
Enrollment trends by class
ECE freshmen enrollment: Colorado institutions (2007 vs 2012)
Total ECE undergraduate enrollment: Colorado institutions (2007 vs. 2012)
ECE freshmen retention rates
Persistence rates within ECE
Women in Engineering (FA13)
Women in ECE
Graduate degrees awarded
Percent of international degrees awarded

Update on Spring Action Items:

- **Action item:** Visit new Advanced Beam Lab as part of a future IAB meeting
- **Status:** Add to IAB agenda for spring or fall 2014.
- **Action item:** Determine ECE’s role in the world of MOOCs. Use the opportunity as a marketing/recruitment tool.
- **Status:** ECE faculty will discuss this topic at fall retreat; we will report back at the spring IAB meeting.
- **Action item:** Help the public understand the importance of an engineering degree by publicizing salary benefits and job opportunities.
- **Status:** Info included in recruitment presentations and will be prominently featured on new ECE web site.
- **Action item:** Create YouTube channel for ECE
- **Status:** Already exists, but new videos are being developed to highlight on the channel.
- **Action item:** Require senior design students to create project videos that could be used to promote the department.
- **Status:** Experimenting with the idea this semester; we will report back in the spring.
- **Action item:** Show gender demographics as part of future department updates.
- **Status:** Stats will be included in department update each fall.
- **Action item:** Maintain department Facebook page for marketing purposes; social media should be led by students.
- **Status:** ECE student ambassador hired to manage Facebook.

3. **Industry Spotlight: Covidien (Todd Hansell, Director, Design Quality Engineering)**

Todd delivered an interesting and entertaining overview of Covidien, a company born in 2006 out of Tyco Healthcare. He shared his perspective as director of Design Quality Engineering, defining it as “the discipline of breaking things.” He provided a fun, hands-on demonstration of a medical device using a pumpkin as a prop. The board was so impressed with Todd’s presentation that they recommended inviting him to give his presentation to prospective or current ECE/biomed students to get them excited about the field.
4. **Overview of CSU School of Biomedical Engineering (Stuart Tobet, Director, School of Biomedical Engineering)**

Stuart shared the short history of the School, which launched in 2007, with an overview of the core faculty, academic programs, and enrollment data. He also provided recruitment strategies and information about the regulatory affairs program.

5. **Breakout session: Growing ECE’s Biomedical Program (Facilitators: Jason Gentry, IAB president, and Scott Evans, IAB VP)**

The board split into groups to discuss and brainstorm the following:

- Is the low number of EE’s doing biomed a problem? If so, how do we address this?
  - Why do you believe more students are interested in mechanical/biomedical engineering?
- Does your company play a role in the biomedical space? If so, in what capacity?
- As an employer, would you find attractive a student with a biomedical engineering and ECE background, even if you don’t interact in the biomedical field?

**Results of breakout session:**

The board shared the following opinions and ideas.

- It is understood that electrical engineering is one of the most difficult majors on campus and the board believes this perception steers students away; this could also affect students’ desire to pursue a dual major in biomed/EE.
- What is the most valuable degree to employers?
  - Some believe MSEE is better than a dual degree in biomed and EE
  - Combining a BSEE with an MS in Biomed may be one of the most marketable combinations
  - A systems engineering background is highly attractive. The IAB wonders if it’s possible to earn a master’s in systems engineering through the accelerated BS/MS program
- One group suggested greater emphasis on software in the curriculum to include more firmware/software rather than hardcore electromagnetics.
- In recruiting new students to the dual degree, target the high school population using presentations like Todd’s Covidien overview.
- Leverage BME recruitment to attract more women to EE.
- The board’s sense is that students today have a greater desire to impact the world. With BME, there is an opportunity to show the human impact.
- Share with students the salary benefits of the biomedical industry.
- Knowing that students have to decide on a dual major early in their academic career, the IAB wonders if the department can examine/change the curriculum to allow students to make the decision later but still move in the desired direction of BME/EE.
- Leverage NSF Research Experience for Teachers site grant to maximize outreach and promote BME/EE.
- Make ECE/BME demos and marketing materials more tangible; there is the belief that mechanical engineering/BME is more desirable to students because it’s easier for them to understand.
6. **Expanding the IAB (Andrea Leland, ECE Industrial Relations Coordinator)**
Andrea shared the department’s desire to expand the board to include more active engineering professionals and industry leaders. She shared a “wish list” of companies that are not yet represented on the board and asked the IAB to provide names of potential board members. Following up on the board’s suggestions, Andrea will invite the recommended individuals to the spring meeting.

7. **Research Spotlight (Professor Randy Bartels)**
Professor Bartels impressed the board with an in-depth overview of his current research projects. The presentation included examples of innovative work underway in his lab in the new Scott Biomedical Building.

8. **Senior Design Presentations**
One ECE senior design team delivered an interesting presentation about their innovative project, HexHeat (http://www.hexheat.com/). Team members include: Craig Cogdill, Sami Foster, Stanley Nestler, and Kevin Thompson. Professor Peter Young is the project advisor.

9. **Closing Remarks (Tony Maciejewski)**
Tony wrapped up the meeting and thanked the board for their participation. He encouraged the board to contact him or Andrea with additional ideas or comments regarding the meeting topics. Some members participated in the tour of Professor Bartels’ lab following the meeting.

**ACTION ITEMS:**
- Visit new Advanced Beam Lab as part of a future IAB meeting.
- Share feedback from faculty retreat regarding ECE’s role in MOOCs.
- Report back on status of senior design video project; share link to new ECE recruiting video.
- Find out if it’s possible to earn a master’s in systems engineering as part of the accelerated BS/MS program.
- In terms of biomedical/EE recruitment:
  - Utilize presentations like Todd Hansell’s Covidien overview to recruit students to the major
  - Leverage biomedical recruitment efforts to attract more women to ECE
  - Make recruitment materials more tangible; show prospective students the human impact of the field
  - Share salary benefits of biomedical industry, if available
  - Leverage NSF Research Experience for Teachers site grant to maximize recruitment
- Find out if it’s possible to tweak the curriculum to allow students to slightly delay their decision to pursue a dual major, but still move in the desired direction of BME/EE.

The spring IAB meeting is scheduled for **Friday, April 25.**