IAB members present:
Tim Ash, Warner Andrews, Colin Baldwin, Michael Coddington, Chuck Dvey, Jason Fegley, Dan Ferguson, Debbie Goldman, Elena Gonzalez, Jim Greener, Lance Guymon, Susan Hunter, Dana Kirchmar, Michael Kotson, Alvin Loke, Scott Lukes, Scott Makinen, Grant Miller, Michael Miller, Orhan Norman, John Perzow, Mike Pichler, Chuck Quire, Kurt Rentel, Duane Spence, Fernando Tomasel.

ECE faculty and staff present:

Guests:
Robert Bower, industrial liaison for the CSU EUV Engineering Research Center; Terry Comerford, career counselor for the College of Engineering; a small group of ECE undergraduate and graduate students.

1. Introduction and Welcome (Alvin Loke, IAB president)
Alvin Loke opened the meeting by welcoming new members and visitors: James Bower, industrial liaison for the CSU EUV Engineering Research Center, Michael Kotson, VT Miltope; Susan Hunter, Optidoodle (returning member); Michael Miller, Seagate.

2. Department Update (ECE Department Head Tony Maciejewski)
Tony began his presentation by recognizing and thanking IAB members with at least 10 years of service: Colin Baldwin and Chuck Dvey. He then gave his department update, addressing the following topics:

- Chandra named Distinguished Professor of Finland, awarded $1.5 million
- ECE grad student Mark Berrill receives Wigner Post-doctoral Fellowship Award
- Dr. Sudeep Pasricha wins Best Paper Award at ISQED 2010 Conference
- Professor Carmen Menoni named IEEE Fellow
- Update on search for smart-grid faculty candidate
  i. Two new faculty hired: Dr. Liuqing Yang and Dr. Sid Suryanarayanan
- ECE in the media (www.engr.colostate.edu/ece):
  i. ABC World News Tonight – Center for Collaborative Adaptive Sensing of the Atmosphere
  ii. STEM outreach – Chen’s National Science Foundation grant
  iii. “Sensing the Killer” - Krapf’s TB research
- Best Paper Contest set for first week in May
• Tom Williams named 2010 recipient of University Distinguished Alumni Award for the College of Engineering.
• ECE prevailed at 2010 E-Days celebration
  i. Optical Biosensors senior design team won grand prize
• Centennial celebration scheduled for May 1.
**Graphs and charts:**
• Distribution of College of Engineering research expenditures (08-09)
• Trends in ECE research expenditures (including projection for FY09-10)
• National engineering enrollment trends
• International enrollment trends
• ECE enrollment trends
• Undergraduate degrees awarded
• Enrollment trends by class
• Freshmen enrollment trends
• ECE admissions outlook
• University new freshmen persistence and graduation
• Engineering new freshmen persistence and graduation
• Semester persistence – new freshmen ECE to CSU
• Semester persistence – new freshmen ECE to College of Engineering
• Semester persistence – new freshmen ECE to ECE
• Graduate degrees awarded
• Percentage of graduate degrees awarded to international students

3. **Update on Fall Action Items**
Tony provided an update on the following action items:
• **Action item:** Investigate feasibility of “Smart-Build” course, i.e. soft skills, IP, business plans, sales and marketing.
  **Status:** Some of the topics are already being addressed through the Professional Learning Institute. We are suggesting speakers to address others.
• **Action item:** Share the board’s suggestion for the Master of Management Practice program with MMP academic adviser to possibly use as a guideline for engineering students interested in the program.
  **Status:** Information shared with Tonja Rosales. She is eager to continue working with department to help ECE students succeed with the right coursework. Would like to create specific track for engineers.
• **Action item:** Follow-up on the idea of having board members serve as industry sponsors for freshmen and sophomore classes.
  **Status:** Discussing retention strategies as part of today’s meeting.
• **Action item:** See if there is a business course that could be geared toward engineering students – a “Business for Engineers” class. Product management and product lifecycle concepts are particularly important.
  **Status:** The COE and Wade Troxell have been working with the College of Business to tailor coursework and plans of study for engineering students interested in business.
• **Action item:** Establish a partnership with the COB for senior design projects.
  **Status:** COE senior design faculty to meet with COB faculty to identify potential team collaborations in Fall 2010. Fall 2011 – engineering students ready for COB entrepreneur program (need to take prerequisite coursework).
4. **Research Spotlight (Professor Kevin Lear)**
   Dr. Lear delivered an interesting and informative talk about his work in Optical Biosensors and its applications in cancer detection and as well as infectious diseases such as Tuberculosis.

5. **Industry Spotlight: Wolf Robotics (Lance Guymon)**
   Lance provided a detailed overview of Wolf Robotics and its history. Wolf Robotics, based in Fort Collins, specializes in solutions for metalworking automation with arc welding and cutting systems in the non-automotive industry along with machine tending, material handling, and material removal processes. The company is combined with a business segment in Columbus, Ohio (Rimrock Corporation), specializing in automation solutions for the die cast, forging, and foundry industries. The board seemed particularly intrigued by the large-scale work (primarily welding) performed by Wolf Robotics.

6. **Background on Existing ECE Retention Activities (Louis Scharf)**
   Dr. Scharf laid the foundation for the retention breakout sessions by providing background information on current activities under way in the department as well as efforts led by the “Tiger Team,” a new committee created to focus on student recruitment and retention. Scharf, who heads up the Tiger Team, also provided handouts to facilitate the breakout sessions, which included specific details about the proposed and/or implemented initiatives. He asked board members to split into six different groups, charging each table with a specific topic:
   - Table 1: Care and Feeding in ECE (initiatives to engage students with faculty, staff, and themselves)
   - Table 2: Energizing Student Organizations
   - Table 3: Designing the Freshman and Sophomore Years for Motivation and Retention
   - Table 4: Summer Internships for Honorable Students
   - Table 5: Tools and Programming in the ECE Curriculum
   - Table 6: Miscellaneous Pedagogical Innovations in the ECE Curriculum

**Results of Breakout Session:**

**Table 1: Care and Feeding in ECE**
- Need a diversity of approaches to engagement with students.
- Why is a non EE advising undergraduate students?
- Students need to feel connected or part of the department. Faculty and staff involvement is huge: student engagement is relationship driven not data driven.
- Mentoring is good. IAB involvement is good. Regarding faculty mentoring, rotate the students between mentors at least once. Students need to figure out with whom they feel most comfortable.
- Goal setting and vision of the future keeps students on track. Students need to relate the theory to the profession, not just to application.
- Need exit interviews for those who leave the department. Use the feedback to make improvements in the department, when indicated.
- Perhaps exit interviews need to be with a third party for free and honest disclosure.
• The department has experimented with a peer mentoring program. It was voluntary and students showed little to no interest. If it is to work, it will work through the efforts of student organizations.

• The high school students who come through the ERC summer internships seem to be much more devoted afterwards. Is it possible to get internships started in freshman year even if they are short-term?

• Group events and teaming: a few outgoing, confident people dominate the discussion. The others may end up feeling "nobody cares about me." How to manage this effect?

• There are several faculty who engage their undergraduate students and these examples could be emulated more widely.

• Being "realistic" (50% are below average) is not motivational no matter how true. It may be better to try and match people with areas or specialties where they function above average.

• Communication: Implement a useful calendar application (like Google calendar) for department-related events. Do not distribute personal communications from the same email address as bulk. They get filtered out. YouTube?

**Table 2: Energizing Student Organizations**

• IEEE: what can it do for the students? Need to provide this answer to students to entice them to join. Students need to take initiative.

• Tackle freshman class. Other CSU College of Engineering student organizations are sending promotional materials to students when they're admitted into engineering.

• Ideas for initiatives:
  o Distinguished lecturers - invite speaker to CSU
  o Invite alumni to speak to students.
  o Field trips to cool places.
  o CSU IEEE student officers should contact the local IEEE High Plains Section to determine which school has the best IEEE student chapter, and then reach out to that group for best practices and ideas. Share of best practices with other student organizations in the College of Engineering. Partner with them - SWE, ASME, etc.

• Faculty must play a role by infusing positive energy into the student organizations.

• IEEE/HKN could help organize peer mentoring and tutoring.

• Have student leaders attend some faculty meetings.

• Pizza/Beer with students and faculty.

**Table 3: Designing the Freshman and Sophomore Years for Motivation and Retention**

• Students need to relate concepts to applications.

• Students need to feel a personal connection to the department. Mentoring is a start. It's important to start forming a sense of community outside of student organizations as well.

• Should we still teach fundamentals course? Absolutely, but perhaps taught differently using laptop simulations, Youtube, Wiki, etc.

• Challenges with math TA's.

• Should circuits class be more hands-on and less theoretical? IAB sees great value in hands-on projects, like the hands-on projects shown today. Hands-on early and often.

• Some students don't feel that the textbooks are aligning with what is being taught in lectures and done in labs.
• More use of technology for delivery of courses? Youtube. Wiki.
• Effectiveness of TA's and math instructors is uneven.

Table 4: Summer Internships for Honorable Students
• Internships motivate students and help bring the theory of ECE to life.
• In recruitment of high school students, parents want to know about what formal summer internship programs are available. If CSU had a program to help ensure summer internships for students it would improve recruiting of top students.
• Terry Comerford's role is to help facilitate internships. She regularly gets calls from companies looking for juniors with a 3.0 and above.
• Perhaps industry can reach out more to freshmen and sophomores.
• Perhaps ECE needs to more actively engage with Terry’s office.
• Legions of students are working part-time. Why not allow them to work at local companies instead? This idea should be investigated further. It's a win for students, the university, and local industry.
• Lance Guymon has volunteered to work with ECE to develop an internship program. Use IEEE and HKN to promote, inform, and encourage the value of internships.

Table 5: Tools and Programming in the ECE Curriculum
• C++ and Java are important. C++ should be more broadly accepted.
• Should we try to influence the Computer Science department or fund the teaching of C++ in ECE?
• There are trade-offs between a broad stroke understanding of all tools vs. in-depth knowledge of one tool. How should this be managed?
• Learn applications: C++ PERL, TICL, Ruby, Matlab, SPICE, RTL (Vlog, VHDL), database tools.
• Teach concepts and applications.
• Use Cadence in the junior year.
• Data structures and algorithms.

Table 6: Miscellaneous Pedagogical Innovations in the ECE Curriculum
• Expose students to practical applications early and often. Must be aligned with what they know at that point in their career.
• Teach instrumentation fundamentals early on.
• Expose students to research to help them gain a better, more in-depth understanding of the field.
• Continue with field trips but work to make them more interesting, enticing for students.
• Improve integration with Math department to ensure instruction is on par with instruction in ECE.

7. IAB Elections (Facilitator: Alvin Loke)
   The board unanimously voted in favor of Jim Greener as the new IAB vice president. Michael Coddington becomes IAB president.

8. Student Design Presentations
9. **Closing Remarks (Tony Maciejewski)**

   Tony wrapped up the meeting and thanked the board for their participation.

**ACTION ITEMS:**

The recommendations provided by the IAB will be discussed at length at the ECE Faculty Retreat scheduled for Saturday, October 9. The results of these discussions will be shared at the fall IAB meeting.

**Please mark your calendar for the fall IAB meeting on Friday, November 19.**