1. **Introduction and Welcome (Alvin Loke, IAB President)**

   Alvin Loke opened the meeting by welcoming new members and visitors: Orhan Norman, National Semiconductor; Julie Zinn Patti, Spirae; John Perzow, Analog Devices; and Ken Saller, National Semiconductor. He discussed the agenda and then turned it over to Tony Maciejewski for the department update.

2. **ECE Department Update (Tony Maciejewski, ECE Department Head)**

   Tony began his presentation by recognizing and thanking IAB members with at least 10 years of service: Duane Spence. He then gave his department update, addressing the following topics:
   a. Professor Chandrasekar wins Provost’s Instructional Innovation Award
   b. Professor Chen takes breakthrough research to K-12 classrooms with $2.7M NSF grant
   c. Professors Siegel and Maciejewski awarded $1M grant to design more robust computer systems
   d. Professor Lear uses optics to advance Lab-on-a-Chip technology
      — His work was featured on the cover of the journal, *Lab on a Chip*
   e. Professor Krapf leading team to develop optical technique that provides easy way to detect TB bacteria in fluids
   f. ECE creates exchange agreement with the University of Luxembourg
   h. Professors Rocca and Collins celebrate service milestones
   i. ECE in the Media ([www.engr.colostate.edu/ece](http://www.engr.colostate.edu/ece))
      — Krapf’s Tuberculosis research
      — Siegel and Maciejewski NSF grant
      — Chen’s NSF research
   j. Best Paper Contest winner announced in May
Lauren Netherton and Joel Kindt, “Optical Biosensors”

k. ECE student takes grand prize at Colorado undergraduate space research symposium (Jonathan Cox)

l. Events:
   — Engineering Exploration Day: Feb 13, 2010
   — Engineering Internship Fair: Feb 25, 2010
   — College of Engineering Alumni Awards Dinner: April 10, 2010
   — ECE Centennial Celebration: May 1, 2010

Graphs and Charts:

m. Distribution of engineering faculty (CSU & Nationwide)

n. Distribution of College of Engineering research expenditures

o. ECE research expenditures

p. COE indirect costs

q. National enrollment trends

r. ECE enrollment trends -- Tony asked for the board’s input regarding possible reasons for the slight drop in freshmen enrollments. Comments included:
   • Maybe students are more “green-minded” and don’t consider ECE to be a good fit.
   • Perhaps students are less interested in computer-related majors. Tony explained that for the first time in many years, there were more freshmen enrolled in computer engineering than electrical engineering.
   • Need to compare with national data. Tony noted that on a national level, enrollments in ECE are slightly up. His conjecture is that students’ decisions have been impacted by the local economy.

s. Undergraduate degrees awarded

t. Enrollment trends by class

u. Freshmen enrollment trends

v. Sophomore enrollment trends

w. Junior enrollment trends

x. Senior enrollment trends

y. Freshmen quality trends

z. Women in ECE

aa. Graduate degrees awarded

bb. Percentage of graduate degrees awarded to international students

3. Update on Spring Action Items (Tony Maciejewski)

Tony provided an update on the following action items:

   o Action item: Provide greater flexibility with distance education courses. For example, develop new certificate programs or short courses in specialty areas.
   
   o Status: Carl Melle is working with constituents to determine what model makes the most sense. Professor Sudeep Pasricha is developing a certificate program in embedded systems.
   
   o Action item: Help students prepare to compete in a global economy by encouraging more interaction with international student population.
   
   o Status: The presentations available through our PLI series educate our students on a wide range of topics that help prepare them for our global economy. Opportunities like the exchange agreement with the University of Luxembourg allows students to connect with people from all over the world.
   
   o Action item: Educate students on cyclical nature of the economy to provide encouragement during down times.
o **Status:** Don Morris, who delivered the presentation at our last board meeting, spoke to the senior design class in September. Events like Design Your Future Day give students a chance to meet with professionals and learn first-hand about the economic climate.

o **Action item:** To help prepare students for a global economy, encourage study abroad at an international university.

o **Status:** Exchange agreement established with the University of Luxembourg.

o **Action item:** Make it easier for companies to donate equipment to the department.

o **Status:** We are continually sharing our equipment needs with industry and have recently secured equipment gifts from our corporate partners. The process is fairly easy. If anyone is interested in donating, please contact Andrea Leland.

o **Action item:** Increase opportunities for social networking with CSU and IEEE.

o **Status:** The ECE department works closely with Alvin Loke (IEEE-SSCS) and Pete O’Neill (IEEE-Centennial) to make sure students and faculty are aware of IEEE social activities, seminars, and other events. An ECE alumnae is serving as the CSU IEEE student liaison; Andrea serves as industrial liaison for the Centennial Subsection.

o **Action item:** See if industry partners are interested in giving lectures and/or teaching short courses on specific topics. The ECE department could identify potential areas of interest and solicit companies for interested presenters.

o **Status:** Don Van Zyl from Advanced Energy taught a course last spring. ECE has gained approval for a group studies course. One mechanism would be to have a group of IAB members who collaborate and each teach 3-4-weeks on topics of interest. A faculty member would be assigned as the official instructor for the course.

o **Action item:** Create an online social networking group, e.g., LinkedIn, to serve as an additional communication mechanism and place for networking.

o **Status:** A LinkedIn group for the board has been created. We will use this as an additional mechanism for communicating with the board.

o **Action item:** Get information from Fernando Tomasel on the Trade Adjustment Assistance program to see if ECE can provide support that readily fits with the training that people recently laid off may need.

o **Status:** We received the information from Fernando. The needs of the laid off workers did not fit with the kind of support the ECE department can offer.

o **Action item:** Encourage professors to strengthen relationships with industry to solicit additional research activity during a down economy.

o **Status:** Faculty are engaged in new relationships with National Semiconductor and LSI.

**Additional activities that resulted from previous IAB discussions:**

o Design Your Future Day held on October 7. Attended by 24 industry representatives from 17 companies.

o Carl Melle with Distance Education has been working with IAB members to promote our Systems Engineering program.

4. **ECE Centennial Celebration (Andrea Leland, ECE alumni and industrial relations coordinator)**

Andrea reminded the board that in 2010 the ECE department will celebrate 100 years since the first degrees were awarded in electrical engineering from Colorado State University. She shared the new web page ([www. engr.colostate.edu/ece/centennial](http://www. engr.colostate.edu/ece/centennial)), which features a timeline, a historical write-up for each decade, information about alumni, and photos from the last century.
5. **Industry Spotlight: Woodward (Dr. Kamran Eftekhari Shahroudi)**
Kamran provided an overview of Woodward and its key focus areas. The company takes pride in the broad nature of unique, reliable, robust, and innovative solutions it provides.

6. **Background on Existing/Potential Collaborations with CSU’s College of Business (COB) (Dr. Thomas Siller, COE; Dr. John Hoxmeier, COB)**
Tom Siller discussed the existing partnership with the College of Business, which includes three primary areas:
- Senior design – combine with COB capstone experience
- Honors program
- The Professional Learning Institute – combine with COB coursework regarding lifecycle planning

John Hoxmeier gave an overview of the COB graduate programs, including the Master of Business Administration (MBA), Master of Accountancy (MAcc), Master of Science in Business Administration – Global Social Sustainable Enterprise (MSBA-GSEE), and Master of Management Practice (MMP). Hoxmeier’s presentation focused primarily on the MMP, a new 30-credit degree program. The course work focuses on delivering the primary management skill sets and training that organizations desire in candidates seeking employment in today’s marketplace. The MMP is a 4+1 program in which students combine their four-year undergraduate degree that includes a minor in business, or equivalent, with the one-year MMP graduate degree. For more information about COB graduate programs, contact Tonja Rosales: (970) 491-4661 or Tonja.Rosales@colostate.edu.

7. **Breakout session: Opportunities for partnering with CSU’s College of Business (Facilitator: Michael Coddington, IAB Vice President, National Renewable Energy Laboratory)**
Mike asked the board to consider and discuss among their tables the following questions:
- What kinds of interactions make sense?
- What should be the depth of the relationship?
- Which business courses are most relevant?
- What are the suggested next steps?

**Summary of group discussions:**
- Business classes should be an “add-on” to what already exists in the ECE curriculum; current engineering courses should not be replaced with business courses.
- It is considered a plus for graduates applying for entry-level engineering jobs to have an understanding of business practices. Being business-savvy is more important for higher-level positions.
- Technical knowledge is always the most important factor for engineering job applicants; additional knowledge in disciplines like business is a plus.
- Some board members said that engineers who earn their MBA degree return to work “reprogrammed” – they start focusing more on the business aspects of their position and not their core engineering responsibilities.
- They thought it would be a good idea to create a “Business for Engineers” course, which would teach engineers the mindset of business. They noted that some business courses seem to be too abstract for engineering students. They
agreed, though, that it would be beneficial for ECE students to have a better understanding of product management and product lifecycle.

- The board agreed that the Foundations of Systems Engineering class would be useful because it teaches product lifecycle and the principles of working with an entire system.
- The board agreed that partnering with the COB on senior design would be a beneficial experience for ECE students for the following reasons:
  - Gives students from the COB and ECE a shared appreciation for each other’s work, and an understanding of how their disciplines must work together. This will help them when they enter the workforce.
  - Helps ECE students understand the importance of a business plan, financial analysis, and a launch plan.
  - Requires students to deliver a shared presentation at the end of the project. This type of interaction mimics a common engineering workplace scenario.

- Regarding the logistics of partnering with the COB on senior design, Tony asked the board if they would prefer having the teams work together for one semester or for year-long collaborations. They said that projects could last for one or two semesters. However, it’s better for business students to be involved early in the project.
- Olivera asked the board if the COE/COB partnerships should be close-knit or loosely coupled. Everyone agreed that they should work together closely.
- For research-related projects, the interaction with the COB would be slightly different because of the nature of the work – the students aren’t marketing a typical product. However, the business students might be able to help ECE students with proposals to help gain funding and “sell” their research.
- In general, there is no one-size-fits-all solution for the senior design partnership between the two colleges.

- One group suggested creating a senior-level class called “Smart Build,” which would include the elements below:
  - Soft skills – communication, leadership, etc.
  - Business plans
  - Sales and marketing
  - Intellectual property
  - Global relations

The course would be five credit hours and co-taught by industry. Tony noted that the Professional Learning Institute, which is now required by all COE students, covers these topics.

- After seeing Dr. Hoxmeier’s overview of the MMP, the board recommended the following courses that they believe would fit well with the program:
  - A strategic sourcing course
  - Ethics; business law
  - International relations
  - Additional technical courses that fit with the student’s focus area

- Some board members voiced a practical concern regarding the MMP, suggesting that it would be hard for ECE undergraduates to meet the business pre-requisites while carrying a full engineering load.
- The board also questioned the value of the MMP and wondered if it would really make ECE students more employable. They weren’t sure if 600-level business courses would be that valuable to a student without first having real-world industry experience.
8. Open Forum with Students (Facilitator: Alvin Loke)
A handful of ECE students participated in an open forum with board members. Each student was given an opportunity to ask questions of the IAB. The students asked questions ranging from where to attend graduate school to how to prepare for industry and what tools are needed. They also expressed concern about their lower-level classes. Some students believe the classes are too theoretical, and they say they are not seeing the “real-world” connection or how the concepts are applied. The board offered their opinions and suggestions on these subjects, particularly the latter topic. It was an animated discussion. A few suggestions and key points were made:
- The board agreed that these lower-level classes are difficult but they are key to the learning process and critical for success as an engineer.
- Tony noted that the department is always open to feedback on the curriculum. The curriculum committee welcomes student involvement and input.
- Following the meeting, one board member suggested the idea of establishing an industry “sponsor” for the freshmen and sophomore classes, asking them to evaluate the curriculum and provide tie-ins to their business. This could include demonstrations, lab ideas that match industry, etc. – something that helps students at the early stages of their academic career to solidify why they are learning what they are learning.

9. Closing Remarks (Tony Maciejewski)
Tony wrapped up the meeting and thanked the board for their participation.

ACTION ITEMS:
- 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.
- Establish a partnership with the College of Business for senior design projects. There is no “one-size-fits-all” model, but this type of partnership could be beneficial for most students and most projects.
  - The relationship should be close-knit. It doesn’t necessarily need to last two semesters, however, the business students should become involved during the early stages of the project.
- Investigate the feasibility of a “Smart-Build” course, as suggested by one breakout group. However, note that these topics are also addressed as part of the Professional Learning Institute.
- Share the board’s course suggestions for the Master of Management Practice program with the MMP academic adviser to possibly use as a guideline for engineering students interested in the program.
- Share information about College of Business graduate programs with ECE students.
- Follow-up on the idea of having board members serve as industry sponsors for freshmen and sophomore classes.

Please mark your calendar for the spring IAB meeting on Friday, April 30, 2010.