Members Present: Tim Ash, Colin Baldwin, Chuck Duey, Deborah Goldman, Duncan Halstead, Hai Ho, Ed Hulls, Susan Hunter, Alan Meyer, John Nichols, Cliff Pacaro, Tom Williams

IAB Visitor: Mike Noonen, National Semiconductor

Faculty and Staff Present: V.N. Bringi, Anura Jayasumana, Andrea Leland, Tony Maciejewski, Steve Reising, Louis Scharf

Guest Presenters: Gary Amato, interim director of Technology Transfer for CSURF; Bryce Eldridge and Brooke O’Dell, ECE students

1. **Introduction and Welcome (Tony Maciejewski, ECE department head)**
   Tony opened the meeting, welcomed members, announced Tim Ash’s appointment to IAB VP, explained the meeting theme, and reviewed the agenda.

2. **Update on Action Items from Spring Meeting (Tony Maciejewski)**
   Tony’s presentation provided an update on the following action items:
   - **Action item:** Incorporate K-12 outreach component into the existing senior design program.
     Status: In progress; ECE student adviser working with Legacy High School to include high school students in the senior design experience. Three students currently involved in one project this semester.
   - **Action item:** Initiate meeting with Poudre School District to discuss increasing engineering education in the curriculum.
     Status: Interim superintendent announced; meeting on hold. Dr. Tom Chen developed an Integrative K-12 College Training Program for the Computer and Semiconductor Industry.
       - Tony discussed Tom Chen’s Partnership for Engineering Education in the Rockies (PEER) program
   - **Action item:** ECE will consider reaching out to local high school counselors as a way to further promote engineering education
     Status: ISTeC hosted first ever Information, Science, and Technology Day for High School Students and Counselors.
   - **Action item:** Plan Student Advising Day in conjunction with CSU’s Career Fair.
     Status: ECE hosted Student Advising Day on September 16.
   - **Action item:** Increase the IAB’s involvement in the senior design program by sending the board a list of all student projects early in the year. This gives board members plenty of time to review the list and determine whether they would be willing to serve as a customer for one of the projects.
Status: Project list distributed to IAB in September. ECE student adviser working with board members to assign customers to various projects.

- **Action item**: Provide list of ECE faculty speaking engagements.
  Status: List of faculty talks now available on the ECE web site:
  [http://www.engr.colostate.edu/ece/news/speaking.shtml](http://www.engr.colostate.edu/ece/news/speaking.shtml)

3. **ECE Department Update (Tony Maciejewski)**
   The presentation included the following topics:
   a. Dr. Mario Marconi and Dr. Steve Reising joined the ECE department
   b. Dr. Steven Abt named Interim Dean for the College of Engineering
   c. Dr. Randy Bartels honored by Optical Society of America and National Science Foundation
   d. Current enrollment: undergraduate, 327; graduate, 153
   e. 34 scholarships awarded to ECE students
   f. CCHE index increased from 101 to 110
   g. ECE launched new web site: [www.engr.colostate.edu/ece](http://www.engr.colostate.edu/ece)
   h. Enrollment trends from 1990 to present
   i. Proposal activity in terms of dollars from 1993 to present
   j. Research expenditures from 1993 to present

4. **Global Competitiveness and Outsourcing: The Impact on Higher Education (Tony Maciejewski)**
   The following points were highlighted:
   a. Two key factors impacting higher education: 1) increased homeland security; and 2) increased quality in graduate programs abroad
   b. Interest in engineering in the U.S. has declined
   c. Other countries recognize the value of engineering
   d. Foreign countries are building up Natural Science & Engineering (NS&E) capabilities of their younger cohorts at a greater rate than the US has been able to achieve
   e. US reliance on foreign-born engineers – U.S. has relied heavily on noncitizens to sustain its science and engineering degree production
   f. Tuition costs are another factor
   g. Are institutions really suffering? Numbers are down, but the quality of applicants may be getting better
   h. Impact of trends on ECE at CSU – our current numbers follow the national trend
   i. Ramifications for ECE in the long-term

5. **Intellectual Property and Outsourcing: Colorado State’s Perspective (Gary Amato, interim director of Technology Transfer, CSURF)**: Gary shared his background with the board and gave a broad overview of CSU’s policies on Intellectual Property. Following his presentation, Gary met with board members individually and answered their questions. He also left a packet of information behind for members to review at their convenience. Gary would like the IAB to feel free to contact him at any time: gary.amato@csurf.colostate.edu.
6. **Roundtable Discussion I** (Susan Hunter, IAB president, facilitated the discussion):

Questions posed:

1. How does global competitiveness and outsourcing affect your company/industry?
   a. What types of jobs are being outsourced?
   b. What are the current trends, and will these trends change?
   c. For jobs not being outsourced, what skill sets should future engineers possess?
2. How should ECE respond to the situation?

**Key points discussed by the board:**

*How does global competitiveness and outsourcing affect your company/industry?*

- Susan Hunter said that Agilent is opening facilities in other countries, including marketing, finance, R&D, etc. – 2/3 of their products are sold outside the U.S.
- Tom Williams shared a startling statistic: STMicroelectronics already outsources approximately 2,000 jobs to Bangalore, India, and plans to outsource as many as 6,000 R&D jobs.
- Cliff Pacaro said that Sun is keeping hardware and VLSI work in the U.S.
- The board members agreed that there is a salary differential between U.S. wages and international wages, but they believe the difference is shrinking and things will begin to level off.
- Colin Baldwin said that Arrow is willing to outsource some work, but they will not let go of the algorithms and coding.
- Duncan Halstead told the board that 1 in 5 jobs at LSI Logic go to India – these jobs are typically related to software design and verification, not hardware.
- John Nichols said that Plexus has a design center abroad. Labor rates are cheaper and the time difference allows the company to accomplish more work through two full-time shifts operating at different times of the day.
- Deborah Goldman said that 1/3 of Avaya’s developers are in India. The company just embarked on its third year of outsourcing to India, including jobs related to both hardware and software.

*For jobs not being outsourced, what skill sets should future engineers possess?*

- Strong technical skills and broad knowledge of design
- Creativity
- Problem solving skills, detail oriented
- Improved communication skills
- Teamwork and ability to communicate with internal and external customers and teammates
- Ability to multitask
- Greater “systems” thinking
- Innovative and entrepreneurial spirit
- Graduate work is becoming increasingly important to some companies

*How should ECE respond to the situation?*
ACTION ITEMS:
- Consider partnering with a foreign department or company on an upcoming senior design project(s). This gives students exposure to communication barriers that exist in the real-world of engineering and helps them understand the importance of teamwork and effective communication skills.
- Create additional opportunities for collaborations with other CSU departments to offer more inter-disciplinary projects for students.
- Consider revising the curriculum to include the option of a minor in business management, technical journalism, international studies, or a related field.
- Emphasize the importance of internships – at the undergraduate and graduate levels – and work with the industry to increase the opportunities available to ECE students.

John delivered an interesting and informative presentation about Plexus Technology Group, including several examples of their recent projects and innovative solutions.

8. Student Project Overview: USAR Robocup (Brooke O’Dell and Bryce Eldridge)
Brooke and Bryce gave an overview of Robocup, the Urban Search and Rescue (USAR) Robot Competition. The presentation included video footage of robots utilized in various search and rescue applications. They also shared an update on their senior design project, Roach, which will be entered in the 2005 Robocup competition.

9. Roundtable Discussion II (Tim Ash, IAB VP, facilitated the discussion):
Before addressing the question of how we can all work together to address global competitiveness and outsourcing, the board finished earlier discussions regarding the current state of the industry. This included additional conversations about Intellectual Property and the fact that IP and some technical functions are being outsourced to foreign countries, particularly China.

Key points discussed by the board:

How can CSU, the ECE department, and the IAB work together to address the issues and concerns surrounding global competitiveness and outsourcing?

- In order to be competitive, we have to differentiate ourselves and be the best engineers we can be - abstraction, sophistication, and world-class systems design will set us apart.
- Tony told the board that 70% of ECE’s graduate population is comprised of international students. But, due to CSU’s policies, out-of-state fees are NOT waived for students employed as research assistants, and therefore additional tuition fees are paid out of research grants. The board unanimously agreed that this is a problem and said they would like to write a position statement expressing their concerns.
- The question was posed: Do we need more PhD level graduates? Some board members said their companies have more positions available for those with
undergraduate degrees, while others strongly believe in the importance of a graduate degree.

— Susan Hunter offered to speak to the senior design class about the importance of pursuing a higher degree.
— Susan Hunter, Cliff Pacaro, Chuck Duey, and Tim Ash volunteered to participate in ECE’s graduate recruiting event.

• The suggestion was made to expose students to current trends by making trade publications, such as *EE times*, available in the student lounges. They also recommended having the faculty share pertinent articles with their classes.
• The board continued discussions about the importance of internships for undergraduates and graduates.
• Tony asked the board how he can work with them to increase the opportunities available to ECE students. Everyone in the group agreed to help Tony and serve as a contact for their company.
• A few members believe it is important to continue building relationships with key companies to ensure the department’s research aligns with the industry.
• The board expressed an interest in viewing students’ resumes online. Tony said he would ask students to create their resumes in HTML format for posting to the ECE web site.
• Tony asked the IAB if they would be interested in participating in an internship fair in February. The board thought it was too early in the year and would like to wait until they know they have internship positions available.

**ACTION ITEMS:**

• Tony/Andrea will draft a position statement on behalf of the IAB, asking CSU to waive the out-of-state tuition fees for international students employed as research assistants. The draft will be distributed by email for the board’s review and approval.

• Tony will contact the IAB in the coming months to see about possible spring internships for undergraduate and graduate students. Some IAB members may need to refer him to someone else within their company.

• Encourage students to create their resumes in HTML format for posting to the web. All resumes will be posted on the “Industry Relations” page of the new ECE web site.

• Follow up with interested board members regarding their involvement in ECE’s upcoming graduate recruiting event.

10. Tony wrapped up the meeting and thanked everyone for their participation.

Mark your calendars for the next IAB meeting, which will be held in conjunction with Engineering Days on Friday, April 15 in the Lory Student Center.