Industrial Advisory Board

Fall 2014

Colorado State University
Welcome IAB guests

• Chris Bendele, Intel
• Ali Black, Intel
• Robert Brooks, Oracle
• Lisa Husby, Spirae
• Steven Kommrusch, AMD
• Art Lizotte, Keysight Technologies
• Jonathan Lotz, Ultrata
• Rick Musselmann, Dresser-Rand
• Kyle Tarplee, Numerica
Agenda

• Department Update
• Overview of Pilot Project with Senior Design
• Research Spotlight: Professor Jade Morton
• Industry Spotlight: Precision Biopsy
• Break
• Preparation & Background for Panel Discussion
• Panel Discussion: Industry Engagement & Workforce Development
• Group Breakouts
• Working Lunch/Report Back
Department Update

Tony Maciejewski, ECE Department Head
New Faces in ECE

- **Jade Morton**, new faculty member and recently appointed IEEE Fellow
- **Courtney Johnsrud**, academic advisor
ECE Faculty Honored by CSU

– Carmen Menoni, University Distinguished Professor
– Chandra, University Distinguished Professor
– Branislav Notaros, Provost’s N. Preston Davis Award for Instructional Innovation
Prof. Notaros Recognized for Teaching Excellence

- 2015 IEEE Undergraduate Teaching Award
- Colorado Professor of the Year
Department News

• New department website launched
  www.engr.colostate.edu/ece

• Event to honor Emeritus Prof. Wilmsen underway
  – Contact Andrea for details
Student News

• Winner of 2014 Best Paper Contest announced
  – Single Molecule Tracking

• Check out our new project videos online
COE Research Expenditures

2013-2014

College of Engineering: 46%
ATS: 25%
CIRA: 30%
ECE: 15%
CEE: 17%
ME: 10%
CBE: 3%
Top ECE institutions & peers

US News & World Report Top Institutions
• Berkeley
• Carnegie Mellon
• Cornell University
• Georgia Institute of Technology
• MIT
• Purdue
• Stanford
• University of Illinois, Urbana-Champaign
• University of Michigan
• University of Texas, Austin

CSU Peer Institutions (as ID’d by CSU BOG)
• Iowa State University
• Kansas State University
• Michigan State University
• North Carolina State University
• Oklahoma State University
• Oregon State University
• Purdue University
• Texas A & M University
• University of California, Davis
• University of Illinois, Urbana-Champaign
• University of Tennessee
• Virginia Polytechnic Institute and State University
• Washington State University
ECE Research Expenditures per Tenured Faculty Member: CSU & Peer Institutions (2009-2013)
ECE Research Expenditures per Tenured Faculty Member: CSU & Top 10 USNWR ECE Programs (2009-2013)
COE Student Credit Hours (13-14)

- ECE: 20%
- ATS: 6%
- CEE: 31%
- CBE: 8%
- ME: 35%
National Enrollment Trends by Engineering Discipline (2004-2013)

ECE Fall Enrollment

FA08: 345 (Undergraduate Primary Majors) + 350 (Masters)
FA09: 350 (Undergraduate Primary Majors) + 383 (Masters)
FA10: 383 (Undergraduate Primary Majors) + 427 (Masters)
FA11: 427 (Undergraduate Primary Majors) + 469 (Masters)
FA12: 469 (Undergraduate Primary Majors) + 556 (Masters)
FA13: 556 (Undergraduate Primary Majors) + 596 (Masters)
FA14: 596 (Undergraduate Primary Majors) + 596 (Masters)
Undergraduate Degrees Awarded
Freshmen Enrollment

![Bar chart showing freshmen enrollment for different years and disciplines: FA08, FA09, FA10, FA11, FA12, FA13, FA14. The chart tracks enrollment in Biom/EELO, Biom/EE, CpE, and EE disciplines.](image)
ECE Freshmen Retention Rates

Cohort Size of First-Year ECE Students

Persistence Rates of First-Year ECE Students through the 2nd Fall

Persistence Rates Within Department by Cohort Department and Cohort Term
ECE Freshmen Retention Rates

Cohort Size of First-Year ECE Students

Persistence Rates of First-Year ECE Students through the 5th Fall

Persistence Rates Within Department by Cohort Department and Cohort Term
ECE Freshmen Retention Rates

Cohort Size of First-Year ECE Students

Persistence Rates of First-Year ECE Students through the 6th Fall

Persistence Rates Within Department by Cohort Department and Cohort Term
ECE Colorado Freshmen Enrollment: Colorado Institutions (2009-2013)
ECE Colorado Undergraduate Enrollment: Colorado Institutions (2009-2013)
ECE Total Undergraduate Enrollment per Tenured/Tenure-Track Faculty Member: CSU & Peer Institutions (2009-2013)
ECE Total Undergraduate Enrollment per Tenured/Tenure-Track Faculty Member: CSU & Select Top Institutions (2009-2013)
Women in Engineering (FA14)

Undergraduate
- Intra-College: 27%
- CBE: 16%
- CEE: 26%
- ME: 21%
- ECE: 7%

Graduate
- Intra-College: 3%
- CBE: 5%
- AS: 15%
- ECE: 27%
- CEE: 36%
- ME: 9%
Women in ECE

- Number UG Women
- Percent UG Women
- Number GR Women
- Percent GR Women
% of International Degrees Awarded

Yearly Percentage Chart

- 2008-09: 80% Ph.D., 50% MS, 65% Total
- 2009-10: 70% Ph.D., 40% MS, 60% Total
- 2010-11: 60% Ph.D., 30% MS, 55% Total
- 2011-12: 50% Ph.D., 20% MS, 50% Total
- 2012-13: 40% Ph.D., 10% MS, 45% Total
- 2013-14: 30% Ph.D., 0% MS, 40% Total

Full Year
First Destination Survey Results

• ECE graduates earned the highest starting salaries university-wide
  – EE, $64,663
  – CpE, $60,333
  – COE average, $58,383

• 82% of CpE grads have employment related to their major

• 93% of EE grads have employment related to their major

Source: CSU Career Center
Proposal for M.S. and Ph.D. in Computer Engineering

• Received approval to move forward with proposal
• 4.5 faculty (out of 25.5) currently in computer engineering
• Requesting additional resources partially funded from enrollments in new degree programs
• Gain endorsements from IAB to bolster proposal
NSF RED Proposal Team

• PI
  – Tony Maciejewski

• CoPIs
  – ECE Faculty Lead: Tom Chen
  – Engineering Education Expert: Michael De Miranda
  – Social Science Expert: Zinta S. Byrne

• Senior Project Personnel
  – Gerhard Dangelmayr: Department Head, Mathematics
  – Thomas J. Siller: Associate Dean, Engineering
  – Branislav Notaros: Professor, ECE
  – Alma H. Rosales: Industry
NSF RED Proposal

• Current state of ECE education
  – Stovepipes
  – Faculty assigned and evaluated on individual courses
  – Structure does not promote interaction among faculty and continuity across topics

• Vision
  – New structure similar to matrix organization
  – Holistic approach that fosters deep knowledge of the discipline, capacity for “T-shaped” skills, and professionalism
  – Emphasizes threads throughout curriculum and continuity across all coursework and educational experiences
Current State

Freshman
  - Fall
  - Spring

Sophomore
  - Fall
  - Spring

Junior
  - Fall
  - Spring

Senior
  - Fall
  - Spring

EE Degree

Courses:
- ECE251
- ECE202
- ECE303
- ECE312
- M 261
- M 340
- ECE311
- ECE332
- PH142
- Ch111
- ECE331
- ECE341
- ECE342
Vision Structure

Threads
- Foundation — math and science
- Innovation — research, design and optimization tools
- Professionalism — industry and professional formation, trans-disciplinary skills, entrepreneurship, communication
Update on Spring Action Items

• **Action item:** Develop best practices guide for corporate sponsors of senior design.
  – **Status:** Using examples from Wolf Robotics and Woodward to create materials.

• **Action item:** Encourage students to identify where their projects fall on the spectrum of technology in industry.
  – **Status:** Need industry mentors with technical expertise to help with this. Any interest?
• **Action item:** Address the issue of students not being able to explain WHY their projects are important.
  
  – **Status:** Established new requirements for student project plans:
    
    • project summary (200 words)
    
    • statement of why project is important (75 words)

• **Action item:** Help students improve communication and marketing skills, e.g., project posters.
  
  – **Status:** Ed Minnock and Susan Hunter will touch on this as part of their efforts to help students with project planning and risk mitigation.
• **Action item:** Hold future IAB meetings in conjunction with Engineering Days.
  – **Status:** Spring meeting coincides with E-Days: **April 17, 2015.**
Overview of Pilot Project with Senior Design

Susan Hunter, Propel Labs
Ed Minnock, Minnock & Associates
Preparation & Background for Panel Discussion

Tony Maciejewski
Purpose: Why do we have a board?

a) Reputation is currency
   i. Academia
   ii. Local business community
   iii. Global
b) Strong industry connections influence local opinions
c) Grassroots initiatives lead to large-scale impact
d) Industry involvement and input ensures quality product, i.e., well-prepared graduates
Goals & possible tactics: Together we can do more

a) Deepen industry engagement
   i. Ensure industry input is embedded in the curriculum
   ii. Increase participation in student projects
   iii. Develop new, innovative ways to connect industry with students and faculty

b) Workforce development
   i. Expand mutually beneficial activities, e.g., special training on company tools and technologies
   ii. Look to industry experts to help teach specific courses
   iii. Expand internship and co-op opportunities for ECE students
Goals, tactics (cont’d)

a) Greater advocacy at local, state, and national levels
   i. Partner with industry to impact policy
   ii. Team up to reach K-12 population
   iii. Gain industry commitment to revolutionize ECE education (NSF RED proposal)
IAB Panel

Moderator: Tony Maciejewski

Colorado State University
Why do you participate on the IAB?
Panel Introductions

• Scott Evans, Arrow Electronics
• Jim Greener, Hewlett Packard
• Lance Guymon, Wolf Robotics
• Corey Jaskolski, Hydro Technologies
• Art Lizotte, Keysight Technologies
Questions

1. What role do you play in your company, and at what level are you currently involved with ECE? Give us a snapshot of your interactions.

2. How do you gain executive buy-in for department initiatives?

3. Are you a hiring manager and/or do you interact with your company’s HR team to make recruitment and hiring decisions?
4. When you are working with colleagues in the business community, do you promote ECE at CSU?

5. How do you believe we can maximize industry support to advance the department’s reputation?

6. What have you gained from your relationship with the department and its students?

7. From a department perspective, what can we do to encourage deeper industry engagement?
Group Breakouts

Facilitators: Scott Evans and Lance Guymon
Group Discussion Items

1. To what extent, and at what level, are you willing to be involved with the department and serve as our advocate?

2. Do you have access to high-level decision makers in your organizations, and can you influence their opinions/decisions?

3. Do you interact with your company’s HR team, and do you have influence over hiring decisions?

4. When you are working with colleagues in the business community, do you promote ECE at CSU?

5. From a department perspective, what can we do to encourage deeper industry engagement at all levels?
Working Lunch, Report Results of Breakouts
Facilitators: Scott Evans and Lance Guymon
Closing Remarks

Tony Maciejewski