ECE Department Update

Daryl Beetner
April, 2015
Overview

• The new leadership
  – Vision of the chair
• State of the department
• New and ongoing Initiatives
• Emphasis areas
• 2014 ABET visit
A change in leadership

• A new provost: Dr. Robert Marley
• A new Dean: Dr. Ian Ferguson
• A new ECE Chair: Dr. Daryl Beetner
The new chair

- Grew up in Edwardsville, IL
- Graduate degree at Washington University
- 16 years at Missouri S&T
  - 2 NSF CCLI awards
  - 16 educational publications
    - More than 100 publications overall
  - Several teaching commendations and awards
  - $16M funding, primarily from industry
  - 2 Faculty Excellence Awards
  - Associate Chair for Computer Engineering
Vision

• Student success is priority one
  – Unrivaled education
  – Great prospects
• World-class research and discovery
• A great place to learn, work, and grow
STATE OF THE DEPARTMENT
Total Enrollment

ECE Enrollment

ECE Enrollment

GradCpE
GradEE
BSCpE
BSEE

BSEE
BSCpE
GradEE
GradCpE
Off-campus students

ECE Off Campus Fall Enrollment

ECE Off Campus Fall Enrollment

GradCpE
GradEE
BSEE

GradCpE
GradEE
BSEE

0 10 20 30 40 50 60 70 80

0 10 20 30 40 50
Faculty

• 30 T/TT faculty
• 6 Teaching faculty
  – 2 in Springfield
• 3 Research faculty

• Five new faculty
  – Dr. Egeman Cetinkaya
  – Dr. Jhi-Young Joo
  – Dr. Victor Khilkevich
  – Dr. Misha Cutitaru
  – Dr. Amardeep Kaur
Undergraduate awards

• Matt Horst: ASNT Engineering Undergraduate Award
• HKN Outstanding Chapter Award
• Keenan Johnson, guest editor and feature author of HKN Bridge
• Mason Marshal and Benjamin Miller, Outstanding Undergraduate Poster, ASEE Midwest conference
Undergraduate Awards

- Justin Hoyt, 1st place, IEEE St. Louis Section paper competition
- 2nd Place, IEEE St. Louis Section Black Box competition
- Trevor McCasland, IEEE St. Louis Section Outstanding Student Member
- Kaitlyn Schikore, finalist for the 2014 national IEEE-HKN Outstanding Student Award
Undergraduate Awards

- Ben Toby, EMC Society James Kouda Memorial Scholarship
- Thomas Roth: Microwave Theory and Techniques Undergraduate Scholarship
- Devin Cornell, 2015 WISE program
- Emily Hernandez, selected for NSF/ASEE workshop on *Transforming Undergraduate Education in Engineering*
Faculty awards

• Dr. Pommerenke and Dr. Zheng elevated to IEEE Fellow
  – 9 ECE Fellows at S&T
• Dr. Xiao: Humboldt Research Award
• Dr. Fan: S&T Faculty Research Award
• Dr. Donnell: S&T Faculty Teaching Award
• Dr. Kimball and Dr. Shi: S&T Faculty Excellence Awards
• Dr. Shi: IEEE St Louis Chapter Outstanding Educator Award

C. Xiao is congratulated by German Federal President Joachim Gauck for receiving the Humboldt Research Award.
Faculty Awards

- Dr. Kimball: MACADA outstanding advisor
- Dr. Ghasr: IEEE-I&M Outstanding Young Engineer, and J. Barry Oakes Advancement Awards
- EMC Group: IEEE EMC Symposium Best EMC student paper, Best SI paper, Best SI student paper, Best student design, President’s memorial award
- Dr. Zoughi: President of IEEE Instrumentation and Measurement Society
- Four outstanding teaching awards and seven teaching commendations
NEW AND ONGOING INITIATIVES
Planned initiatives

- Hire an Advising and Recruiting Specialist
- Increased focus on distance education
- Increased use of blended learning
- Improved feedback and focus on outstanding teaching
- Improved senior design experience
Initiative: Advising and Recruiting Specialist

• Some great faculty advisors, but room for improvement
  – Inconsistency
  – Specialty
  – Chemistry
  – Time
  – Tracking underperforming students
  – Non-thesis MS advising

• Significant opportunities for recruiting
Advising specialist in ME

• Handles all but top ME students to graduation
• Picking classes a small part of her job
  – Develops class recommendations long before advising week
  – Meets students throughout semester for “other issues”
• Technical issues handled by faculty
Advising specialist

- Specializes in advising
  - Substantially more training
- Always available
- More students take advantage of advising than with faculty
- Many students prefer her to a faculty advisor
  - Supported by literature
- Has time to be a really excellent advisor
  - Spends much more time/student than a typical faculty
  - Number deficiency students has dropped substantially
  - Gives seminars on advising issues
Potential issues

• Technical advising for questions like:
  – Which specialty?
  – Which classes for specialty?
  – Where to work?
  – Graduate school?

• Connecting with students
  – Research
  – Other opportunities
Tentative plan

• Create an “Advising and Student Welcome Center”

• Advising specialist:
  – Advises majority of ECE undergraduates
  – Top students assigned to faculty.
  – All students given faculty technical advisor.
  – Conducts or coordinates majority of ECE recruiting activity

• MS non-thesis advisees split among faculty
Advantages

• Consistency
  – Minimal bouncing between advisors;
• Staff advisor known and available to all students;
• All students can meet with faculty;
• Students with greatest need for attention will have it;
• Faculty remain connected to advising process and to students
Does the ECE Academy support the hiring of a staff advising and recruiting specialist?
Initiative: Distance education

- Opportunity to better serve students and industry – and stay relevant
- Tuition: 20% to department and 20% to faculty
  - $35k in FY12 for 14 courses
  - Few “on-line” offerings
  - 1 course/year/faculty with 5 students = $93k
Requirements

- Better infrastructure
- Focused attention
- High-quality, consistent, targeted course offerings
- Better advertising
- Improved advising
Associate Chair for Distance Education

• Will receive some summer salary and will be released 1 course/year

• Focus on
  – Customer needs and recruitment
  – New course/certificate development
    • Leveraging strengths to meet needs
  – Which classes offered and when
  – Advising
  – Marketing and promotion
Does the ECE Academy support the increased focus on distance education?
Initiatives: Blended Learning

- Students spend time with video or computer-based lectures before class
- Class time spent in team-based active learning

Frequency Response Video Lesson
The basic material is constructed in advance, annotations and explanations added during recording just as during traditional lecture
Impact in Circuits II

Final Exam

Exam Percentage

- Traditional
- Blended

<table>
<thead>
<tr>
<th>Year</th>
<th>Traditional</th>
<th>Blended</th>
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<tbody>
<tr>
<td>Summer 2009</td>
<td>85</td>
<td>90</td>
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<tr>
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Does the ECE Academy support the use of blended learning in sophomore level courses?
Initiatives: Teaching committee

- Student-teacher ratings are imperfect
- Some faculty are struggling
- Teaching Committee
  - 3-4 faculty well known for teaching
  - Review faculty 2-3 years before promotion/tenure
    - Lecture, syllabus, problems, exams
    - Interview students
  - Recommend improvements
  - Write a review as a committee
  - Assist other faculty as time permits
Initiatives: Improve Senior Design

- Many good projects, good experiences but inconsistency in difficulty, expectations, commitment, success.
- Direction
  - Strengthening expectations and rubrics
  - Growing a “Senior Design Czar”
  - Developing a “Senior Design Showcase”
  - Hoping for more industry sponsorship/involvement
Ongoing initiative: Enhancement of Undergraduate Controls Lab

- $70k campus match, $90k donations
  - ECE Academy, Anheuser-Busch, Automation and Control Concepts, ArcelorMittal, Burns and McDonnell, CPM Beta Raven, Intelligrated, McEnery Automation, Nucor-Yamato Steel, Siemens, Dr. Keith Stanek

- Supports new required controls lab and new motion controls lab
- Enhancement complete in Fall.
Ongoing initiative: Enhancement of Undergraduate Controls Lab

Rotary knife lab

Motor control experiment with pendulum
Completed initiative: Historical Displays
EMPHASIS AREAS
EE BS Emphasis Areas

- **Circuits and Electronics:** El Eng 3120, 41XX, and 51XX Courses
- **Optics and Devices:** El Eng 3250, 42XX, and 52XX Courses
- **Controls and Systems:** El Eng 3340, 43XX, and 53XX Courses
- **Communications and Signal Processing:** El Eng 3410, 3440, 44XX, and 54XX Courses
- **Power and Energy:** El Eng 3500 or 3540, 5150, 45XX, and 55XX Courses
- **Electromagnetics:** El Eng 46XX and 56XX Courses
- **Computer Engineering:** El Eng 3410, Cp Eng 3XXX-level or above Courses (Excluding Cp Eng 3000, 4000, 5000, 3002, 4096, 4097, and 5070 Course)

Does the ECE Academy support continued review of emphasis areas?
Current CpE Emphasis Areas

- Computational Intelligence
- Computer and Architecture
- Embedded Computer Systems
- Integrated Circuits and Logic Design
- Networking and Software Engineering
- Security and Reliability
Proposed CpE Emphasis Areas

- Computational Intelligence
- Computer and Architecture
- Embedded Computer Systems
- Integrated Circuits and Logic Design
- Networking and Software Engineering
- Security and Reliability

Does the ECE Academy support this change?