



# EE CIRCUIT BOARD

## UMD Electrical Engineering

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Editor: Shey Peterson

Fall 2013

### GREETINGS FROM JIANN-SHIOU YANG, PROFESSOR AND HEAD

Greetings to all alumni and friends of the Department of Electrical Engineering at UMD! It is that time of the year again for me to update you on the recent news and also highlight some of the activities and accomplishments in the Department since Fall 2012. The Department



continues to provide students with a high quality of education and outreach opportunities, and extends the breadth and depth of the research activities consistent with our student interest and faculty expertise. I hope you enjoy reading this newsletter.

The name change of the Department from Electrical and Computer Engineering (ECE) to **Electrical Engineering (EE)** became official in Fall 2012. The Department submitted a document to ABET in November 2012 requesting for accreditation of the Electrical Engineering (BSEE) program until September 30, 2016, the Next General Review (NGR). I am pleased to report that in May 2013 the EAC Executive Committee of ABET voted to continue accreditation of our EE program. The ABET records have been updated to reflect the ECE name ending May 13, 2016 and the EE name starting May 18, 2013. Both EE and ECE will run concurrently through Spring 2016, that is the end of the current ABET accreditation cycle. Starting the Fall semester of 2016, ECE will be dropped and EE will become the sole program. A NGR from UMD for the BSEE program, along with the other engineering programs, will be initiated in January 2015. Dr. **Stan Burns** will chair the departmental ABET Committee with the committee members **Scott Norr** and **Jiann-Shiou Yang**. Even though we have changed the department name to EE, our students can still pursue the Computer Engineering (CpE) minor if they want. I would also like to report that a new Electrical Engineering minor has recently been approved by the UM Board of Regents on October 21, 2013. Effective Spring 2014, this EE

minor will be open for all non-EE science and engineering students in the Swenson College of Science and Engineering (SCSE) interested in pursuing this minor. In Spring 2014, we are going to offer the elective course EE 5315 "Introduction to Robotics and Mobile Robot Control Architecture". This elective course has not been offered for many years and it will be taught by Mr. **Scott Norr**.

After serving on the faculty for twenty-two years, Dr. **Marian Stachowicz**, Jack Rowe Chair, will retire in January 2014. He leads the Laboratory for Intelligent Systems (LIS) since he joined the Department. A Minnesota Power Jack Rowe Chair Search Committee has been formed (**Jing Bai**, **Tom Ferguson**, **Mohammed Hasan**, **Taek Kwon**, **Jiann-Shiou Yang** (chair)) this Fall semester to find his replacement. Congratulations go to Dr. **Jing Bai** for being promoted to the rank of Associate Professor, effective Fall 2013. There are two faculty on leave this academic year. Dr. **Hua Tang** is on sabbatical during 2013-14 and Dr. **Jing Bai** is on single semester leave this Fall 2013 and her maternity leave in Spring 2014. I would like to thank Dr. **Imran Hayee** for his serving as the Director of Graduate Studies (DGS) for our MS graduate program for the past six years. This Fall semester, Dr. **Stan Burns** is temporarily serving as DGS and also the graduate seminar organizer. Thanks again go to Ms. **Joellyn Gum** from LHB, Inc for helping me review the ECE/EE scholarship applications. Thirteen scholarship recipients were awarded their scholarships this year at the SCSE Engineering & Industry Banquet, held on October 21, 2013 at the DECC.

Finally, I would like to share with you a piece of very encouraging news. Our ECE and EE graduate placement rates have been always high. The most recent 2011-2012 graduate follow-up statistics data available from the UMD Career Services show that the placement rate for that year was 100% with 88% of our graduates employed in Minnesota and 71% surveyed indicated their job relevance to major. The median starting salary for our 2011-12 graduates

was \$62,500, the highest among all the academic programs on the campus.

Please stay connected with the Department and consider sharing your personal success story with us by sending your information to the Department via e-mail (umdee@d.umn.edu) or snail-mail. Again, I look forward to connecting with you in our next newsletter.

#### UPDATE FROM ASSISTANT PROF. JING BAI



**Dr. Jing Bai** was promoted to the rank of Associate Professor with indefinite tenure. She was also elected the new Director of Graduate Studies (DGS) with her service to begin upon her return in Fall 2014

#### UPDATE FROM PROF. STAN BURNS

**Dr. Stan Burns** continues to teach EE 1001, Intro to Electrical Engineering and both the lecture and laboratory sections of EE 2212, Electronics I. He is also now teaching EE 4611 which is the revised upper-level course in Semiconductors. The topics in



EE 4611 map onto his past research activities at the Iowa State University Microelectronics Research Center. He is also Director of Graduate Studies this Fall and Graduate Seminar Coordinator.

The EE 1001 class includes presentations by our faculty and topics on professional development and engineering ethics as well as very informative and motivational presentations by external speakers from industry. He would like to thank Andrew Remus from Minnesota Power, Greg Carpenter from Boston Scientific, Dean Klein from Micron Technology in Boise, Bruce Howell from Cirrus Design, Keith Erickson and Mark Chmielewski from Saturn Systems, Jeremy Smolich from U.S. Steel ("The Mines"), Mat Jonson and Grant Sims from GeaCom and Greg Carpenter and Dan Landherr from Boston Scientific for providing these very topical, interesting, and motivational presentations. They also provided more in-depth seminars to the rest of the students and faculty during their visits.

As Chair of the ABET Committee for the Department, he is pleased to report that ABET has added the BSEE to the current BSECE accreditation. The BSECE and BSEE program accreditation extends through to Spring 2016. All of the SCSE

engineering programs will undergo a new accreditation review cycle with preparation of the self-studies and data collection starting in 2014.

Our very successful 2012 Engineering Day took place on 29 October with close to 300 registrants. Responsibilities for Engineering Day is now being rotated between departments with Chemical Engineering organizing the 2013 effort.

The numbers of engineering students taking the Fundamentals of Engineering Examination has increased markedly over the last few years primarily because the addition of the new Civil Engineering program graduates. There have been an increasing number of EE examinees. He has been the Chief Proctor for the UMD site. The last paper offering was on 13 April 2013 with 90 examinees, a record number for UMD. In addition to a training WEBINAR, he participated as a member of the NCEES Standards Committee for the new computerized offering that will start in 2014. Those wanting to take the exam will be required to sign up at a local Pearson-Vue test site any time after 2 January 2014.

#### UPDATE FROM PROF. CHRIS CARROLL

**Dr. Christopher Carroll** attended the ASEE annual national conference in Atlanta in June, where he presented a paper describing some experiences gained when teaching digital circuit design topics to middle school students during the week-long summer camp hosted by the EE department in the summer of 2012. UMD engineering will again host camp activities for pre-college students during the summer of 2014, building on the experience we gained in the first camp two years ago. This offering will involve all the engineering programs at UMD.



In October, Dr. Carroll presented a paper at the ASEE regional conference in Fargo. That paper reported experience gained in converting the microprocessor lab (EE 2325) to use a new processor, the ATmega32 microcontroller. This is a member of the AVR family from Atmel, and the switch was made in response to student interest in that family of processors due to their use in the popular Arduino microcomputer systems that have been embedded by students in senior projects and elsewhere. Experience with the ATmega32 in EE 2325 will give students a foundation in AVR processors that will aid them in future design work.

#### UPDATE FROM INSTRUCTOR TOM FERGUSON



**Mr. Tom Ferguson**, Adjunct Instructor completed the construction and performance validation of a large phased array antenna for 7 MHz operation in July. The final array design required about 4 months of modeling and simulation, several months of material procurement and preparation, followed by field installation. Field measurements of gain, radiation angle, directivity and impedance were remarkably close to the values predicated by the model. Testing continues in spite of propagation issues related to the current sunspot cycle. The engineering of this array will be incorporated into lectures for EE 5477 (Antennas and Transmission Lines) to support material on array theory and design.

#### UPDATE FROM PROF. IMRAN HAYEE

**Dr. Imran Hayee** and his graduate students developed vehicle-to-vehicle technology using dedicated short range communication devices (DSRC). The devices are placed in a vehicle and connected with a GPS device and a computer. When in place, each car with a device can send messages or signals to other vehicles equipped with the technology. When the system is triggered the lead car transmits a real-time message to cars behind it. Those vehicles deliver the message to their driver and retransmit the message to vehicles even farther down the road. They are also working with the Minnesota Department of Transportation to make the devices communicate with variable message signs. In July, the National Transportation Safety Board formally recommended this technology to automakers. It could appear within two to four years.

#### UPDATE FROM PROF. TAEK KWON

**Dr. Taek Kwon** is involved with the ongoing development of a new intersection conflict warning system referred to as the Advanced LED Warning System for Rural Intersections (ALERT) for reducing crashes at rural two-way stop intersections. The ALERT system, now in the second phase of the study, is designed to alert drivers of approaching traffic at sight-restricted intersections, thereby helping them to avoid collisions. Intersections of this type exhibit some of the most fatal crash history



across the nation. In addition to notifying the driver, the goal of this project is to create a low-cost solar powered system which can be easily installed. The ALERT system consists of vehicle detectors which detect vehicles on the major and minor approaches and wirelessly activated LED blinker warning signs that dynamically flash when there is vehicle detection. Building upon earlier system limitations, the new system includes vehicle activated blinker STOP signs which are designed to mitigate the previous observation of drivers ignoring the stop sign and using this system like a traffic signal. To assess the driver behaviors at the test site, almost a year's worth of video data was collected and a survey of local residents' reactions were also collected.

#### UPDATE FROM INSTRUCTOR SCOTT NORR



**Mr. Scott Norr** has recently been working on his Master's degree. The tentative title of his research is "A Novel 3-Phase Active Filter with Linear Response for Medium Voltage Power Systems". He also



supervised a recent Senior Design Project: A Smart Bow Sight by Zackry Graves, Brent DeVries, and Peter Noll. A bow sight was developed that

incorporated a laser range-finder, an accelerometer and a programmable controller. It was capable of adjusting the sight pin settings for variations in both range and angle of release. Pictured is the laser range-finder and programmable controller

#### UPDATE FROM PROF. MARIAN STACHOWICZ

**Prof. Marian S. Stachowicz** had been on sabbatical leave all 2012 calendar year visiting several universities around the world including teaching in the VNU University of Engineering and Technology in Hanoi, Vietnam, the Warsaw School of Computer Science and the AG-H University of Science and Technology in Krakow, Poland. During summer sailing as a crewmember on the famous brig STS Fryderyk Chopin, he gave two seminars for Polish and Russian students: Colors



Reduction in Computer Vision and Digital Fuzzy Sets and Multivalued Logic. The 16 day trip started in Gdynia, Poland and finished in Saint Petersburg, Russia, the city where Professor Stachowicz received summa cum laude in his Master Degree in Control and Computer Engineering from LETI - Leningrad Electrical Institute, Soviet Union. This time he took part in the IFAC World Conference on Manufacturing Modeling, Management and Control.

In Fall 2013 he is teaching EE 3151 Control Systems with the help of Graduate Teaching Assistant Sanjana Venus. On Friday, September 13, 2013 he and his students participated in UMD's Nobel laureate Brian Kobilka lecture "Structural insights into G-protein coupled receptor signaling". Brian Kobilka graduated summa cum laude from UMD in 1977 with Bachelor of Science Degrees in biology and chemistry. On September 15 Professor Stachowicz visited the Cirrus Aircraft where several of our graduates work.

#### UNDERGRADUATE NEWS IEEE Student Branch

IEEE UMD Student Chapter has been growing stronger every year. Our club has continued to provide our members with networking information during meetings and events. During our bi-yearly picnics we grilled a high volume of hot dogs and hamburgers to an increasing amount of attendees. Last semester we toured the AAR Facility in Duluth and will soon be touring the Cirrus Facility again in the upcoming week. We recently provided our members with the opportunity to purchase new t-shirts which have been a hit. Finally, we starting an ongoing fundraiser by setting up an old pop machine in our student learning center on campus.



2012 Cirrus Tour group

#### 2013 Engineering Scholarship Awardees



Top Row: **Chad Auginash (Mary Ann and Jerry Ostroski Engineering Scholarship)**, **Benjamin Strobel (Cliffs Natural Resources Scholarship)**, **Jason Vanderlinde (Schott Foundation Scholarship)**, **Tyler Roschen (Saturn Systems Inc. Scholarship)**, **Frederic Fyvie (Electrical and Computer Engineering Alumni Scholarship)**, **Marcus Hale (Electrical and Computer Engineering Alumni Scholarship)**, Bottom Row: **Victoria Bourget (Thor A. Gustafson Scholarship)**, **Austen Bryan (Minnesota Power Foundation Scholarship)**, **Nicholas Robillard (Thor A. Gustafson Scholarship)**, **John Link (Roy Labounty Scholarship)**, **Aaron Schiller (Robert J. Marchetti Engineering Scholarship)**, **Vinson Gee (Builders Scholarship)**, **Kelli Fuchs (Erin Swieringa Memorial Scholarship)**,



**Chad Auginash and Caleb Williams** (not pictured) were each selected for the **IEEE Power and Energy Society (PES) Scholarship**. Only 228 recipients were selected out of 100 Universities.

#### First Robotics

Dr. Stan Burns is a member of the State of Minnesota FIRST Robotics Planning Committee. UMD will host the regional kickoff event for the FIRST Robotics competition on 4 January 2014 18-22 schools are expected to participate. The Lake Superior Regional will be held March 2014 at the DECC with up to 120 schools participating. Last March, we had over 100 schools participate - up from 63 schools in 2012. EE students will again be assisting the Duluth East and Duluth Denfeld High School teams.

### Battlebots

Battlebots club is a great opportunity for both beginners and enthusiasts alike to design and build a robot for combat based competition. Our club currently plans to compete in the Midwest Robotics League, hosted at Dunwoody Technical college. We are currently in the process of designing and constructing two separate 15lb robots for this season. Additionally, we hope to compete in the Lake Superior College tournament in the spring. We have a club website at Bulldogbots.com detailing our current progress and latest developments, as well as other information about previous bots and projects. We're always looking for donations and sponsorship opportunities, if you're interested in helping our club out, please contact us.

### GRADUATES

Spring 2013

#### B.S.E.C.E.

Dana Gorg	Zachary Grimley
Bradley Hensel	Emily Howe
Thomas Hunt	Trevor Jackson
Quinten Johnson	Kyle Kreimer
Brent Kulaszewicz	Rebecca LaCasse
Chee Lee	Peter Noll
Matthew Protas	John Sydor
Shoua Vang	Ger Vue
Cole Willard	Bryan Wyatt

#### B.S.E.E.

Lucas Choudek	John Christensen
Jake Clifton	Brent DeVries
Zachry Graves	Aamani Gundu
Sarah Lasiuk	Cory LeClaire

#### M.S.E.C.E.

Rini Shrestha	Xiaohu Qian
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Expected Fall 2013

#### B.S.E.C.E.

Dominic Del Vecchio	Fredric Fyvie
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#### B.S.E.E.

Henok Araya	Matthew Balcerzak
Matthew Haan	

#### M.S.E.C.E.

Harsha Asam	Umair Ibrahim
Rohit Sharma	

### GRADUATE STUDENT WORK



**Umair Ibrahim** successfully defended his thesis "Development of a Traffic Information System using Ad-hoc Control and DSRC based V2V Communication".

**Moazzam Sahi** is currently a third-year graduate student who joined the department in Fall 2011. He is currently working on hardware implementation of video segmentation and object extraction algorithm.



**Rini Shrestha and Rohit Sharma** completed their MS



thesis/project defense in May and September of 2013 under the supervision of Dr. Jiann-Shiou Yang.

**Bo Wang** joined the EE department in Spring 2013.



Prior to that, he received his Bachelor's degree in Photonic Information Science and Technology from the University of Science and Technology (USTC) in China.

He is now working with Dr. Jing Bai on the simulation of pulse propagation in quantum-cascade lasers. His research is supported by the National Science Foundation (NSF).

### FACULTY PRESENTATIONS AND PAPERS

**G. Taubel** and **J.-S. Yang**, "A Lane Departure Warning System Based on the Integration of Optical Flow and Hough Transform Methods," *Proceedings of The 10<sup>th</sup> IEEE International Conference on Control and Automation*, pp. 1352-1357, Hangzhou, China, June 12-14, 2013.

**J.-S. Yang**, "Estimation of Vehicle's Lateral Position via the Lucas-Kanade Optical Flow Method," *WSEAS Transactions on Systems*, E-ISSN: 2224-2678, Issue 8, Vol. 11, pp. 349-363, 2012.

**H. Chang, H. Tang**, Feasibility Analysis of Fixed-width Pulse Feedback to Reduce Clock Jitter Effects in Continuous-time Lowpass Delta-Sigma Modulators, *Proc. of 56th International Midwest Symposium on Circuits and Systems*, Columbus, Ohio, Aug 5-8<sup>th</sup> 1-4.

**Peng Li, Hua Tang**, "A Low-Power VLSI Implementation for Fast Full-Search Variable Block Size Motion Estimation", *International Journal of Electronics*, Vol. 100, No. 9, pp. 1240-1255, Sep 2013.

## **ALUMNI NEWS**

**We want YOU! We would like to know and share what our alumni have been up to since graduation! Please send us an email or give us a call, we can even include a picture!**

## **EE Department Head**

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**If you would like to make a donation to support the efforts of the EE Department and/or for scholarships, you may send your contributions to:**

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