As we wrap up the 2013-14 academic year, I am proud of the accomplishments during this year by our faculty, staff and students. Professor Wicks and his team have created the new Center of Excellence in Distributed Sensing in the Mumma Radio Lab. The new lab will be called the Mumma Radar Lab. The lab has unique microwave imaging, radar, and multiple-input multiple-output (MIMO) measurements with four robots that can pretty much place the sources and receivers at any precise point in space, to the accuracy of ~10 μm. We are looking forward to formally opening the lab in the summer and starting new research activities in the lab.

Our faculty continue to do impressive research and scholarship. Professor Asari’s Vision Lab has become a tech playground with lots of new toys including a hexacopter, Segway and mobile robot. Professor Taha has secured new DARPA and NSA funding this term. Many of our faculty continue to support Air Force Research Laboratory (AFRL) through funded research. Our department faculty, staff and students are playing a major role in organizing the 2014 IEEE National Aerospace and Electronics Conference (NAECON 2014), to be held for the first time on our campus. It is an exciting opportunity to showcase our new research projects.

For the first time in over a decade, we have crossed the 500 mark for the total number of students in the department based on the spring 2014 enrollment numbers. We had 270 undergraduates, 178 M.S. students and 64 Ph.D. students enrolled in the spring term. The fall 2014 recruitment looks very strong with over 530 applications for our undergraduate programs and 500+ applications for our graduate programs.

The 2014 IEEE National Aerospace and Electronics Conference (NAECON) will be held June 25-27 at the University of Dayton Research Institute Conference Center (Meyer Room), 1700 S. Patterson Blvd., Dayton, Ohio. The 2014 theme is “sensory processing.” NAECON is a major forum for researchers, practitioners and students interested in advanced aerospace systems, sensors, navigation, power systems, imaging, advanced materials, RFIC design, THz and signal processing, passive and active sensing, cyber and Trust in semiconductor design.

The NAECON Grand Challenge theme is “sensory materials and interfaces to achieve high performance, trust, reliability and improved sensory processing.” NAECON is sponsored by the IEEE Aerospace and Electronic Systems Society (AESS) and the IEEE Dayton Section. The conference will have an expo of industry sponsors as well.
Imagine a camera that captures information invisible to the human eye. Well, the Vision Lab’s new Resonon Pika II hyperspectral camera is able to do just that. Unlike standard cameras that capture three channels of the electromagnetic spectrum (red, green and blue), a hyperspectral camera provides 240 spectral channels. That is 80 times more data than can be captured by a household camera!

The camera can “see” things that are invisible to humans due to its spectral range of 400 to 900 nanometers wavelengths, which extends well beyond visible light. When asked what Vision Lab has planned for the hyperspectral camera, Ph.D. student Paheeding Sidike explained, “The numerous spectral bands provide a unique signature for specific materials. We can potentially utilize this information for detecting pipeline oil leaks, since oil has different reflective properties than water or vegetation.”

The Vision Lab has already begun extending their visibility improvement research to exploit the additional data and further enhancement of the imagery. For more information on the hyperspectral camera and other Vision Lab projects, visit visionlab.udayton.edu.

Vision Lab Hexadrone

The Center of Excellence for Computer Vision and Wide Area Surveillance Research (Vision Lab) is taking to the skies. The acquisition of an unmanned aerial system, the Turbo Ace Cinewing 6 Hexacopter, equipped with a variety of imaging and positioning sensors, enables aerial surveillance projects to thrive. “Previously, our algorithm development relied on data from infrequent and expensive piloted flights. Our new hexacopter allows for us to capture aerial imagery at any place, any time,” said Yakov Diskin, a Ph.D. student researcher with the Vision Lab’s intelligent robotics group. The UAV capabilities aid multiple Vision Lab projects, including the Air Force Research Laboratory-sponsored aerial target tracking and large-scale 3-D scene modeling efforts.

Extreme Low-Power Cognitive Processors

Dr. Taha’s research team is working on novel extreme low-power computer processors for cognitive applications. These are very specialized systems based on a new class of devices discovered in 2008, called memristors. Initial research indicates that these processors can potentially reduce the power consumption for cognitive applications by about 300,000 times compared to conventional desktop computing processors. Dr. Taha has presented the findings of this work at several organizations including DARPA, the Lawrence Livermore National Laboratory and the Air Force Research Laboratory. At present this research is funded through the NSF, AFOSR and DARPA (via AFRL). Dr. Taha and Dr. Subramanyam are collaboratively working with the AFRL to fabricate and characterize memristor devices. One of their recent publications in this area received the 2013 Best Paper Award at the International Joint Conference on Neural Networks (one of the premier conferences in neural networks). These computing systems have many applications, including UAVs, biomedical systems and portable electronics.
MARK WEISENBERGER’S UD EXPERIENCE — A Family’s Perspective

Our son graduated from the University of Dayton today! Just like all parents of graduates, we are proud of our son’s accomplishments. We would like to share a little about Mark’s journey and what made it special for us. About five years ago, Mark decided he wanted to become an engineer. Then he said he wanted to go away to college as his sister did. Aware of Mark’s Autism Spectrum Disorder, we felt uncertain about whether or not this would work.

Mark has always been persistent at his work and his classes regardless of how long it takes. Throughout grade school, high school and college, Mark spent many long hours working to learn and understand. With any class, skills need to be applied in the homework. It takes Mark a very long time to process concepts and complete the work. Even at times when he was given an option to reduce his homework load, he did the work anyway. That has always been his way.

The University of Dayton provided assistance to Mark with the learning center, tutors and caring professors. His adviser, Guru Subramanyam, was especially helpful, and Mark could not have made it without Guru’s guidance and reassurance. Guru was also helpful to us when we felt uncertain about Mark’s progress. Guru believed in Mark and was encouraging and patient.

Mark generally kept to himself throughout his five years at UD. You may have seen him in class or the cafeteria or at Mass. Mark’s RA described him as a nice and quiet guy. He never bothered anyone.

It has been exciting to see Mark’s gifts and talents develop as he progressed through the engineering program. He has always had a strong ability to excel in mathematics, calculus and physics. Now, we have seen him become more confident in his engineering skills and applications.

We have experienced many challenging situations along the way. We never could have envisioned what Mark’s life would be like at the University of Dayton. But Mark stayed the course and after five years, he finished his degree. Today, he is an electrical engineer!

Many thanks to all the people from the University of Dayton who supported Mark and any “differently-abled” students along their way!

— Pete and Barb Weisenberger

Mark has gained a position with Nationwide and will start in June.
Kubach Gift to UD Will Benefit Engineering Faculty and Students

A gift of more than a half-million dollars to the University of Dayton will benefit electrical and computer engineering faculty and their students.

The $566,411 bequest from the estate of Reinhold Kubach will establish the Reinhold W. and Alice Mohl Kubach Faculty Fellowship in the School of Engineering. “The funds from the fellowship will be used to support faculty and help them develop their teaching approach and philosophy and establish their research program and laboratories. The faculty development and research opportunities, in turn, will help us continue to provide a transformative education to our students,” School of Engineering Dean Tony Saliba said. “I knew professor Kubach as a student and later as a colleague. I admired his passion for teaching and his dedication to students. We hope this gift inspires future faculty to provide the same dedication to their students.”

Kubach emigrated from Germany in 1950 and, after several stops, established roots in Dayton. He taught at the University of Dayton School of Engineering from 1958 to 1989. “They never had children, and their family lived so far away in Germany,” said Nancy Stork, a former University of Dayton development officer who now works in student development. “Their neighbors became very good friends, in a way adopting them when they first came. They were so committed to education and to UD, I think, because UD gave them a chance to establish a new life here when they came over from Germany. That meant a lot to Reinhold, and he loved being with students.”

Kubach, who died in 2012, was a long-time supporter of the University, dating back to his teaching days. For many years, Stork said, Kubach gave a portion of his salary to the annual fund. The Kubachs are charter members of the University of Dayton President’s Club. They occasionally came back to campus for alumni activities and events with the Leo Meyer Society, which honors those who have made planned gifts to the University. Alice Mohl Kubach died in 2006.

“They wanted their legacy to remain here in the States, at the University of Dayton,” Stork said. “To make a difference for others in a place that made such a difference to them.”

AWARDS / HONORS / PROMOTIONS

• Dr. Qiwen Zhan, professor of electro-optics and electrical and computer engineering, was recently elected as a Fellow Member of The Optical Society (OSA). Fellow membership in OSA is limited to no more than 10 percent of the membership and is reserved for members who have served with distinction in the advancement of optics. Zhan is being honored specifically for seminal contributions to the development of new optical polarization engineering techniques for controlling light-matter interactions on the nanometer scale.

• Kevin Stevens was awarded the Thomas R. Armstrong, ’38 Award of Excellence for Outstanding Electrical Engineering Achievement in Memory of Brother Ulrich Rappel, S.M., and W. Frank Armstrong – donated by Thomas R. Armstrong.

• David Zimmerman was the recipient of the Brother Louis H. Rose, S.M. ’33 Award of Excellence to the Outstanding Junior in Electrical Engineering.

• Jialin Lu and Heting Li were jointly awarded the Anthony Horvath, ’22 and Elmer Steger, ’22 Award of Excellence to the Outstanding Senior in Electrical Engineering – donated by Anthony Horvath and Elmer Steger.

• Carly Gross was the recipient of the Mary C. Millett Endowment Award for the Outstanding Senior Electrical and Computer Engineering Student in Memory of Mary C. Millette.


C. Yakopcic, T. M. Taha, G. Subramanyam, and R. E. Pino, “Memristor SPICE Model and Crossbar Simulation Based on Devices with Nanosecond Switching Time,” IEEE International Joint Conference on Neural Networks (IJCNN), August 2013. Received IJCNN 2013 Best Paper Award.


Announcing the ECE Centennial Book

It is with great pleasure that we announce the completion of the book *100 Years of Excellence in Engineering Education and Research: Electrical and Computer Engineering*. The book highlights the humble beginnings of the electrical engineering department at UD in 1911. It chronicles the growth of the department and the people that were instrumental in making this program what it is today. The book is available to all our alumni, parents, students and friends for $25 each. To place an order for your copy please fill out the order form below.

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