Summer 2015

The Department of Electrical and Computer Engineering Newsletter

University of Dayton. Department of Electrical and Computer Engineering

UNIVERSITY of DAYTON

THE DEPARTMENT OF

ELECTRICAL AND COMPUTER ENGINEERING

SUMMER 2015

CALENDAR OF EVENTS

First day of classes
Aug. 26, 2015

No classes – Labor Day
Sept. 7, 2015

Family Weekend
Sept. 18-20, 2015

Midterm break begins after last class
Oct. 7, 2015

Thanksgiving Break
Nov. 24-29, 2015

Chair's Corner *Dr. Guru Subramanyam*

I would like to take this opportunity to thank Dr. Don Moon and Dr. John Loomis for their long service (35 years, retired December '14) to our department, the School of Engineering and the University of Dayton. They have truly been instrumental in shaping our department over the past several decades.

Over the years, Dr. Moon has served our department as the chair and as the associate dean for graduate programs in the School of Engineering. Dr. Loomis was one of the key faculty in the formation of the electro-optics program in its inception. Loomis has also been instrumental in the accreditation of our computer engineering program. Dr. Moon and Dr. Loomis have been granted the emeritus status by the University. We look forward to their continuing service as emeriti faculty. Our department is conducting faculty searches for one electrical engineering and one computer engineering position. We look forward to welcoming new faculty in the fall or the spring semester next year.

Mr. John Fortune, our senior lab manager, also retired at the end of May this year. Mr. Fortune has been with our department for over 24 years! Our department's undergraduate laboratories are in excellent condition thanks to his management. We will miss his services, and we wish him well in his retirement.

One of the significant developments in the spring semester is the approval of the GE Aviation EPISCenter (Electrical Power Integrated Systems Center) Professor in Electrical Power Systems. This position will be partially funded by GE Aviation. The named professor will work very closely with the GE Aviation EPISCenter. This professor will teach electrical power systems and conduct research in collaboration with the EPISCenter. We are excited about this new partnership between our department and the GE Aviation EPISCenter.

As we complete this academic year, I would like to extend hearty congratulations to the graduating seniors. Go Flyers!

New Master's Program in Computer Engineering

Students have been asking for quite some time and it's here! UD is now one of a handful of schools that provide a master's program in computer engineering. As quoted in the proposal for the program, "Computer Engineering is one of the fastest growing fields of engineering in the United States and across the globe. ... Additionally, according to the Job Outlook 2012 report from NACE research, a Master's degree in Computer Engineering is one of the top five Master's degrees in demand in the United States. ... Specifically, the Master of Science in Electrical Engineering (MSEE) program, currently offered at UD, is steadily growing. Over the past 3 years, the ECE department has seen a steady increase in the number of applications, and a large number of incoming student classes. ... Additionally, the ECE department has received dozens of inquiries about a computer engineering Master's degree program." (Excerpts from UD's MSCE Program Proposal, September 2014)

ECE Department Purchases New Robot

The latest addition to the Motoman Robotics Lab is a Baxter robot manufactured by Rethink Robotics. The robot was purchased by research funds provided by the 711th Human Performance Wing, Human Effectiveness Directorate at the Air Force Research Laboratory. The research project is about robot-human interaction, and it seeks to develop a reliable maintenance task performed by a robot, first with full human control but moving toward increasing robot autonomy. The project also seeks to increase the understanding of trust in robot-human interactions.

Barath Narayanan Awarded the Krishna M. Pasala, Ph.D. Memorial Scholarship

The IEEE Dayton Section is pleased to announce the 2015 award of the Krishna M. Pasala, Ph.D. Memorial Scholarship to Barath Narayanan. The memorial scholarship is awarded annually to a graduate student attending the University of Dayton within the Department of Electrical and Computer Engineering. The award of the scholarship is based on academic excellence in the area of electrical engineering and includes a prize of up to $1,000. On behalf of the IEEE Dayton Section and the IEEE Foundation, we congratulate Narayanan on his winning of this award. He was presented his award at the IEEE Dayton banquet on April 25, 2015, by Dr. John Malas, as seen in the photo.

John Fortune retires

Congratulations to John Fortune on his retirement. Fortune worked in the Department of Electrical and Computer Engineering for over 24 years. He has played an integral part in creating and maintaining our lab classrooms. Fortune plans to spend his retirement traveling the U.S. with his wife, Betty, and enjoying the warmer climate of Greer, South Carolina. We wish him well in his retirement.

UD's Electrical Engineering Department is a "Hidden Gem"

College Recruiter has named the University of Dayton as one of 12 winners of its 2015 Hidden Gem Index for the best colleges and universities for employers who want to hire high-quality graduates who majored in electrical and communications engineering. We were ranked No. 1 in this area, above schools that included Western Washington University, Milwaukee School of Engineering, Oklahoma State University, The University of Maine, University of Cincinnati, California State University, Long Beach, University of Houston, Louisiana Tech University, Georgia Southern University, SUNY Buffalo State and Farmingdale State College.

Welcome to UD Electrical and Computer Engineering, Dr. Vamsy Chodavarapu!

Welcome to Dr. Vamsy Chodavarapu, who will be joining our faculty in the fall 2015 term. Chodavarapu obtained his Ph.D. and M.S. degrees in electrical engineering from the University at Buffalo, The State University of New York, in 2006 and 2003, respectively. He obtained his B.Eng. degree in instrumentation engineering from Osmania University in India in 2001. Chodavarapu comes from McGill University, where he worked as an associate professor in the electrical and computer engineering department. His specific research interests are in the areas of CMOS sensor microsystems, RF/analog circuits, neuro-/biomedical prosthetics and wearables, bio-/neuro-/RF- MEMS, biological/chemical sensing and nano-/bio- materials.

Dr. Vijayan Asari Receives ASC's 2015 Outstanding Engineers and Scientists Award

Dr. Vijayan Asari has been named a recipient of the 2015 Affiliate Societies Council of Dayton Outstanding Engineers and Scientists Award. Dr. Asari is the director of the UD Vision Lab and is the Ohio Research Scholars Chair for the Department of Electrical and Computer Engineering. The award was presented at the 56th Outstanding Engineers and Scientists Award Banquet on April 16, 2015, at the University of Dayton River Campus. He received a plaque and a personalized proclamation from the Ohio Senate.

2014-2015 FACULTY PUBLICATIONS, AWARDS, ACHIEVEMENTS, PATENTS

Kongfeng Zhu, Chengqing Li, **Vijayan K. Asari**, and Dietmar Saupe, "No-reference video quality assessment based on artifact measurement and statistical analysis," ***IEEE Transactions on Circuits and Systems for Video Technology***, vol. 25, no. 4, pp. 533-546, April 2015. (IEEE)

Yakov Diskin and **Vijayan K. Asari**, "Dense point-cloud representation (DPR) of a scene using monocular vision," ***IS&T/SPIE Journal of Electronic Imaging***, vol. 24, no. 2, pp. 023003: 1-25, doi:10.1117/1.JEI.24.2.023003, March 2015. (IS&T/SPIE)

Varun Santhaseelan and **Vijayan K. Asari**, "Utilizing local phase information to remove rain from video," ***International Journal of Computer Vision***, vol. 112, no. 1, pp. 71-89, DOI 10.1007/s11263-014-0759-8, March 2015. (Springer)

Vijayan K. Asari, Paheding Sidike, Chen Cui, and Varun Santhaseelan, "New wide-area surveillance techniques for protection of pipeline infrastructure," ***SPIE Newsroom: Defense and Security***, DOI: 10.1117/2.1201501.005760, pp. 1-4, January 2015. (SPIE)

Varun Santhaseelan and **Vijayan K. Asari**, "Automated whale blow detection in infrared video," ***Computer Vision and Pattern Recognition in Environmental Informatics***, *Section I: Computer Vision and Pattern Recognition Methods for Aquatic Animal Detection and Monitoring*, Chapter 4, Edited by Jun Zho, Xiao Bai and Terry Caelli, Published by IGI Global, June 2015.

Fatema Albalooshi and **Vijayan K. Asari**, "A self-organizing lattice Boltzmann active contour (SOLBAC) approach for fast and robust object region segmentation," ***IEEE International Conference on Image Processing - ICIP*** 2015, Quebec City, Canada, 27-30 September 2015.

Evan Krieger, Paheding Sidike, Theus Aspiras, and **Vijayan K. Asari**, "Directional ringlet intensity feature transform for tracking," ***IEEE International Conference on Image Processing - ICIP 2015***, Quebec City, Canada, 27-30 September 2015.

Md. Zahangir Alom, Paheding Sidike, **Vijayan K. Asari** and Tarek Taha, "State preserving extreme learning machine for face recognition," ***IEEE International Joint Conference on Neural Networks - IJCNN 2015***, Killarney, Ireland, 12-17 July 2015.

Almabrok Essa, Sidike Paheding, and **Vijayan K. Asari**, "A modular approach for key-frame selection in wide area surveillance video analysis," ***IEEE National Aerospace & Electronics Conference & Ohio Innovation Summit - NAECON-OIS 2015***, Dayton, Ohio, 16-19 June 2015.

Sidike Paheding, Almabrok Essa, Fatema Albalooshi, **Vijayan K. Asari**, and Varun Santhaseelan, "Automatic building change detection in wide area surveillance," ***IEEE National Aerospace & Electronics Conference & Ohio Innovation Summit - NAECON-OIS 2015***, Dayton, Ohio, 16-19 June 2015.

Yakov Diskin, Nina Varney, and **Vijayan K. Asari**, "Characterization of detectable objects using an uncalibrated and passive volumetric change detection approach," ***IEEE National Aerospace & Electronics Conference & Ohio Innovation Summit - NAECON-OIS 2015***, Dayton, Ohio, 16-19 June 2015.

Sidike Paheding, Almabrok Essa, and **Vijayan K. Asari**, "Intrusion detection in aerial imagery for protecting pipeline infrastructure," ***IEEE National Aerospace & Electronics Conference & Ohio Innovation Summit - NAECON-OIS 2015***, Dayton, Ohio, 16-19 June 2015.

Evan W. Krieger, Paheding Sidike, Theus Aspiras, and **Vijayan K. Asari**, "Vehicle tracking under occlusion conditions using directional ringlet intensity feature transform," ***IEEE National Aerospace & Electronics Conference & Ohio Innovation Summit - NAECON-OIS 2015***, Dayton, Ohio, 16-19 June 2015.

Evan Krieger, **Vijayan K. Asari**, and Saibabu Arigela, "Integrated intensity and spatial enhancement technique for color images," ***International Conference on Digital Image Processing: Techniques and Applications - ICDIPTA 2015***, Copenhagen, Denmark, 11-12 June 2015. (WASET)

Nina Varney, Yakov Diskin, and **Vijayan K. Asari**, "3D object classification in uncalibrated structure from motion models," ***Optical Society of America (OSA) Imaging and Applied Optics Congress: Imaging Systems and Applications (IS)***, Session: Advances for Military Imaging, Arlington, Virginia, USA, 07-11 June, 2015.

Yakov Diskin, Nina Varney, and **Vijayan K. Asari**, "Registration of LiDAR point cloud models using inter-object geometry," ***Optical Society of America (OSA) Imaging and Applied Optics Congress: Imaging Systems and Applications (IS)***, Session: Advances for Military Imaging, Arlington, Virginia, USA, 07-11 June, 2015.

Jake Foytik and **Vijayan K. Asari**, "A two-layer framework for piecewise linear manifold-based head pose estimation," ***IEEE International Conference on Automatic Face and Gesture Recognition - FG 2015***, Ljubljana, Slovenia, 04-08 May 2015.

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Nina Varney and **Vijayan K. Asari**, "Volume component analysis for classification of lidar data," ***SPIE Conference on Defense + Security: Optical Pattern Recognition XXVI***, Baltimore, MD, USA, 20-24 April 2015.

Theus Aspiras, **Vijayan K. Asari**, and Wesam Sakla, "Gaussian-weighted neighborhood connectivity of nonlinear line attractor for learning complex manifolds," ***SPIE Conference on Defense + Security: Optical Pattern Recognition XXVI***, Baltimore, MD, USA, 20-24 April 2015.

Fatema Albalooshi, Paheding Sidike, Evan Krieger, and **Vijayan K. Asari**, "Efficient thermal image segmentation through integration of nonlinear intensity enhancement with unsupervised active contour model," ***SPIE Conference on Defense + Security: Optical Pattern Recognition XXVI***, Baltimore, MD, USA, 20-24 April 2015.

Paheding Sidike, **Vijayan K. Asari**, and Mohammad S. Alam, "A robust fringe-adjusted joint transform correlator for efficient object detection," ***SPIE Conference on Defense + Security: Optical Pattern Recognition XXVI***, Baltimore, MD, USA, 20-24 April 2015.

ALmabrok Essa and **Vijayan K. Asari**, "Video-to-video pose and expression invariant face recognition using volumetric directional pattern," ***International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP), In Proceedings of the 10th International Conference on Computer Vision Theory and Applications - (VISAPP 2015)***, (ISBN: 978-989-758-090-1), Berlin, Germany, pp. 498-503, (VISIGRAPP 2015 Paper Compilation, pp. 36-41), DOI: 10.5220/0005353604980503, 11-14 March 2015.

Kevin Krucki and **Vijayan K. Asari**, "Scene projection by non-linear transforms to a geo-referenced map for situational awareness," ***Proceedings of IS&T/SPIE International Conference on Electronic Imaging: Video Surveillance and Transportation Imaging Applications 2015***, San Francisco, California, USA, 08-12 February 2015. (IS&T/SPIE)

Binu Nair and **Vijayan K. Asari**, "Person identification from streaming surveillance video using mid-level features from joint action-pose distribution," ***Proceedings of IS&T/SPIE International Conference on Electronic Imaging: Video Surveillance and Transportation Imaging Applications 2015***, San Francisco, California, USA, 08-12 February 2015. (IS&T/SPIE)

Pahading Sidike, Vijayan K. Asari, and Mohammad Alam, "Multiple object detection in hyperspectral imagery using spectral fringe-adjusted joint transform correlator," ***Proceedings of IS&T/SPIE International Conference on Electronic Imaging: Image Processing: Machine Vision Applications VIII***, San Francisco, California, USA, 08-12 February 2015. (IS&T/SPIE)

Chen Cui and Vijayan K. Asari, "Robust textural features for real time face recognition," ***Proceedings of IS&T/SPIE International Conference on Electronic Imaging: Imaging and Multimedia Analytics in a Web and Mobile World 2015***, San Francisco, California, USA, 08-12 February 2015. (IS&T/SPIE)

Vijayan K. Asari, Paheding Sidike, Chen Cui, and Varun Santhaseelan, "Recent progress in wide-area surveillance: Protecting our pipeline infrastructure," ***Proceedings of IS&T/SPIE International Conference on Electronic Imaging: Imaging and Multimedia Analytics in a Web and Mobile World 2015***, San Francisco, California, USA, 08-12 February 2015. (IS&T/SPIE)

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Vijayan K. Asari, "Wide area surveillance: Situational awareness for security automation," ***Global Summit and Expo on Multimedia and Applications***, Birmingham, United Kingdom, 10-11 August 2015. (Multimedia & Applications)

Vijayan K. Asari, "Wide area surveillance: Real time motion detection systems," ***TENSYMP 2015:*** *International Conference of IEEE Region 10*, Theme: **Internet of Things**, Ahmedabad, Gujarat, India, 13-15 May 2015. (TENSYMP 2015)

Fatema Albalooshi, Yakov Diskin, Sara Smith, and **Vijayan K. Asari**, "An intelligent segmentation algorithm for aiding healthcare providers with tumor detection and analysis," ***Health and Human Performance Research Summit***, Dayton OH, USA, 28-30 April 2015.

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Andrew Sutter, Daniel Prince, Mark Edmonds, Matthew Cusumano, and **Vijayan K. Asari**, "Brain machine interface for a robotic arm," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

ALmabrok Essa, Fatema Albalooshi, Sidike Paheding, Yakov Diskin, and **Vijayan K. Asari**, "Automatic building change detection by 2D and 3D representation for wide area surveillance," ***Brother Joseph W. Stander Symposium 2015, University of Dayton, Dayton, OH, USA, 15 April 2015***.

Sidike Paheding, ALmabrok Essa, and **Vijayan K. Asari**, "Automatic intrusion detection on pipeline right-of-way via aerial imagery," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Yakov Diskin and **Vijayan K. Asari**, "Determining volume changes from overhead video surveillance," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Fatema Albalooshi, Sidike Paheding, Yakov Diskin, and **Vijayan K. Asari**, "A self-organizing maps approach to segmenting tumors in computed tomography (CAT) and magnetic resonance imaging (MRI) scans," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Kevin Krucki and **Vijayan K. Asari**, "Three-dimensional point cloud representation of surveillance scenes in real-time," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Nina Varney and **Vijayan K. Asari**, "Automatic perception and target detection in LiDAR data," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Nina Varney, Yakov Diskin, and **Vijayan K. Asari**, "Classification of vehicles using monocular 3D reconstruction," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Evan Krieger, Sidike Paheding, Theus Aspiras, and **Vijayan K. Asari**, "Directional ringlet intensity feature transform for pedestrian tracking," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Paheding Sidike and **Vijayan K. Asari**, "Rotation, scaling and illumination invariant pattern recognition using joint transform correlation for object detection and tracking," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Chen Cui, Andrew Braun, and **Vijayan K. Asari**, "Robust textural features for real time face recognition," ***Brother Joseph W. Stander Symposium 2015***, University of Dayton, Dayton, OH, USA, 15 April 2015.

Vijayan K. Asari, "Learning embedded lines of attraction by self-organization for multidimensional pattern recognition," ***IEEE Computational Intelligence Society International Conference on Advances in Pattern Recognition - ICAPR 2015***, Indian Statistical Institute, Kolkata, India, 04-07 January 2015. (Invited Talk)

J. C. French and **E. J. Balster**. "A Fast and Accurate Orthorectification Algorithm of Aerial Imagery using Fixed-point Processing," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 7, no. 5, pp. 1826-1834. June 13, 2014.

C. D. McGuinness, **E. J. Balster**, and K. L. Priddy. "Beyond H.264: Implications of Next Generation Video Compression on Surveillance Imagery," in Proc. *SPIE conference on Ground/Air Multisensor Interoperability, Integration and Networking for Persistent ISR*. Baltimore, Maryland, April 20-22, 2015.

A. D. Thompson, **E. J. Balster**, C. M McGuinness, and W. F. Turri. "YUV Chrominance Sub-Sampling Comparison using H.264," in Proc. *SPIE conference on Ground/Air Multisensor Interoperability, Integration and Networking for Persistent ISR*. Baltimore, Maryland, April 20-22, 2015.

P. C. Hytla, **E. J. Balster**, J. R. Vasquez, and R. M. Neuroth. "Dual Ratio Change Detection Utilizing Real and False Color Imagery," to appear in Proc. *IEEE Symposium Series on Computational Intelligence*. Orlando, Florida, Dec. 9-12, 2014.

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F. Almehmadi and **M. Chatterjee**, "Numerical examination of the nonlinear dynamics of a hybrid acousto-optic Bragg cell with positive feedback under profiled beam propagation," JOSA B 31(4), 833-841 (Apr 2014).

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K. M. Mohamed and **R. C. Hardie**, "A Collaborative Adaptive Wiener Filter for Multi-Frame Super-Resolution," Frontiers in Physics: Optics and Photonics, 3:29. doi: 10.3389/fphy.2015.00029. (This article is part of the Research Topic Modern Trends and Applications of Super-resolution Imaging), April 29, 2015.

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R. Hasan and **T. M. Taha**, "Memristor Crossbar Based Programmable Interconnects," IEEE Computer Society Annual Symposium on VLSI (ISVLSI), 2014.

T. M. Taha, R. Hasan, and C. Yakopcic, "Memristor Crossbar Based Multicore Neuromorphic Processors," IEEE International System on Chip (SOC) Conference, 2014.

C. Yakopcic, R. Hasan, **T. M. Taha**, "Tolerance to Defective Memristors in a Neuromorphic Learning Circuit," IEEE NAECON, 2014.

C. Yakopcic, **T. M. Taha,** and R. Hasan, "Hybrid Crossbar Architecture for a Memristor Based Memory," IEEE NAECON, 2014.

W. Wang, C. Yakopcic, E. Shin, K. Leedy, **T. M. Taha**, and G. Subramanyam, "Fabrication, Characterization, and Modeling of Memristor Devices," IEEE NAECON, 2014.
R. Hasan, **T. M. Taha**, "Memristor Crossbar Based Low Cost Classifiers and Their Applications," IEEE NAECON, 2014.

Y. Qi, B. Zhang, **T. M. Taha**, H. Chen, and R. Hasan, "FPGA Design of a Multicore Neuromorphic Processing System," IEEE NAECON, 2014.

V. Bontupalli, R. Hasan, **T. M. Taha**, "Power Efficient Architecture for Network Intrusion Detection System," IEEE NAECON, 2014.

C. Yakopcic, R. Hasan, **T. M. Taha**, M. R. McLean, and D. Palmer, "Efficacy of Memristive Crossbars for Neuromorphic Processors," IEEE International Joint Conference on Neural Networks (IJCNN), 2014.

R. Hasan, **T. M. Taha**, "Enabling Back Propagation Training of Memristor Crossbar Neuromorphic Processors," IEEE International Joint Conference on Neural Networks (IJCNN), 2014.

2014-2015 STUDENT AWARDS & ACHIEVEMENTS

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 was awarded to **David M. Zimmerman**.

The Anthony Horvath '22 and Elmer Steger '22 Award of Excellence to the Outstanding Senior in ELE was awarded to **Matthew V. Fakler** and **Mark J. Edmonds**.

The Brother Louis H. Rose, S.M. '33, Award of Excellence to the Outstanding Junior in Electrical Engineering was actually awarded to two students this year: **Devin W. Spatz** and **Roseanna G. Lawandi**.

The Mary C. Millette Endowment Award for the Outstanding Senior Electrical Engineering Student in Memory of Mary C. Millette was awarded to **Lauren M. Millikin** and **Ashley M. Demange** this year.

The Award of Excellence to the Outstanding Cooperative Education Student in Engineering was presented to senior electrical engineering student **Cory W. Baker**.

In addition to undergraduate awards, there is also a section of awards just for graduate students. The 2015 Graduate Student Summer Fellowship Award winners are **Danielle Bane**, **Hua Chen**, **Md Raqibul Hasan**, **Shu Wang, Ayesha Zaman**, **Hailing Yue** and **Barath Narayanan**.

GRADUATES – MAY 2015

B.S./B.E. Degrees Awarded

Sulaiman B. Alabbas
Rachel A. Bachmann
Andrew A. Bak
Cory W. Baker
Mark J. Banchy**
Patrick B. Benton*
Pawlos Y. Campbell
Erik J. Carter
Matthew T. Cusumano
Ashley M. Demange**
Mark J. Edmonds**
Matthew V. Fakler***
Kyle M. Flanigan**
Kevin T. Geary*
Yicong Gong*
David M. Griffith
Zhenghang Gu
Nitisha Gupta
Alexander J. Hamilton
Isolde M. Hannan*
Stephen A. Holdmeyer
George C. Kemper
Mitchell T. Kiser
Ethan D. Langhorst
Kevin J. Lavoy
Xiaomin, Lin**
Tongjie Liu
Qing Lu
Wenjie Lu *
John J. Maher
Lauren M. Millikin**
Michael T. Ohradzansky*
Brooke C. Place
Daniel P. Prince*
Spencer C. Raak**
Matthew J. Sprague*
Nickolas J. Vallo**
John M. Wetula*
David M. Zimmerman***
James J. Zimnicki

*Cum Laude ** Magna Cum Laude *** Summa Cum Laude*

M.S. Degrees Awarded

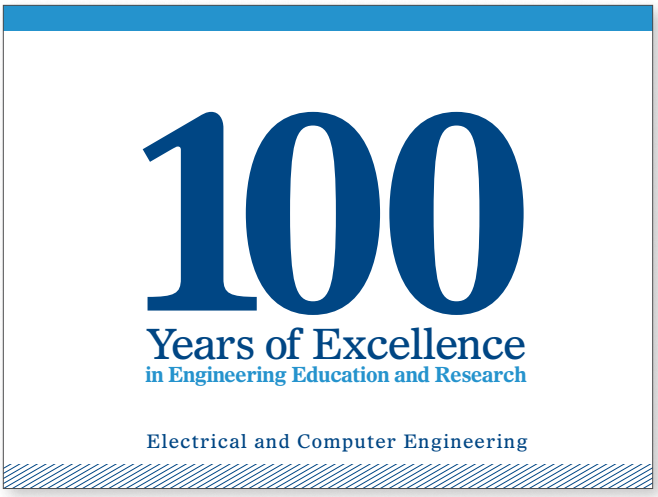
Mounika Aatukuri
Ademola T. Abimbola
Sai Pranava Alambaram
Yousif N. Alanzi
Abdulaziz E. Alkhaldi
Awwad H. Alshehry
Khalid H. Alyami
Karthik Anumolu
Vasundhara Balaji
Alex W. Beigh
Pramod Bethinni
Yanfeng Chen
Venkata S. P. Davuluru
Ye Gu
Johnathan M. Headlee
Yinwei Jiang
Srilekha Jogiparthi
Varunaju Kaluvakolanu
Apoorva R. Kankanala
Christina M. Karam
Rameez A. Khan
Narasimha N. S. S. S. Kotipalli
Satya Kumar Lalam
Matthew B. Lemon
Fuhao Li
Ying Liu
Nikhil K. Modugu
Sandeep Kumar. K. Pallera
Abinay Pingili
Niharika Remella
Santosh Kumar Sana
Wade A. Schroeder
Vinaykumar Siddaiah
Yuan Hung Su
Roshni Uppala
Sravani Vallapureddy
Tejasvi Veerabhadraiah
Chong Cheng Wang
Xudong Xia
Uday Kumar Yellanki
Bin Zhang
Dingnan Zhang

Ph.D. Degrees Awarded

Fatema A. Albalooshi
Fares S. Almehmadi
Yakov Diskin
Barry K. Karch
Khaled M. Mohamed
Binu M. Nair

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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