Message from the Chair: Fostering Experiential Learning

One of the “hallmarks” of our College of Engineering is that all departments promote “real-life” learning opportunities. Any visitor who walks through the front door of the Auburn Science and Engineering Center cannot help but notice the new Swagelok Engineering Career Center. This transformation to the entrance of the College of Engineering occurred in 2017, however the focus on preparing career-ready students has been at the core of our existence for the past 100 years.

In Biomedical Engineering, we strive to form meaningful relationships with the medical diagnostics, biomaterials and medical device industries. These take the form of co-op job placements, career fairs, on-campus medical conferences that students attend at no cost, joint research projects (involving both faculty and students), invited experts who contribute to our classes (see page 8), field trips, and real-world projects for the BME Design Team (pages 4 & 5).

Moving forward, the University of Akron has started their Akron Guarantee Scholarship Program. The idea is that new students would need only be in good standing to continue to receive Akron Guarantee Scholarship dollars and, over the course of their time at UA, they would receive more scholarship dollars from this program relative to previous years.

If it sounds like a good deal, it is!

B.L. Davis, Ph.D
Professor and Department Chair
bdavis3@uakron.edu
2018 Spring Seminar Series

Seminars are held in the Auburn Science and Engineering Center, Room 223/224 from noon to 1pm. They are open to the public, anyone wishing to attend can contact Dr. Christie Zhang (ge10@uakron.edu) for additional information.

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<tr>
<th>Date</th>
<th>Speaker</th>
<th>Topic</th>
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<td>1/26</td>
<td>John Zhe, PhD University of Akron</td>
<td>MEMS/NEMS and lab-on-a-chip devices</td>
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<td>2/9</td>
<td>Matt Reilly, PhD The Ohio State University</td>
<td>Biomechanics of Presbyopia, Cataract, and Ocular Trauma</td>
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<td>2/23</td>
<td>Kathleen Schmainda, MD, PhD Medical College of Wisconsin</td>
<td>MRI Methods Development</td>
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<td>3/9</td>
<td>Srin Venkatesh, Ph.D Gojo Industries</td>
<td>Accelerating Growth Through Innovation and Product Development</td>
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<td>3/16</td>
<td>Devesh Amatya, PhD Colibri Heart Valve</td>
<td>Medical Device and Regulations</td>
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<td>3/23</td>
<td>Matt Becker, Ph.D University of Akron</td>
<td>Using new materials and additive manufacturing to change medicine</td>
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<td>4/6</td>
<td>Ian Sigal, Ph.D University of Pittsburgh</td>
<td>Imaging and Biomechanics</td>
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<td>4/20</td>
<td>BJ Dupps, MD, PhD Cleveland Clinic</td>
<td>Biomechanics and Entrepreneurship</td>
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<td>5/4</td>
<td>Anthony Passerini, Ph.D University of California, Davis</td>
<td>Vascular Hemodynamics</td>
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UA at BMES

The department of Biomedical Engineering sent students and faculty to Phoenix, Arizona for the 2017 BMES Meeting. The meeting is a four day event held annually that calls for abstracts from universities across the world. This year, we had seven University of Akron presentations five of which included research performed by undergraduate BME students.

From Left to Right: Keyvan Amini Khoiy, Dr. Christie Zhang, Dr. Rebecca Willits, Ramila Joshi, Dr. Hossein Tavana, Dr. Yang Yun, Dr. Rouzbeh Amini and Pradip Shahi Thakuri
Dr. Rebecca Willits selected as ELATE Fellow

The department of Biomedical Engineering would like to congratulate Dr. Rebecca Willits for being selected as a 2017-18 Fellow for the Executive Leadership in Academic Technology and Engineering program (ELATE at Drexel.) ELATE is a national leadership development program for women who are senior faculty in STEM disciplines at academic institutions. This intensive fellowship is designed to enhance leadership and business skills of fellows via mentoring and leadership sessions.

This year, Dr. Willits is one of twenty-six women to be nominated and chosen for the program housed at Drexel University (Philadelphia, PA.) The fellowship is welcoming a diverse group of experienced STEM faculty from 23 institutions throughout the US and Canada.

Dr. Willits received her PhD in Chemical Engineering from Cornell University in 1999, following her BS and MS in Chemical Engineering at Tufts University and The Johns Hopkins University, respectively. In 2010, she moved from Washington University to the University of Akron and was appointed as the Margaret Donovan Endowed Chair for Women in Engineering and professor of Biomedical Engineering.

Dr. Willits’ research is interdisciplinary in nature, involving chemistry, biology, materials science and engineering. Her focus is to design new materials for drug delivery and tissue regeneration. She is the author of 32 refereed journal publications and has four patents and invention disclosures.

At the University of Akron, Dr. Willits is the second most-recent woman to be selected to participate in the ELATE program, following Dr. Joan Carletta of electrical and computer engineering who was selected as a 2015-16 fellow.
BME Design Team designs unique bicycle

BME Design Team members Luke Schmitt, Zac Kilburn, John D’Edidio (top left) alongside Jared Radebaugh (holding younger son) and Wesley Radebaugh (second son on specially-designed bicycle), Jen Radebaugh (mother), Wesley’s other brother (Everett), Bethanee Davis (developmental specialist at Summit Developmental Disabilities Board), Jane Caprez (physical therapist) and Mike Firtha (mentor to the Design Team and UA alumnus). The bicycle was delivered to Wesley in early December, 2017.
BME Design Team Recognition

Over the past year the BME Design Team has been recognized by the Akron E-week Committee, and UA’s Department of Student Life. The team has also been featured in numerous news reports, including those at the Akron Beacon Journal, Norton Post (see page 4), Fox 8 News, Cleveland.com, Newsbout.com and Akron.com. This is due to their efforts to design and implement novel devices to help individuals with musculoskeletal and/or neurological conditions that restrict activities of daily living.

(Right) BME Design Team’s certificate recognizing their outstanding creativity.

Collaboration with Ghana

At the HealOhio wound healing conference held at UA in 2016, one of the delegates from Ghana was a senior Nursing Officer, Abdulsalam Mohammed. Since that time he has returned to Ghana and has connected the National Reconstructive Plastic Surgery and Burns Center with UA’s BME Design Team. As a result, UA students are now working on concepts for keeping medications cool, dispensing pills and other projects aimed at meeting the needs of patients in hospitals in Ghana.

(Right) Alexandria Stephens, Jillian Savage and Gabriella Zuschak in a teleconference “meeting” with Abdulsalam Mohammed from Ghana’s National Reconstructive Plastic Surgery and Burns Center
Cleveland Clinic Foundation Donates to UA

Thanks to the generosity of the Cleveland Clinic’s Department of Biomedical Engineering, we have recently installed a six-degree-of-freedom robot that will be used for orthopaedic biomechanics research. The rotopod is similar to a standard hexapod robot, but, due to the unique mounting configuration of the six actuators on a circular path, it is additionally capable of providing full-physiological loading simulations for hip, knee and ankle research.

(Right) Installing the R2000 Rotopod, developed by Mikrolar Incorporated

BME Students Celebrate at Honor’s Banquet

2017 saw us graduate one of the largest group of BME Honors’ students! They have gone on to get jobs at companies such as Zimmer Biomet, General Electric, Stryker, Coltene Whaledent, Intellirod Spine, or to medical or graduate school (e.g., University of Southern California, OSU, Western Michigan, CWRU and UC Davis).
Dr. Marnie Saunders Receives NSF Funding

The department of Biomedical Engineering would like to congratulate Dr. Marnie Saunders for receiving a three-year grant from the National Science Foundation that will total $329,383. The grant will build upon a novel bone remodeling platform developed under her previous NSF CAREER award. The grant, “Quantification of bone’s load-induced multicellular interactions with a lab-on-a-chip platform,” will utilize the platform to quantify contribution of soluble activity, direct cell contact, and cell communication to mechanically-induced bone remodeling. This grant will go towards both research of the previously aforementioned as well as building a bio-mimicry learning community for sixth grade Akron Public School students.

Dr. Saunders is associate dean of the graduate school and an associate professor in Biomedical Engineering. She received her BSME from the University of Akron before continuing with the Department of Biomedical Engineering to earn her MS and PhD with a concentration in orthopaedic biomechanics. Dr. Saunders continued with a post-doctoral fellowship at the Pennsylvania State University College of Medicine to study bone cell mechanotransduction before joining the faculty of Penn State and later joining the University of Kentucky. She returned to The University of Akron as an associate professor in 2010. Her research has been funded for over 15 years with support from government and private foundations totaling over $8.7 million.

Daniel and Therese Sheffer Engineering Scholarships

Two outstanding BME students are this year’s recipients of Daniel and Therese Sheffer Engineering Scholarships; (i) Ceara Stack chose Biomedical Engineering, because it allows her to pursue her passion for caring for the elderly and infirm. She maintains that the “faculty and classes are phenomenal” and have prepared her well for her interning assignments thus far. (ii) Jillian Savage chose Biomedical Engineering because of her interests in biology, mathematics, and problem solving. These skills serve her well in her capacity of BME Design Team Leader for a device to assist a child with a musculoskeletal disability.

Congratulations to both Ceara and Jillian!
Acknowledgement of all External Fall 2017 Guest Speakers

This past 2017 fall we were exceptionally fortunate to have numerous guest lectures who contributed to our classes. Their collective efforts brought “real-life” meaning to the material being taught, especially as those speaking came from industry, medical hospitals or other academic institutions. Many thanks to all those listed below!

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<th>Speaker</th>
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<tr>
<td>Musa Audu, Ph.D</td>
<td>Case Western Reserve University</td>
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<td>Meghan Ball, PT</td>
<td>Akron Children’s Hospital</td>
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<td>Paul Bishop, MS</td>
<td>Cleveland Clinic</td>
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<td>Melissa Boswell</td>
<td>Stanford University</td>
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<td>Razvan Bunescu, Ph.D</td>
<td>Ohio University</td>
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<td>Robb Colbrunn, Ph.D</td>
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<td>John Dawson</td>
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<td>Landon Davis</td>
<td>Yanke Bionics Inc.</td>
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<td>Russell Fedewa, PhD</td>
<td>Cleveland Clinic</td>
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<tr>
<td>Gabe Gullia, C.P.</td>
<td>Yanke Bionics Inc.</td>
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<td>Ron Hart, MS</td>
<td>Cleveland FES Center</td>
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<td>Sarah Insull</td>
<td>U.S. Endoscopy</td>
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<td>Luis Justiniano, MS</td>
<td>Simi US Motion Inc.</td>
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<td>Mike Kelly, MD, Ph.D</td>
<td>Akron Children’s Hospital</td>
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<td>Vijay Khrishna, Ph.D</td>
<td>Cleveland Clinic</td>
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<td>Kevin Malinowski</td>
<td>Invacare</td>
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<td>Melanie Morscher, PT</td>
<td>Akron Children’s Hospital</td>
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<td>Maria Pasquale, MS</td>
<td>Novel Electronics Inc.</td>
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<td>Richard Pickett, PT</td>
<td>Akron Children’s Hospital</td>
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<td>Geoff Vince, Ph.D</td>
<td>Cleveland Clinic</td>
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<td>Mutian Zhang, Ph.D</td>
<td>Summa Healthcare</td>
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Department Chair Receives Summa Health Award

Each year Summa recognizes the efforts of orthopaedic surgeons who graduate from their residencies, as well as others who have contributed to Summa’s research program. In this respect, Dr. Davis was recognized for “outstanding service to orthopaedic education and research” for efforts spanning 2014-2017.

(Right) Dr. Davis at the Annual Summa Orthopedic Graduation Ceremony along with the plaque he received.

Paul Bishop Recognized for Excellence in Scientific Research

Congratulations to Ph.D. student Paul Bishop having been awarded the Society for Vascular Ultrasound 2017 “D.E. Standness, MD, Scientific Award for Excellence in Scientific Research” for his research creating a low cost 3D printed artery model that is ultrasonically realistic. His paper, “Can 3D Printing Create a Low Cost ultrasonically Realistic Superficial Femoral Artery Model,” on the work was presented at the 2017 Society for Vascular Ultrasound annual conference. The annual award for Excellence in Scientific Research is awarded in memory of D.E. Strandness, MD, who passed away in 2002 and is considered the Father of Noninvasive Diagnosis. Paul Bishop is a Ph.D. student in biomedical engineering and is currently the Director of the Cleveland Clinic’s Peripheral Vascular Core Lab located in Beachwood, Ohio.

(Above) Paul Bishop, and the D.E. Strandness Award Certificate.
Stephanie Ham Awarded $25,000 for Start Up

Congratulations to 2017 graduate Stephanie Ham for being awarded an Innovation Fund Northeast Ohio fund of $25,000 for her start-up company, OncoSolutions. Innovation Fund Northeast Ohio is awarded to new technology-based companies as an attempt to “close a gap” in Northeast Ohio’s entrepreneurial climate by providing access to funding that is typically used by the startups to build and test their prototypes. The fund is overseen by Great Lakes Innovation & Development Enterprise (GLIDE), and OncoSolutions has been awarded funding as one of four young companies to receive the award.

OncoSolutions is building a drug-screening technology that will generate 3D cancer cell models to mimic tumors within the body. As current cancer-treating drugs are tested on 2D models before animal-testing stages, Oncosolutions’ technology expects to reduce animal drug failure rates which range from 50 to 80 percent with the existing technology. The Innovation Fund award follows the Ohio Third Frontier TVSF Phase 2 award and the startup will be performing validation studies with this new round of funding.

Stephanie joined the University of Akron as a PhD student in August 2012 and graduated this past August. She developed the 3D tumor model while investigating the influence of tumor microenvironment on cancer cells under the advising of Dr. Hossein Tavana. She received her BSc in Chemical Engineering from Miami University, Ohio prior to joining the University of Akron.

Siefring Helps Team USA to Victory in Thorpe Cup

This past summer, BME student and University of Akron junior women's track and field team All-American heptathlete Jackie Siefring helped the United States to a convincing victory over Germany in the women's heptathlon in the Thorpe Cup. This is an international track and field competition between USA and Germany. Teams are composed of up to seven men and seven women who compete in the decathlon and heptathlon.

As the only collegian in the women's field, Siefring opened the seven-event competition, placing eighth, fourth, fifth and seventh, respectively, in the 11-woman field in the 100-meter hurdles (14.36), high jump (5-5/1.65m), shot put (39-5.25/12.02m) and 200 meters (25.41). After four events she stood sixth in the standings with a four-event total of 3,235 points. Siefring opened final-day competition winning the long jump with a mark of 19-11.75 (6.09m). She followed with a mark of 111-9 (34.06m) in the javelin, before posting the third-fastest time in the 800 meters (14.92).
New Faculty Opening in Biomedical Engineering

To apply for this position, candidates must complete the on-line application and submit a single PDF file containing: (1) a cover letter that clearly identifies the JobID, (2) a detailed CV with a complete list of published and accepted papers in peer-reviewed journals and conferences, (3) a compelling research vision and agenda that highlights fundable areas the candidate plans to pursue, (4) a teaching statement that identifies core undergraduate/graduate courses that the candidate can teach and new courses to develop, (5) a statement of diversity/inclusion to highlight the applicant’s past experiences with diversity, and future plans to attract underrepresented minorities to research, and (6) a list of at least three references. Applicants should fully describe their qualifications and experience with reference to the minimum and preferred qualifications. This is the information on which the initial review of materials will be based. A resume may be submitted but will not be accepted in place of any information requested on the application. For assistance with your application or attachments please call 330-972-8431.

Responsibilities
The Department of Biomedical Engineering at The University of Akron invites applications for a talented and dynamic tenure-track Assistant Professor who can establish and execute a vibrant agenda for strategic research and education beginning Fall 2018. Candidates are expected to have demonstrated a strong research record and to establish a nationally recognized and externally funded research program. The successful candidate will have a strong interest, passion, and ability to teach undergraduate courses, supervise M.S. and Ph.D. students, mentor undergraduates in research, and integrate research with teaching at the graduate level.

Members of the faculty in the department pursue a broad research program that spans interdisciplinary experimental and computational research in biomaterials, tissue engineering, biomechanics, signals, and sensors. Our faculty have active collaborations within the university, as well as with physicians and scientists at national and regional institutions, such as the Cleveland Clinic and Northeastern Ohio Medical University. Research of our faculty has been supported by funding from the NSF, NIH, DoD, Veterans Administration, various foundations, and industry. The University of Akron is a research-intensive public university with about 22,000 students. The College of Engineering is one of the fastest growing colleges in the country with more than 3200 undergraduate and 370 graduate students in nine programs. In addition to its traditional programs, the college has established five multi-disciplinary research centers including Conquer Chiari Research Center and Biomimicry Research and Innovation Center. The Department of Biomedical Engineering has 400 undergraduate students and offers ABET accredited B.S. degrees in Biomedical Engineering, as well as M.S. and Ph.D. degrees. We emphasize experiential learning. A majority of the undergraduate students participate in our co-operative education programs and are also active in regional and national conferences.

The College of Engineering is actively seeking to increase diversity within the College. Women, under-represented minorities, individuals with disabilities, and veterans are particularly encouraged to apply.

Required Qualifications
Candidates should have a doctoral degree in Biomedical Engineering, or a closely related discipline with biomedical engineering emphasis, and preferably post-doctoral training. Candidates are expected to have received their degrees, or completed all requirements and expect their degree before joining in Fall 2018.

Preferred Qualifications
Prior experience and a commitment to continue working with or teaching diverse groups and diverse students will be valued. Preference will be given to candidates with research interest in the broad area of biomechanics. Exceptional applicants in other areas of Biomedical Engineering may also be considered.

For additional information, please refer to: https://www.uakron.edu/hr/job-openings/openings.dot
Heal Ohio Conference at UA

On Nov 2nd, 2017 almost 200 scientists, physicians, students and industry representatives gathered at the University of Akron for a wound healing conference. Many biomedical engineering topics were central to the conference, including (i) wound imaging, (ii) biomaterials, (iii) tissue engineering and (iv) therapeutic technologies. This year Military Trauma was included as an additional theme, with excellent presentations by surgeons from the Crystal Clinic Orthopaedic Center and the Veterans Administration. Given the success of the meeting, it is planned to host another Heal Ohio Conference at UA in the fall.
Upcoming Spring Events

January 20th: Scholar's Day. See: http://www.uakron.edu/scholars/
January 26th: College of Engineering Celebration of Research.
February 6th: Spring Engineering & Engineering Technology Career Fair
February 9th: Discovering Diversity Day: http://uakron.edu/admissions/undergraduate/visit/discovering-diversity-day
February 14th: Akron ArchAngels meeting. See: https://www.uakron.edu/archangels/
February 17th: Goodyear STEM Day. See: https://www.goodyear.com/careerdag/
March 10: “BEST Medicine” Engineering fair. See: www.uakron.edu/bestmedicine
March 16: Celebrate “Inclusion Month” at Lock 3 in Akron:

March 16th: Senior Day, A to Zip. See: https://www.uakron.edu/admissions/undergraduate/visit/senior-day
April 11th: National Biomechanics Day
April 23rd: College of Engineering student capstone design project presentations.
April 26th: College of Engineering Awards Banquet
May 9th: Akron ArchAngels meeting. See: https://www.uakron.edu/archangels/

http://www.uakron.edu/guarantee/
2018 BEST Medicine Engineering Fair
March 10, 2018

What: Premier engineering fair devoted to students interested in engineering solutions to medical issues

When: March 10, 2018, 7:45 a.m. – 2:30 p.m.

Where: NIHF STEM Middle School
199 S. Broadway Street, Akron, Ohio 44308

Who: 6th – 12th grade students

Visit: www.uakron.edu/bestmedicine
Email: bestmedicine@uakron.edu
Advisory Board Members
The Department of Biomedical Engineering is fortunate to receive input from leaders in the field. Going forward, in each newsletter we will highlight these individuals who volunteer their efforts to assist BME at the University of Akron. In this edition, two new members are featured: Drs. Brian Duncan and Vijay Iyer.

Brian W. Duncan, M.D., M.B.A., B.C.M.A.S.
After completing training at the Massachusetts General Hospital, Dr. Duncan was a staff pediatric cardiac surgeon at Children’s Hospital, Boston, Seattle Children’s Hospital and Cleveland Clinic. Dr. Duncan’s specialty interests included transplantation in children and adults with end-stage congenital cardiopulmonary disease and mechanical circulatory support for these patients. While working clinically, he authored more than 125 peer-reviewed manuscripts and book chapters and wrote the definitive textbook on pediatric circulatory support entitled Mechanical Support for Cardiac and Respiratory Failure in Pediatric Patients.

In 2014, Dr. Duncan began as the U.S. Medical Director for the Cardiac Surgery Business Unit of Sorin Group and is now the Vice President of Medical Affairs for the Cardiac Surgery Business Unit of LivaNova, formed by Sorin’s merger with Cyberonics in October 2015.

Dr. Duncan has experience assisting and evaluating medical device firms in all aspects of business development and strategy, including issues related to regulatory, reimbursement, and financing/fundraising with the aim of ensuring new high impact, cost effective technologies are available to patients.

Vijay K. Iyer, Ph. D., M. B. A.
Dr. Vijay Iyer leads business development efforts on the medical devices team at BioEnterprise, an economic development organization with the mission of accelerating life science commercialization in Northeast Ohio via entrepreneurial efforts and growth. Vijay is an accomplished executive with over 25 years of diverse functional experience in the medical device industry, in small, medium and large companies, serving hospital, home and alternate care settings. His most recent role was with Philips Respironics, the Home Healthcare Solutions business of Philips Healthcare, where he managed early stage venture investments, internal and external, after he led corporate and business unit business development and strategy for over 15 years. Vijay spent the first decade of his career managing product and technology development in medical devices, including technical assessments and due diligence. Several patents, papers and presentations capture many of his key contributions.

Dr. Iyer has a bachelor’s degree in electrical engineering from the National Institute of Technology in India, a masters/doctoral degree in biomedical signal processing from the University of Cincinnati, and an executive MBA from Kennesaw State University.
(Right) Students participate in a class activity related to electrical circuits. From Left to Right: Pa Kou Xiong, Dr. Jim Keszenheimer, Jonathan Lawless, Logan Belew, and Kyle Ritz.

(Below) Mariah Costa and Madison Marks showing their Halloween spirit!

(Above) Leaders of the BMES student chapter, Uma Dixit and Krupa Patel, welcome students to UA.

(Above) Adrian Belli using myoelectric signals to control a prosthetic hand.

(Left) Alexandria Stephens at the “New Roo” Weekend.

(Left) UA BME alumnus, Lindsey Montanari, now a Honda employee, speaking with current BME student Claire Langenderfer at the fall Career Fair held in the Student Union.