FALL 2016

BME

DEPARTMENT OF BIOMEDICAL ENGINEERING AT THE UNIVERSITY OF ROCHESTER

HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES
UNIVERSITY of ROCHESTER

MESSAGE FROM THE CHAIR

As the new Chair of the Department of Biomedical Engineering at the University of Rochester, I am eager to share with you our latest advances in research, developments in education, and updates on our BME students and faculty.

This year our BME faculty members have had great success in securing new funding for research projects in their state-of-the-art laboratories. Their successes include new grants from the NIH and NSF on BME topics as diverse as tendon biomechanics, ultrasound imaging, optical and nanomembrane technologies for biosensors, visual and auditory perception, diffuse optical imaging techniques, corneal biomechanics, hemodialysis technology, and other exciting topics (pages 5-8). Additionally, many of our faculty have developed exciting new industry partnerships to translate their research advances to commercial products and clinical practice.

I am particularly delighted to introduce our two newest faculty members in the Department of Biomedical Engineering: Edmund Lalor from Trinity College in Dublin, Ireland, and Ross Maddox from the University of Washington (page #). Both of these outstanding new faculty members add to our departmental and institutional strength in neuroengineering, and provide new research opportunities and courses for our graduate and undergraduate students.

Congratulations are in order to our talented BME students as they continue to garner numerous awards and honors (pages 15-18). Undergraduate students in BME Senior Design, as well as Master's students in our CMTI program, have again won several national and regional awards for engineering design and entrepreneurship. Be sure to review some of our students' projects presented at the Hajim School Design Day (page 11). Our graduate students have also been recipients of prestigious fellowships from the NIH and other foundations, and their excellence in research and teaching have been recognized with several awards and honors.

Special recognition goes to Laurel Carney as our new endowed professor. This year, Professor Carney was named the Marylou Ingram Professor of Biomedical Engineering in recognition of her achievements in auditory processing research, and her excellence in education at the UR (page 9). Further congratulations to Laurel Carney for receiving the Engineering Professor of the Year Award from the UR Students' Association.

These are exciting times for UR BME and I hope you enjoy reading about all of these wonderful updates from Rochester in this issue of the UR BME magazine.

Diane Dalecki
Chair, Department of Biomedical Engineering

UR BME MISSION

"Discover, create, and educate to engineer ever better solutions in biomedical research and health care."

{ABOVE}
A section of 3D printed vertebrae is seen in the lab of Michael Richards, a University of Rochester Biomedical Engineering alumnus and Research Assistant Professor at the University of Rochester Medical Center.

{ON THE COVER}
Marian Ackun-Farmmer, a second-year BME PhD student in the lab of Professor Danielle Benoit in Goergen Hall at the University of Rochester. Marian's current project involves the use of a polymer based nanoparticle system for targeted drug delivery to remodeling areas of bone. Pictured here is the pipetting step - micelle samples were diluted with PBS in an eppendorf tube to be used later for size determination.

RESEARCH AREAS AND AFFILIATIONS

RESEARCH AREAS

Neuro & Sensory Systems Engineering
Biomedical Nanotechnology
Regenerative Medicine
Biomedical Imaging
Biomedical Optics
Biomechanics

BME-AFFILIATED RESEARCH CENTERS AND INSTITUTES

Aab Cardiovascular Research Institute
Center for Emerging & Innovative Sciences
Center for Medical Technology and Innovation
Center for Musculoskeletal Research
Center for Navigation and Communication Sciences
Center for Translational Neuromedicine
Center for Visual Science
Clinical & Translational Science Institute
James P. Wilmot Cancer Center
Rochester Center for Biomedical Ultrasound
Rochester Center for Brain Imaging

DIANE DALECKI APPOINTED NEW CHAIR OF THE DEPARTMENT OF BIOMEDICAL ENGINEERING

"For a long time we were a new department, then a growing department, and now we are a much more stable department. That gives us opportunities now to tackle the things that will really make us a robust, top-ranked BME program. That's where we are headed next."

Diane Dalecki

Even before Biomedical Engineering became a department, Diane Dalecki wrote the curriculum for what was then a fledgling interdepartmental program for undergraduates.

After the department was formed 15 years ago, she was among its first faculty members.

And on July 1, she became its second chairperson. She replaces Richard Waugh, who, she notes, "hired every one of us, has done a fabulous job growing our department," and to whom the department is "indebted for its existence."

"I have some very big shoes to fill."
Waugh has no doubt she will do just that.

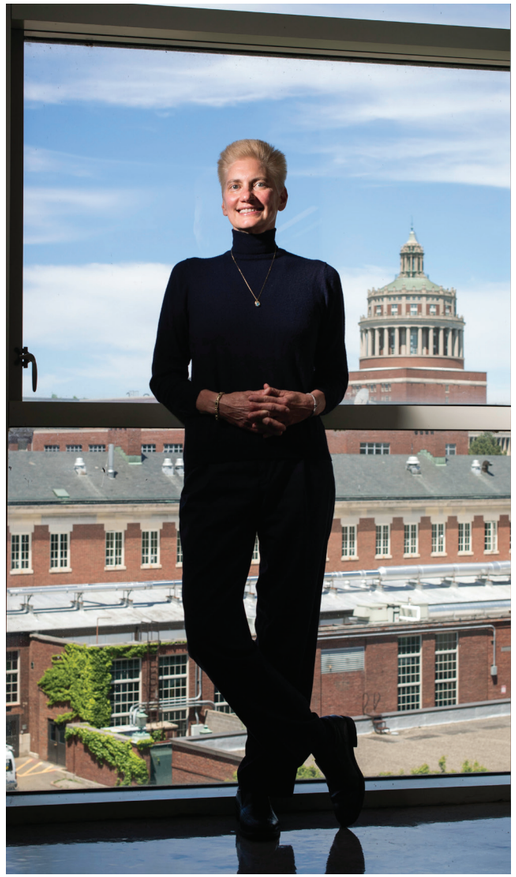
"Diane has been an exemplary contributor to the program from the very beginning," he said. "She was our first director of undergraduate studies. She ran our first accreditation visit. She started BME 101 and turned it into a course that really had teeth and became a model for our EAS 10X courses (offered by departments school-wide). She implemented hands-on labs as part of a freshman class that enrolls more than 100 students, which is no mean feat. She's always been there, extraordinarily dedicated and devoted to the department, and I think everybody senses that."

Waugh, 64, will continue to be a BME faculty member, run his research lab and serve as the University's associate vice president for research. However, he said the time seemed right to step down as department chair for a couple of reasons. His wife, a schoolteacher, is retiring and he would like to have more time for travel.

Moreover, after 19 years as BME program director, then department chair, "I just felt like it was time to give somebody else a turn," Waugh said. "There are still opportunities for growth, so the new chair would still have a chance to set some directions."

The department, though relatively new, has had the largest undergraduate enrollment in the Hajim School for several of the past few years. It has led the Hajim School in female enrollment and in numbers of female faculty. The department's programs for Senior Design and mentoring of junior faculty have served as a model for the rest of the school.

Dalecki sees the department at a transition point. "For a long time we were a new department, then a growing department, and now we a much more stable department. That gives us opportunities now to tackle the things that will really make us a robust, top-ranked BME program. That's where we are headed next."



The department, established in 2000, is a joint program shared by the Hajim School of Engineering & Applied Sciences and the School of Medicine and Dentistry at the University of Rochester. It consists of 18 primary faculty members with expertise spanning biomechanics, biomaterials, regenerative medicine, neuroengineering, nanotechnology, imaging, and biomedical optics. The department enrolled 368 undergraduates and 70 graduate students during the 2015–16 academic year and led the Hajim School's female undergraduate enrollment with 48 percent.

Dalecki is excited that the two new members joining the faculty this year – Edmund Lalor from Trinity College in Dublin, Ireland, and Ross Maddox from the University of Washington -- both bring expertise in neuro-engineering, which will strengthen not only the department but its ties with the Medical Center. Close association with a medical center is "a cornerstone of any elite biomedical department," she noted.

She's also excited by the opportunity to work with the nearly 1,000 alumni of the department – nearly every one of whom she has taught as freshmen.

"Our students when they are here are so dedicated to our department," Dalecki observed. "I want to maintain those ties with them, and keep them interested in our department and engaged with the things we're doing."

"When I look back on my career, I think of this (founding the Department of Biomedical Engineering) as being the accomplishment I am proudest of. It's something that's going to make a lasting difference in the university."

Rick Waugh, former department chair

ABOUT DIANE DALECKI

- Distinguished Professor of Biomedical Engineering with a secondary appointment in the Department of Electrical and Computer Engineering.
- Director of the Rochester Center for Biomedical Ultrasound
- Chair (starting July 1, 2016) of the Department of Biomedical Engineering
- Research: Her laboratory develops novel diagnostic ultrasound techniques and discovers and advances new applications of ultrasound for therapy, tissue engineering, and regenerative medicine.
- Fellowships: She is a fellow of the American Institute of Ultrasound in Medicine (AIUM), the Acoustical Society of America (ASA), and the American Institute of Medical and Biological Engineering (AIMBE).
- Education: BS in chemical engineering, and MS and PhD in electrical engineering from the University of Rochester.

FUNDING NEWS

Michael Richards, left, a Research Assistant Professor in the Department of Surgery at the University of Rochester Medical Center and Doran Mix, vascular surgery resident physician in the Richards lab at the University of Rochester Medical Center, are developing a novel ultrasound technology to characterize the structure of aortic abdominal aneurisms and blockages in carotid arteries, in collaboration with Carestream Health Inc.

Carestream Health, a leader in medical and dental imaging, and an interdisciplinary team of researchers at the University of Rochester will collaborate on developing new technologies to expand the use of ultrasound imaging for medical diagnosis. Headquartered in Rochester, Carestream entered the ultrasound market earlier this year, and is looking to expand its portfolio of products.

With funding provided by the company and New York State through the Center for Emerging and Innovative Sciences, the collaboration will initially focus on developing ultrasound technologies for:

- Diagnosing tendon damage, led by Stephen McAleavey with Mark Buckley of the Department of Biomedical Engineering. Initially the project will focus on insertional Achilles tendinopathy, a painful heel condition that resists nonsurgical treatments.
- Characterizing the structure of aortic abdominal aneurisms and blockages in carotid arteries, to more accurately assess the risk of ruptures, led by Michael Richards of the Department of Surgery with Marvin Doyley of the Department of Electrical and Computer Engineering, and of Biomedical Engineering.
- Producing handheld devices, using novel system architectures and relatively inexpensive components, led by Zeljko Ignjatovic, with Michael Huang and Doyley, all of the Department of Electrical and Computer Engineering.

"These are three very substantive projects," said James Burns, CTO of Carestream's, X-ray and Ultrasound Solutions. "We hope it is the start of a very rich relationship."

Diane Dalecki, director of the University's Rochester Center for Biomedical Ultrasound and chair of the Department of Biomedical Engineering, said, "this is a dream match between a company in our own backyard and our researchers, who are eager to take the work they're doing in the laboratory and translate it to people who are building the products that make a difference for patients and physicians."

Carestream offers two high-end ultrasound products, Touch Prime and Touch Prime XE, for general ob-gyn, vascular, and abdominal imaging. The company will expand its portfolio to include mid-range and portable devices.

"This is a dream match between a company in our own backyard and our researchers, who are eager to take the work they're doing in the laboratory and translate it to people who are building the products that make a difference for patients and physicians."

"Through these joint projects, we can innovate in ultrasound technology and applications, and in turn influence Carestream's technology roadmap. We seek to generate a pipeline of clinically validated ultrasound technologies for new products," said Ajay Anand, PhD, a Carestream system engineer and principal investigator who worked closely with the University researchers to develop the collaboration. "In addition, we have an opportunity to really enhance the medical ultrasound technology ecosystem in the Rochester area."

The collaboration is administered by the Center for Emerging and Innovative Sciences, one of 15 Centers for Advanced Technology funded by NYSTAR, a division of the New York State Department of Economic Development. Funding for the first year of the initial two-year phase of the collaboration totals $270,000.

UR Ventures, the University's technology transfer office, the University's Center for Business Engagement and its Office of Research and Project Administration, and CEIS worked with Carestream to develop the master research agreement.

Since the early 1960s, University of Rochester researchers have produced pioneering clinical and technological advances in diagnostic ultrasound imaging. The Rochester Center for Biomedical Ultrasound, formed in 1986, includes nearly 100 researchers, including visiting scientists from around the country.

Hani Awad and Danielle Benoit receive NIAMS grant to study tendon healing

Professors Hani Awad and Danielle Benoit received a $2 million grant from the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) for their project titled, "Engineering Scarless Repair of Flexor Tendon Injuries." The goal of this multi-PI project is to advance the understanding of the mechanism of scar formation in flexor tendons of the hand, whose scar-mediated healing often leads to adhesions and loss of hand function. The project identifies a therapeutic target and maps out its mechanism of involvement in scar formation, and investigates the efficacy of a novel nanoparticle-mediated drug delivery approach to mitigate its effects in a preclinical model of flexor tendon repairs. Successful completion of this project, which integrates biology, biomechanics, and biomaterials, will have a profound impact on the prevention or resolution of tendon adhesions.

Stephen McAleavey receives NIH grant for ultrasound elastography

Professor Stephen McAleavey has received an R21 grant from the National Institutes of Health for his project titled, "Quantification of Shear Wave Strain Dependence in Breast Tissues." The goal of this project is to improve the power of ultrasound imaging and elastography to predict if a breast lesion is benign or malignant, by using a novel, high-resolution technique to non-invasively map the non-linear mechanical properties of breast tissue. Co-investigators on this interdisciplinary project are Marvin Doyley (electrical engineering), Linda M. Schiffhauer (pathology and laboratory medicine), and Avice O'Connell (imaging sciences).

Jim McGrath receives NIH grant for hemodialysis technology

Professor Jim McGrath received an NIH R21 grant for his project titled "Small Animal Hemodialysis with Ultrathin Silicon Nanomembranes". The goal of this project is to advance porous silicon nanomembranes as a novel, highly permeable dialysis membrane technology to significantly reduce the amount of membrane area required for hemodialysis. Successful completion of the project will advance home hemodialysis by enabling smaller and wearable devices, and shorter and more effective dialysis times.

Hani Awad and Andrew Berger receive multi-PI NIH R01 grant

Professor Hani Awad and Professor Andrew Berger (Optics) received a multi-principal investigator R01 grant for their project titled "Raman Spectroscopic Platform for Transcutaneous Monitoring of Bone Quality." Their multidisciplinary project will develop a noninvasive optical method to measure bone fragility in arthritic and secondary osteoporosis preclinical models as they receive both anabolic and anti-resorptive medication that try to preserve bone health. By providing a better way of tracking bone fragility in living subjects, this work will generate new understanding of how bone disorders develop and how medicines can treat them more effectively.

For information on how to support the research of our BME faculty, contact Eric Brandt at ebrandt@alumni.rochester.edu or 585-273-5901

Ross Maddox receives NIH R00 grant to study role of visual stimuli in hearing

Professor Ross Maddox received an R00 grant from the National Institutes of Health for his project titled "Visual and Auditory Perceptual Factors Affecting Spatial Release from Masking." When listening in noisy environments, the brain uses differences in the locations of sound to improve understanding. The goal of this project is to investigate the effects of visual stimuli and eye position on the auditory system's ability to leverage these small location differences. It combines new behavioral measures, eye-tracking, and novel metrics of brain activity using electroencephalography so that we may better understand not only healthy listening, but also the difficulties faced by people who have normal hearing tests but still struggle to communicate in noisy settings.

Ed Brown is Multi-PI on new NIH R21 grant

Professor Ed Brown and Professor Xinping Zhang of the Center for Musculoskeletal Research are multi-principal investigators on an NIH R21 grant titled "Understanding Revascularization and Repair of Cranial Bone Grafts via Intravital Imaging." The goal of this proposal is to evaluate the role of hypoxia during revascularization of cranial bone grafts.

Jim McGrath and SiMPore receive NIH STTR grant to develop nanomembranes for separation processes

Professor Jim McGrath received an NIH STTR Phase I grant (R41), in collaboration with SiMPore Inc, for their project titled "Enabling Nanomembrane-based Biomolecule and Nanoparticle Separations". The goal of this project is to develop a technological approach to enable separation of nanoparticles and antibodies using SiMPore's porous silicon nanomembranes. The team has demonstrated recently that use of SiMPore's nanomembranes in a custom centrifuge configuration allows for separation of antibodies from 20 nm polystyrene particles. Successful completion of the project will provide additional innovations in membrane fabrication and non-fouling coatings, and advance the use of nanomembranes for functionalized nanoparticle fabrication processes.

Regine Choe and Danielle Benoit awarded NSF grant

BME professors Regine Choe (Principal Investigator) and Danielle Benoit (Co-Investigator) have been awarded a grant from the NSF for their collaborative research project titled, "Diffuse Optical and Correlation Tomography for Monitoring of Bone-Graft Healing." The overall goal of this proposal is to develop new and safe imaging methods that use red and infrared light to monitor and image the re-growth of blood vessels in healing bones. These methods are based on diffuse optical tomography (DOT) and diffuse correlation tomography (DCT) as scientific research tools to provide non-invasive, deep-tissue longitudinal monitoring of vascularization of engineered tissues.

Jim McGrath receive NSF grant for nanomembrane-based molecular sensors

Professor Jim McGrath received an Accelerating Innovation Research grant from the NSF for his project titled "Commercialization of Nanomembrane-Based SERS Sensors". This multidisciplinary project aims to advance porous nanomembranes as SERS (sensitive erasable reproducible flow-through) sensors for molecular recognition, with potential applications in the fields of forensics, toxicology, and biomedicine. The project brings together McGrath's leading nanomembrane research lab, with a world-leading nanomembrane manufacturer, SiMPore Inc., and international experts in photonics from Nottingham University to translate a novel laboratory discovery towards commercial applications in industries that improve human welfare.

Dean Johnson receives NIH K25 award

Dean Johnson received a Mentored Quantitative Research Career Development Award (K25) from the NIH for his project titled "Novel Ultra-permeable Membrane-based Dialyzer for Home Hemodialysis". The goal of this project is to advance nanomembrane-based technologies for home hemodialysis. The award will also provide training and mentorship in areas of biomedical engineering, translational medicine, and nephrology.

Mark Buckley receives grant from AOFAS to study tendinopathy

Professor Mark Buckley received a grant from the American Orthopaedic Foot & Ankle Society (AOFAS) for his research project entitled, "In Vitro Assessment of the Role of Mechanical Strain in the Pathogenesis and Reversal of Insertional Achilles Tendinopathy." Insertional Achilles tendinopathy (IAT) is a common and painful disorder that responds poorly to conservative (i.e., nonoperative) care. Improved outcomes for IAT patients require interventions that target the fundamental causes of the disease. This project seeks to elucidate how mechanical deformations occurring in the Achilles tendon insertion can lead to IAT pathogenesis, and whether the IAT-associated changes can be reversed in vitro by specific mechanical loading regimens. The findings of this study will motivate effective, targeted non-surgical therapies for IAT.

Ed Brown and Efferent Labs develop new optical biosensor

Professor Ed Brown has received research funding from Efferent Labs, Inc. for his project titled "Development and Evaluation of an Implantable Optical Biosensor". The main goal of this study is to develop an implantable optical biosensor and characterize its performance. Efferent Labs is a medical technology company focused on implantable biosensors.

BME Professors receive University Research Awards

BME Professors Mark Buckley, Catherine K. Kuo, and Danielle Benoit and their collaborators were the recipients of University Research awards this year. University Research Awards provide seed money on a competitive basis for innovative research projects. Professors Kuo and Buckley, along with Natasha O'Malley from Orthopaedics, were funded for their project titled, "Role of Mechanics in Etiology of Congenital Talipes Equinovarus." Through this project, the team will develop novel in vitro and in vivo experimental models to investigate the role of aberrant mechanical loading of embryonic tendons in the development of clubfoot. Professor Benoit, with Rudi Fasan (Chemistry) and Benjamin Frisch (Hematology/Oncology), received funding for their project titled, "Targeted Delivery of Cytotoxic Agents for the Eradication of Leukemia Stem Cells in the Bone Marrow". This team will investigate the functionality and therapeutic potential a novel nanoparticle-based system for the controlled and selective delivery of anti-leukemic agents to acute myeloid leukemia and leukemia stem cells within bone marrow.

Amy Lerner and Jim McGrath receive PumpPrimer II Awards

Professor Amy Lerner and Professor Jim McGrath each received university PumpPrimer II Awards. PumpPrimer II awards are competitive university grants designed to enable faculty to develop pilot data for bold new research directions. Professor Lerner received funding for her project titled "Corneal Biomechanics and Optics: Model Refinement and Validation for Translational Applications". The goal of this project is to perform experiments to validate an advanced three-dimensional corneal biomechanical model based on individual material properties and geometry by comparing model predictions with experimentally measured corneal responses to different intraocular pressures and spatially-varying photo-disruption of corneal tissue. Professor McGrath received funding for his project titled "Desalinization with Ultrathin Nafion Membranes". The goal of this project is to establish that ultrathin Nafion membranes have the potential for desalinization with orders-of-magnitude greater efficiency than conventional reverse-osmosis.

Catherine K. Kuo receives Pilot Award

Professor Catherine Kuo has received a Pilot Award from the UR Center for Musculoskeletal Research for her project titled "Axial and Limb Tendon Progenitor Cell Baseline and FGF4-induced Differences". This study will elucidate key differences between tendon progenitor cells of the axial and limb regions that may play important roles in the development, healing, and function of spinal and limb tendons.

Denise Hocking receives Program of Excellence Award

Professor Denise Hocking received a Program of Excellence Pilot Award from the UR Department of Pharmacology and Physiology for her project titled "Fibronectin-Driven Mechanisms of Embryonic Tendon Development." Professor Catherine Kuo is a co-investigator on this award. The project aims to determine how the cell-mediated co-assembly of fibronectin and collagen fibrils within the extracellular matrix influences tendon development.

FACULTY AWARDS AND HONORS

Greg Gdowski recognized by IEEE for Leadership Efforts

Greg Gdowski, the Rochester IEEE Section Chair, has received an IEEE award for Regional Professional Leadership from IEEE USA for demonstrated leadership efforts in advancing the professional aims of IEEE in Region 1, specifically in revitalizing the Rochester Section and the photonics community. Gdowski is an associate professor of BME and Director of the Center for Medical Device Technology and Innovation.

Catherine K. Kuo receives Award for Innovation in Research

Catherine K. Kuo, associate professor of BME and Orthopaedics, received an Award for Innovation in Research at the Go:Life in Orthopaedics Conference in Gothenburg, Sweden. Her talk titled, "Embryonically inspired approaches to regenerate soft tissues", described her innovative research program to regenerate tendons in a manner that recapitulates embryonic tendon development and scarless healing.

Laurel Carney wins Students' Association Engineering Professor of the Year Award

Professor Laurel Carney was the recipient of the UR Students' Association Engineering Professor of the Year Award. Professor Carney was recognized for her outstanding teaching in BME 210 – Biosystems and Circuits, her involvement of students in her research laboratory, and her mentoring of undergraduates. "She is truly one of the most remarkable professors I've ever had," said BME sophomore Christian Keenan, who presented Professor Carney with the award at the Undergraduate Research Exposition this spring.

LAUREL CARNEY NAMED MARYLOU INGRAM PROFESSOR OF BIOMEDICAL ENGINEERING

"I cannot imagine a more deserving or appropriate individual to receive this honor. Laurel contributes to the department and the University in more ways than I can count, as an educator, as a mentor, and in multiple service roles. At the same time, her research in auditory processing is recognized internationally as one of the most outstanding programs in her field. She is truly an amazing individual and we are fortunate to have her among our faculty."

Rick Waugh, former BME department chair

Past the auditory canal, through the eardrum and beyond the cochlea is where you will find the research of Laurel Carney, Ph.D., acclaimed professor of biomedical engineering. Carney's research focuses on the complex network of auditory nerve fibers that transmit the inner ear's electrical signals to the brain with the goal of better hearing aids. Her research combines neurophysiological and behavioral studies with computer modeling in an effort to develop hearing aids that make human speech louder and clearer. In June 2015, she earned the William and Christine Hartmann Prize in Auditory Neuroscience from the Acoustical Society of America. And on January 22, the University of Rochester formally installed her as the Marylou Ingram Professor in Biomedical Engineering.

"I cannot imagine a more deserving or appropriate individual to receive this honor," said Biomedical Engineering Department Chair Richard Waugh. "Laurel contributes to the department and the University in more ways than I can count, as an educator, as a mentor, and in multiple service roles. At the same time, her research in auditory processing is recognized internationally as one of the most outstanding programs in her field. She is truly an amazing individual and we are fortunate to have her among our faculty."

The namesake and creator of Carney's professorship, the late Marylou Ingram '42, '47M (MD), dedicated her life to the pursuit of scientific knowledge, paving the way for future generations of female scientists. After receiving her bachelor's degree from the University of Rochester in 1942, she earned her medical degree at Rochester in 1947 as one of very few women in the program at the time.

Dr. Ingram led a long and illustrious career in academic medicine, medical research and teaching. Her pioneering work focused on experimental hematology, radiation biology, cellular biology and immunology. Ingram played a key role in developing automated cell analysis systems, and her work landed on the cover of Scientific American in 1990. Her teaching career included stints in the University of Rochester Medical Center's Department of Radiation Biology and Biophysics, at the California Institute of Technology, and at the University of Miami, where she was the founding director of the Institute for Cell Analysis. In 1982, she joined the Huntington Medical Research Institute as a senior research scientist and the head of the tissue engineering and in-vitro systems until her death in 2013.

"Dr. Ingram will be remembered as one of the preeminent scientists of her time, a legacy she further enriched by establishing this professorship," said President and CEO Joel Seligman. "Her excellence and commitment to her research are now the standards our faculty must live up to. A holder of several patents, widely published, and winner of several honors, Laurel Carney is an exemplary inaugural holder of the Ingram Professorship."

DIANE DALECKI NAMED DISTINGUISHED PROFESSOR OF BIOMEDICAL ENGINEERING

Medical ultrasound technology uses high-frequency sound waves to produce detailed images that help physicians diagnose conditions affecting the body's organs and soft tissues. What if this technology could also be used to help treat the problem? Diane Dalecki '83, '85 (MS), '93 (PhD), director of the Rochester Center of Ultrasound, has already asked the question, and she is currently working on the answer.

Dalecki's lab, which is dedicated to advancing the use of ultrasound in medicine and biology, is developing ultrasound-based technologies for tissue engineering and regenerative medicine. The ultimate goal: have the ability to fabricate living, functional artificial tissues and organs.

Tissue engineering and regenerative medicine are just a part of an impressive list of work that led to Dalecki being named the University's Distinguished Professor of Biomedical Engineering.

"Diane has become one of the country's leading experts on the interaction between ultrasound and biological systems," said Joel Seligman, president, CEO, and G. Robert Witmer, Jr. University Professor. "As she was the first person in the world to pace heartbeats with pulsed ultrasound, it is particularly appropriate that she be the first recipient of this professorship."

The distinguished professorship was established by the University through royalties from the Blue Noise Mask. Invented by Kevin Parker, Ph.D., the William F. May Professor in Engineering, and Theophano Mitsa '88 (MS), '91 (PhD), the Blue Noise Mask is a widely adopted halftoning technique that prints shades of gray in less time and at a higher quality than traditional methods. It is a patented process that has been licensed worldwide by more than a dozen companies, including Hewlett-Packard, one of the world's largest computer printer manufacturers. The royalties have funded four other endowed professorships and provided support for research and scholarships.

"Funding made possible by the Blue Noise Mask underscores the importance of recognizing world-class work and retaining world-class people," said Robert L. Clark, senior vice president for research and dean of the Edmund A. Hajim School of Engineering & Applied Sciences. "Diane is at the top of both categories as an outstanding researcher and an exceptional teacher."

Dalecki has been a recipient of the University's Goergen Award for Excellence and Artistry in Undergraduate Education and is a three-time recipient of the Undergraduate Engineering and Applied Sciences Professor of the Year Award.

She is a fellow of the American Institute of Ultrasound in Medicine, the Acoustical Society of America, and the American Institute of Medical and Biological Engineers,

"Diane has become one of the country's leading experts on the interaction between ultrasound and biological systems. As she was the first person in the world to pace heartbeats with pulsed ultrasound, it is particularly appropriate that she be the first recipient of this professorship."

Joel Seligman University President

From left to right: Peter Lennie, Dean of the Faculty of Arts, Science and Engineering; Diane Dalecki, Distinguished Professor of Biomedical Engineering and Director of the Rochester Center for Biomedical Ultrasound; Kevin Parker, inventor of the Blue Noise Mask, and Joel Seligman, University President & CEO

NEW FACULTY

Edmund Lalor, Associate Professor, Biomedical Engineering

EDMUND LALOR

"I am extremely excited to be joining the BME department at the University of Rochester. The warm and collegiate atmosphere and the ultra talented students have me impatient to get into the classroom. And the opportunities for rich intra- and inter-departmental collaboration have me acting quickly to move my Dublin-based team over to Rochester and to grow it as we strengthen our research program."

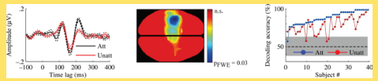
Ed Lalor received the B.E. degree in electronic engineering from University College Dublin, Ireland in 1998 and the M.Sc. degree in electrical engineering from the University of Southern California in 1999. After periods working as a silicon design engineer for a Dublin-based company and a primary school teacher for children with learning difficulties, Ed joined MIT's Media Lab Europe, where he worked from 2002-2005 as a research scientist investigating brain-computer interfacing and attentional mechanisms in the brain. This research led to a PhD in biomedical engineering which was completed through UCD in 2006. Subsequently, he spent 2 years in New York working as a postdoctoral research fellow in the Cognitive Neurophysiology Laboratory at the Nathan Kline Institute for Psychiatric Research and as an adjunct assistant professor in the City College of New York. He returned to a position as a Government of Ireland Postdoctoral Research Fellow based at the Institute of Neuroscience and the Centre for Bioengineering in Trinity College Dublin in 2008. Following a brief stint at University College London's Institute of Ophthalmology, he returned to Trinity College Dublin as an Ussher Assistant Professor in 2011. In 2016, he joined the Departments of Biomedical Engineering and Neuroscience at the University of Rochester as an Associate Professor.

Research in the Lalor lab seeks to explore quantitative modelling approaches to the analysis of sensory electrophysiology in humans. Such a framework has two important advantages over more traditional approaches to this type of research:

1. It enables the examination of the neural processing of natural stimuli such as speech, music and video, thereby facilitating the flexible design of highly naturalistic cognitive neuroscience experiments.

2. It allows for improved spatiotemporal resolution and (accordingly) improved interpretability of non-invasively recorded neuro-electric responses to such naturalistic stimuli.

The Lalor lab seeks not only to develop these modelling approaches, but also to exploit them in tackling a number of specific cognitive and clinical neuroscience questions. In terms of cognition much of this work has focused on how we direct our attention to behaviourally relevant stimuli in our environment. This includes studies on visual spatial attention and more recent work on the cocktail party problem. In addition, the Lalor Lab is interested in how we integrate visual and auditory information when processing natural speech. In terms of clinical research, through collaboration, the Lalor Lab investigates these sensory processing questions in patients with schizophrenia and in children with developmental disorders.



Professor Lalor's team have pioneered approaches for "decoding" electrical brain activity on the scalp to determine which of several speakers a person is paying attention to in near-real time. These approaches open up new possibilities for research on hearing disorders and for the development of novel, neuroengineered hearing-aid solutions.

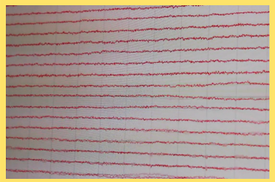
Ross Maddox, Assistant Professor, Biomedical Engineering

ROSS MADDOX

"I've always had a bit of a scientific identity crisis: am I an engineer or am I a neuroscientist? The thing that I found most exciting about coming to UR is that I can be both. I am thrilled to join a community of faculty who are not only leaders in their field, but also highly supportive of each other, newfaculty especially. UR is the perfect place to set up my lab and build fruitful collaborations across the whole campus."

Ross Maddox joined the Departments of Biomedical Engineering and Neuroscience in 2016. He did his postdoctoral training at University of Washington Institute for Learning and Brain Sciences. He earned his PhD and MS in Biomedical Engineering from Boston University, and his BS in Sound Engineering from the University of Michigan–Ann Arbor. Among the awards and honors he has received is the Pathway to Independence Award from the National Institutes of Health (K99/R00). He has published his research in numerous scientific journals, including Current Biology, PLOS Biology, and eLife.

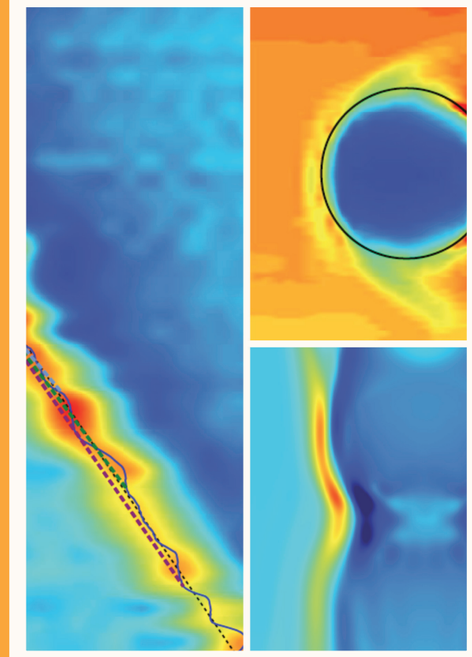
Faced with the cacophony of daily life, the human brain is remarkably adept at focusing on one sound source while tuning out numerous competing others, effortlessly solving the so-called "cocktail party problem." Professor Maddox studies the brain's solutions to this problem. His research has two main thrusts: to investigate how the visual system interacts with the auditory system to improve selective attention under noisy conditions, and to identify and dissociate the neural causes of disabled listening, particularly in people who show no signs of hearing impairment as defined by current audiologic testing. His work combines behavioral studies, electroencephalography recordings of neural activity, and novel applications of signal processing techniques.



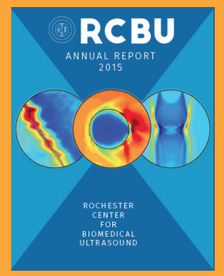
The Maddox Lab will be developing new ways to analyze human brain activity using electroencephalography

RCBU

Rochester Center for Biomedical Ultrasound



The Rochester Center for Biomedical Ultrasound (RCBU) was created at the University of Rochester to unite professionals in engineering, medical, and applied science communities at the University of Rochester, Rochester General Hospital, and the Rochester Institute of Technology. Since its founding in 1986, the RCBU has grown over the years to nearly 100 members, with several visiting scientists from locations around the world. The Center provides a unique collaborative environment where researchers can join together to investigate the use of high frequency sound waves in medical diagnosis and therapy. The Center's mission encompasses research, education and innovation.



Interested in the RCBU?

Contact RCBU Director Diane Dalecki at dalecki@bme.rochester.edu or visit rochester.edu/rcbu/ to learn more and request a copy of the 2015 RCBU Annual Report

Centers within BME

CMTI

Center for Medical Technology & Innovation

The Center for Medical Technology & Innovation offers a one-year masters degree in biomedical engineering specializing in medical device design. The program involves a 2-semester guided process in medical technology innovation and an 8-week clinical immersion program in clinical and surgical settings. One of the program's strengths is its close proximity to Strong Memorial Hospital, the largest hospital in Upstate New York. The CMTI is less than a 5 minute walk from the hospital, making it easy to interact with our clinician colleagues.

What you'll learn:

-Identify and evaluate unmet clinical needs
-Work with surgeons for concept design
-Market and intellectual property assessment
FDA regulatory processes and quality systems
-Design and execute prototype tests
-Prototype clinical needs into scientifically proven concepts

Ready to learn more?

Visit cmti.rochester.edu for more information or to apply. Scholarships are available! Contact our team at cmti.ur.rochester.edu

Braille Reader Team

Kevin McAlpine, Emma Gira, Emily Kwan, Christina Amaral, Matthew Mender

Seventy-two percent of people with diabetes will develop diabetic neuropathy by their mid-fifties. For individuals who are visually impaired and are readers of braille, the onset of severe diabetic neuropathy means they can read neither visually nor tactilely. Our mission is to develop a device that will translate the braille documents of a person with diabetic neuropathy into an audio output. Additionally, we envision this device as an aid to non-braille readers in inclusive educational and workplace environments.

Scolifit

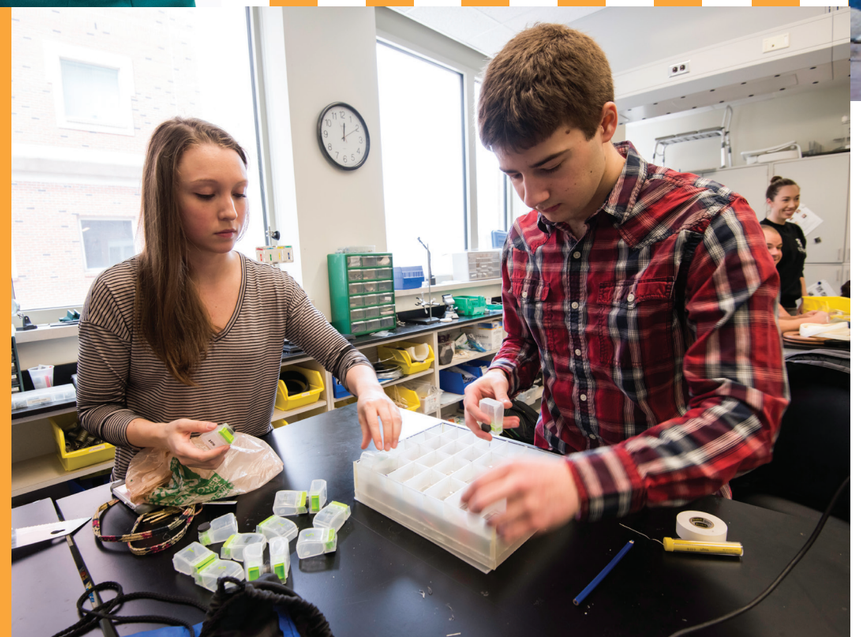
Angela Ryck, Erica Marron, Danielle Wilson

Our mission is to help orthotists create the optimal brace for each patient's unique spinal curvature. ScoliFit is a wearable torso-positioning device designed for use on adolescent idiopathic scoliosis patients. This device can determine the torso position that immediately reduces a given patient's spinal curvature and enables orthotists to incorporate that position into the profile of the patient's final brace. Since the current method of making braces is subjective and has no such capacity for validation, ScoliFit is unique in its ability to establish the optimal brace design before the brace is made.

TouchStream Solutions Medical Management

Bethany Lennox, Rachel Melnyk, Jacob Parisi, Brittany Garrison,Hayley Forrest

Our project addresses the problems identified by TouchStream Solutions with the current medication pillbox for use with their medication scheduling system. The task is to create a medication dispenser integrated with the current scheduling system that can be customized for various medications and customer needs for a range of patients including individuals with mental disabilities and those above the age of 65. This medication dispenser will help to improve customer interaction with the TouchStream system, assist customers and caregivers with the management of daily medications and personal independence, and reduce instances of incorrect or missed medication doses.



DESIGN DAY 2016

BURN Pot Skirt Team

Yejin Jeong, Nikki Sroka, Jessica He, Adam Langenbucher

Due to dangers in deforestation, toxic byproduct emission, and financial strains for families in Kenya, there is a strong demand for pot skirts that can increase fuel efficiency by improving convective heat transfer in cookstoves. Consumers have requested that the pot skirt be adjustable to several pot sizes. In response to these customer needs, we need to create a pot skirt design that is safe, cost effective, fuel efficient, adjustable and to be compatible with the upcoming line of wood-burning BURN cookstoves.

Each year, biomedical engineering students partner with companies and institutions to solve real-world engineering problems through developing prototype medical devices and research instruments. We celebrate the culmination of our students' engineering education by hosting Design Day, wherein they present their projects. Both undergraduate seniors and graduate students enrolled in the Center for Medical Technology & Innovation masters program participate. Some examples of this year's student projects are illustrated in these pages. We are grateful to our industry partners and collaborators for the opportunity to address their challenges. Their dedication to improving health care have inspired our students to apply, develop and demonstrate their creative talents and engineering expertise. For more information on a specific project, please contact Amy Lerner at amy.lerner@rochester.edu. For a full list of projects, visit our website at bme.rochester.edu/senior-design/

STUDENT FELLOWSHIPS & SCHOLARSHIPS

Jomy Varghese awarded NCI Fellowship Grant

Jomy Varghese, a Ph.D. candidate in the lab of Danielle Benoit, was awarded a Ruth L. Kirschstein NRSA Individual Predoctoral Fellowship (F30) from the National Cancer Institute (NCI) for his project titled "Engineered Nanoparticles to Radioprotect Salivary Tissue". Head and neck cancers comprise 6% of malignancies diagnoses annually, affecting 40,000 in the US and over 550,000 patients worldwide, who will then go on to receive radiotherapy. Radiation-induced xerostomia (dry mouth) carries a significant risk for subsequent life threatening pathology and profoundly diminished quality of life by interfering with patients' ability to eat and sleep. This project proposed to develop novel nanoparticle platforms for radioprotection, via localized, controlled delivery of siRNA and antioxidant strategies, that have the potential to prevent xerostomia.

Christopher Farrar awarded NRSA Fellowship Grant

Christopher Farrar, a Ph.D. candidate in the lab of Professor Denise Hocking, has been awarded a Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (F31) from the National Heart, Lung, and Blood Institute for his project entitled "Influence of extracellular matrix fibronectin on platelet-derived growth factor (PDGF) signaling". PDGF is produced by a variety of different cell types and stimulates mesenchymal cell proliferation, migration, and gene expression. Together with fibronectin, PDGF plays an important role in angiogenesis and wound repair. In contrast, excess PDGF and abnormal fibronectin matrix deposition are linked to several diseases, including pulmonary fibrosis, atherosclerosis, and certain cancers. The focus of Chris' project is to determine how mesenchymal cell adhesion to extracellular matrix fibronectin fibrils influences the ability of these cells to respond to PDGF, with the long-term goal of developing new treatment approaches to effectively regulate the sensitivity of cells to growth factor stimulation.

Manuel Ramirez Garcia selected as a 2016 Fight for Sight Summer Student Fellowship recipient

Manuel Ramirez Garcia, a Ph.D. candidate the lab of Mark Buckley, was awarded a summer fellowship from the Fight for Sight Foundation. The goal of Fight for Sight is to encourage and facilitate research in detection, understanding, prevention, treatment and cures of visual disorders, especially those diseases leading to impaired sight or blindness. Manuel received the fellowship for his proposal titled " Role of the Mechanical Environment in Determining Corneal Endothelial Cell Viability." The goal of Fight for Sight is to encourage and facilitate research in detection, understanding, prevention, treatment and cures of visual disorders, especially those diseases leading to impaired sight or blindness.

Ninoshka Fernandes receives Donald M. and Janet C. Barnard Fellowship

Ninoshka Fernandes, a Ph.D candidate co-advised by Professors Deborah Fowell and Edward Brown, received a Donald M. and Janet C. Barnard Fellowship from the College of Arts, Science and Engineering. These fellowships recognize outstanding achievement by Ph.D. students in engineering and science, as evidenced through their coursework and their dissertation research work. In addition to her research, Fernandes has contributed to our educational mission in several capacities, including serving as a tutor for calculus and chemistry, contributing to the Early Connection Opportunity program through the Office of Minority Student Affairs, and developing a new BME workshop for students for BME students in introductory physics courses. "Ninoshka stands out in our department as an outstanding citizen, promising educator and an excellent scientist," says Amy Lerner, associate professor of biomedical engineering.

Nicholas Boldt receives two scholarships to study abroad in Japan

Nicholas Boldt (class 2018) was recently awarded two scholarships to study abroad in Osaka, Japan during the 2016 summer through CET Academic Programs. The Intensive Japanese Language Program included language classes, living with a local roommate and attending various cultural activities. Nicholas received both a Benjamin A. Gilman International Scholarship and a Freeman Asia Grant. The Benjamin A. Gilman International Scholarship Program offers grants for undergraduate students to pursue academic studies or credit-bearing, career-oriented internships abroad. Freeman-ASIA (Freeman Awards for Study in Asia) is designed to support U.S.-based undergraduates to study overseas in East or Southeast Asia. The program aims to increase the number of U.S. citizens and permanent residents with first-hand exposure to, and understanding of Asia, and its peoples and cultures.

STUDENT AWARDS AND HONORS

Alex Kotelsky wins 2016 Curtis Award for Excellence in Teaching by a Graduate Student

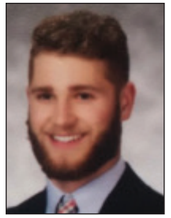
Alexander Kotelsky, Ph.D. candidate in the lab of Mark Buckley, was the recipient of a 2016 Edward Peck Curtis Award for Excellence in Teaching by a Graduate Student. "Alex is more committed and skilled in undergraduate instruction than any graduate student I have come across throughout my career," Professor Buckley said in a nomination letter. Alex has demonstrated true dedication to undergraduate education. A few highlights of Alex's involvement include his educational research in novel teaching strategies for undergraduate engineering courses as a Teaching as Research Fellow, his extensive tutoring through the David T. Kearns Center and the Center for Excellence in Teaching and Learning (CETL), his informal tutoring of undergraduates in the Buckley Lab, his work as a physics workshop leader for undergraduates in the BME department, and his excellent work as a teaching assistant (TA) for three semesters in upper-level undergraduate BME courses. His passion for teaching and mentoring is nicely summed up by the praise of an undergraduate whom he tutored: "I was able to pull up my GPA thanks to Alex's unconditional support. I highly respect his dedication and hard work--he is my role model."

Jonathan Langdon wins Outstanding Dissertation Award for Engineering

Jonathan Langdon, Ph.D. candidate in the lab of Stephen McAleavey Lab, received the prestigious Outstanding Dissertation Award for Engineering this year. This honor attests to Jonathan's exceptional work in the field of biomedical ultrasound. Jonathan's thesis was titled, "Development of Single Track Location Shear Wave Viscoelasticity Imaging for Real-Time Characterization of Biological Tissues." "Jonathan was an outstanding PhD student in our biomedical engineering program," said Biomedical Engineering Chair Diane Dalecki. "His dissertation research made significant advances in new ultrasound elastography technologies for measuring and visualizing viscoleastic properties of tissues. I am delighted to see Jonathan's work recognized with this award."

Omar Soufan receives Social Entrepreneurship Award

Omar Soufan (Class 2017) was a recipient of a Student Life Award, sponsored by the Office of the Dean of Students in recognition of undergraduate students who have significantly and positively impacted the University or the surrounding community through service to others, investment of talent and time, and pursuit of excellence. Soufran received the Social Entrepreneurship Award, which is given to a student or group of students who have pursued an innovative idea with the potential to enhance community or to address a pervasive community issue, on or off campus. Soufran and Ibrahim Mohamad (Mech Eng) organized a rehabilitation center in Lebanon, sponsored by the Syrian American Medical Society, that tends to wounded Syrian refugees.



Ryan Bowen recognized among top freshmen

Ryan Bowen (Class 2018) was awarded the Iota Book Award. This honor recognizes the top students among the previous year's freshmen. Criteria for selection include scholarly achievement, humanistic values, co-curricular activity, and leadership potential.

BME graduate students place second and third in Falling Walls Competition

Sara Nowacki, a Ph.D. candidate in the Awad Lab, won second place in the University of Rochester's Falling Walls Competition for describing how teriparatide, integrated into matrices, can improve cartilage regeneration. Karl Smith, a Ph.D. student in the McGrath, Lab, placed third for describing his use of physics to make water behind a filter form a mixer vortex, reducing the difficulty of normal stirring when fluids stick to surfaces. A total of 19 presenters competed. The competition is associated with the Falling Walls foundation, a non-profit organization that fosters discussions on research and innovation and promotes the latest scientific findings to society.

NATIONAL INSTITUTES OF HEALTH (NIH) AWARDS
Margaret Thomas-Freeberg (Awad Lab) received support for her research from the T32 grant administered through the Center for Musculoskeletal Research.

Sara Nowacki (Awad Lab) received support for her research from the T32 grant administered through the Center for Musculoskeletal Research.

AMERICAN HEART ASSOCIATION (AHA) AWARD
Eric Comeau (Dalecki and Hocking Lab) received a pre-doctoral felowship for the AHA for his project titled, "Ultrasound standing wave field technologies for cell patterning and microvessel network formation in vitro and in situ."

DEAN'S FELLOWS
Sarah Wayson
Marian Ackun-Farmmer

PROVOST FELLOW
Raul Rodriguez

GRADUATE STUDENT TA AWARD
Manuel Ramirez Garcia (BME283)
Ryan Trombetta (BME283)

OUTSTANDING BME THESIS AWARD
Drew Scoles

SERVICE AWARD
Raul Rodriguez

OUTSTANDING DISSERTATION AWARD FOR ENGINEERING
Jonathan Langdon

STUDENT HONORS AND AWARDS CONTINUED

Two BME teams tie for 2nd place at Forbes Competition

Two groups of BME seniors tied for second place in the Charles and Janet Forbes Entrepreneurial Competition this year. Scoliosis Brace Compliance, presented by Samuel Perakis and Marlen Mahendraratnam, aims to increase patient compliance, and thereby bracing efficacy, for adolescents with scoliosis. AnesthEz, presented by Syed Reefat Aziz and Rose Mbaye, seeks to improve the efficiency of nerve block procedures through a foot controlled syringe pump. The Forbes Entrepreneurial Award was established in 1989. Charles Forbes was motivated by his belief that engineers, with an appreciation of the business aspects of new ventures, can contribute significantly to a much needed increase in manufacturing and production-oriented industry in the United States.

2nd place (tie): Samuel Perakis and Marlen Mahendraratnam of Scoliosis Brace Compliance with Vice Provost for Entrepreneurship Dr. Duncan Moore and judge Ann Forbes.

2nd place (tie): Syed Reefat Aziz and Rose Mbaye of AnesthEZ with Vice Provost for Entrepreneurship Dr. Duncan Moore and judge Ann Forbes.

CMTI students win 2nd place in Mark Ain Business Model Competition

A team of BME CMTI graduate students and TEAM graduate students, Martin Gitomer and Shwe Pyie, took second place at the 10th Annual Mark Ain Business Model Competition. The consisted of Martin Gitomer (CMTI), Shwe Pyie (CMTI), Alin Ponici (TEAM, and BME alumnus) and Jia Shi (TEAM). The students presented Stimsense, a medical device that objectively quantifies depth of anesthesia throughout surgery to guide proper dosing, reduce post-operative complications and achieve better patient recoveries. The Mark Ain Business Model Workshop Series and Competition is supported by UR Simon School of Business alumnus and entrepreneur, Mark S. Ain '67, founder of Kronos Incorporated, the Chelmsford, Massachusetts-based market leader in the workforce management industry.

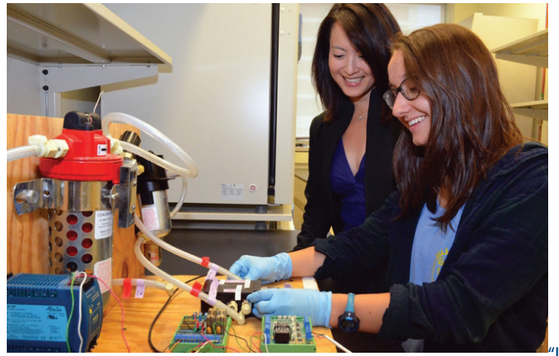
Angela Ryck wins America's Got Regulatory Science Talent Competition

Angela Ryck, a graduate of the Center for Medical Technology and Innovation biomedical engineering masters program, was the winner of the University of Rochester's 3rd Annual America's Got Regulatory Science Talent Student Competition. This competition is one of several Regulatory Science educational initiatives developed by the Clinical and Translational Science Institute. It requires students to propose innovative solutions to Regulatory Science challenges within scientific priority areas that FDA has identified in its Strategic Plan for Advancing Regulatory Science. After winning the local completion at the University of Rochester, Angela traveled to the FDA in Maryland, met with winners from the University of Maryland competition and presented her proposed "Emergency Situation Communication and Preparedness Evaluation" to the Acting FDA Commissioner and others at the FDA.

Matt Mender named Academic All-American

Matt Mender (Class 2016) was elected to the 2015 CoSIDA Academic All-America Division III Football Team by members of the College Sports Information Directors of America. This is the second consecutive Academic All-America honor for Mender, a defensive tackle from Glens Falls, NY. He was a Second Team honoree in 2014 – and the only player from a New York State college chosen to the Division III team. This year, he earned a spot on the First Team.

Xerox fellows: 'Learning by doing is always the most valuable'



From left to right: Professor Catherine K.Kuo and Xerox Fellow Breanna O'Reilly

"I have learned more from a week of being in this lab than I probably could have in a semester of classes," says Xerox fellow Breanna O'Reilly, a rising senior in biomedical engineering who is working with Associate Professor Catherine K. Kuo. "Learning by doing is always the most valuable."

Breanna is one of several BME undergraduates who are gaining more research experience this summer through participating in the Xerox Engineering Research Fellows program, administered by the David T. Kearns Center for Leadership and Diversity in collaboration with the Hajim School and Xerox Corp. This year's student participants are Kwasi Nimako (mentor: Prof. Wendi Heinzelman) Sue Zhang (mentor: Prof. Danielle Benoit), Stephanie Kamau (mentor: Prof. Mark Buckley), Amanda Smith (mentor: Prof. Diane Dalecki) and Breanna O'Reilly (mentor: Prof. Catherine K. Kuo).

Kuo's lab studies embryonic tissue, specifically how it can be used as a model for growing tendon replacement tissue in a bioreactor. Tendons are composed primarily of fibers of collagen protein. Actual tendon cells and blood vessels are scattered in such small numbers along these fibers that it is difficult for damaged tendons to heal properly -- hence the interest in cultivating replacement tissue. Part of O'Reilly's work this summer is helping set up a bioreactor that is custom built by the Kuo lab.

Xerox fellows also had opportunities to do some mentoring of their own. This summer, Xerox fellows interacted with high school students participating in an Upward Bound precollege program. At a kick-off event and subsequent weekly breakfast meetings, fellows described their projects, answered questions and, in turn, listened to the high school students share their own dreams.

UNIVERSITY OF ROCHESTER NEWS

University of Rochester Makes Best Biomedical Engineering Schools List According to Student Reviews

We're honored to have landed a spot on the Graduate Programs Fall 2015 Rankings of Top Biomedical Engineering Graduate Programs! This list highlights the best graduate programs in the country in a variety of fields based solely on ratings and reviews from current or **recent graduate** students posted on graduateprograms.com. It encompasses reviews posted by more than 75,000 students participating in over 1,600 graduate programs nationwide.

Vice President Biden, Governor Cuomo announce that Rochester will be headquarters for nation's newest manufacturing innovation hub

At a press conference in Greece, NY, Vice President Joe Biden announces the new national institute to advance U.S. photonics manufacturing capability will be headquartered in Rochester.

Total Funding for New Photonics Institute Will Exceed $600 Million

The University of Rochester is a key partner in a consortium that has won a national competition to advance U.S. photonics manufacturing capability. The new American Institute for Manufacturing Integrated Photonics (AIM Photonics) will be headquartered in Rochester, New York, and will bring the nation's leading talent from companies, universities, and federal research institutions together under one entity to develop the next generation of integrated photonics and deliver global manufacturing leadership.

"This is historic," said University of Rochester President and CEO Joel Seligman. "AIM Photonics will provide and empower the absolute best talent, sustainable relationships and infrastructure required to capture and sustain U.S. global leadership in this critical industry. As the headquarters for this new institute, Rochester is uniquely positioned to support this growth. Now, together with our partners, our work truly begins."

Integrated photonics – devices that bring together multiple optics-based functions, often on an integrated circuit – is expected to revolutionize the carrying capacity of Internet networks, enhance medical technology and improve imaging-sensing capabilities for national defense and security. The U.S. has been a world leader in developing photonics technology for the past century. Defense applications and technologies encompass night vision systems, satellite surveillance systems, infrared, flexible displays, sensors, detectors, data communications, and lasers.

In October 2014, President Barack Obama announced that the Department of Defense, through the Air Force Research Laboratory, would take the lead in the creation of an Integrated Photonics Institute for Manufacturing Innovation, committing $110 million to the project. AIM Photonics will be part of the federal National Network of Manufacturing Innovation proposed by President Obama to "create a competitive, effective, and sustainable manufacturing research-to-manufacturing infrastructure for U.S. industry and academia to solve industry-relevant problems."

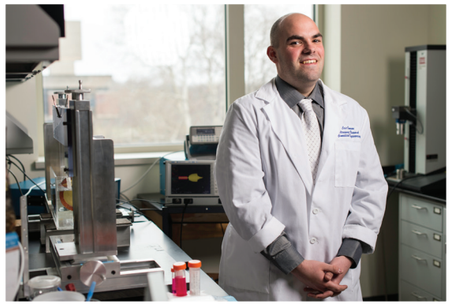
Rochester is home to the oldest and largest hub for photonics manufacturing in the U.S. and has successfully competed for three other federal advanced manufacturing jobs programs. All of these awards were based on the region's strengths in photonics. In particular, the AMTech program awarded to the University of Rochester provides funding to develop a roadmap for the U.S. photonics industry and for developing a strategy to expand photonics manufacturing in New York State. Rochester was chosen by the AIM Photonics team to be the hub for the effort, in part, because of its historical strengths and for its ability to provide a total solution to help advance technologies important to national security and make manufacturers more globally competitive.

GRADUATE STUDENT SPOTLIGHTS

Eric Comeau

PhD Candidate | Hometown: Canton, CT | Anticipated Graduation Year: 2016
Research: Developing ultrasound-induced cell and particle patterning techniques for tissue engineering and regenerative medicine applications.

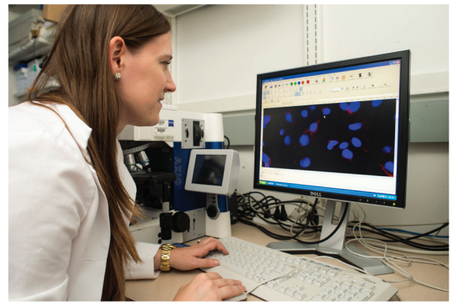
"The biggest factor that drew me to the U of R was its collaborative nature. Many students are co-advised, and there is no competition among students or faculty. Everyone is willing to help regardless of research area, and that's not something I observed at any other university I visited . I chose to be co-advised by Dr. Dalecki and Dr. Hocking. Their combined expertise in biomedical ultrasound and cell biology has given me the opportunity to undertake a very multi-disciplinary thesis project."



Maggie Thomas-Freeberg

PhD Candidate | Hometown: Brighton, NY | Anticipated Graduation Year: 2017
Research: Development of treatments for scarless healing of flexor tendon injuries. Designing nanoparticle-mediated siRNA therapeutics to promote more regenerative healing.

"The faculty here foster a collaborative environment so whenever you hit a challenge in your research, you have many opportunities to seek help, not just from your advisor but a number of other faculty, so you never really hit a dead end. I have enjoyed the culture the graduate students have created at the university-we are not all here to just get our degree and get out. There's a healthy work-life balance and I've made friendships that will last a lifetime."



Alumni Updates

SEAN VIRGILE

BS, 2010

Current position

Co-Founder, Diagnostic anSERS Inc. We're a spin-out from the University of Maryland commercializing a chemical sensing platform, starting with forensics and a "Marijuana Breathalyzer" to detect impaired drivers.

Why UR?

When I toured campus in the summer, I visited the BME department to ask about the program. It was the caring and support of Dottie Welch (who was dressed as a clown!) and the professors I met that showed how much UR really wants its students not only to succeed but become leaders once we graduate. This drive and ambition was present among all of the students from my first day and is still there.

Favorite UR memory

The picturesque moments. I'll never forget that time I was walking back from the library, in the snow, and hearing the bells play the Harry Potter theme.

Advice for current/future students:

Internships! Spend your summers trying out new things to figure out what you do and do not like to do.

Goals for the next 5-10 years

Leading Diagnostic anSERS to the next level. While starting with marijuana-impaired driving, we see much broader applications capable of impacting everyone every single day.

Hobbies

Swimming, museums, and theater. Being in the DC area, there's an abundance of cultural events, from Embassy Week to the Smithsonians to Shakespeare. Get a guided tour of the Kennedy Center. The art and history is amazing!

ERIN KEEGAN

BS, 2013; MS, 2014 (CMTI)

Current position

Lead Reviewer, Division of Neurological and Physical Medicine at the U.S. Food and Drug Administration. The most rewarding part of my job is helping start-up companies or companies with very novel devices navigate the regulatory process. I also love that I get to use my expertise in biomedical engineering to critically review test plans and data from nonclinical and clinical studies to ensure safe and effective neurological devices reach the American people.

Why UR?

As an undergraduate, I was drawn to the idea of designing my own "clusters" as opposed to putting a check box next to general education requirements. I also liked the overall feel of the campus and the small size student body with large size resource opportunities. For graduate school, the choice to stay was easy. I had already had first-hand experience of the high quality education and the vibrant campus life and didn't want to leave! The CMTI program also gave me more of the device design and clinical experience that I was looking for after my undergraduate senior design course.

From left to right: Connor Virgile (brother, UR BME '19), Sean Virgile, (UR BME '10),Chelsea Virgile (sister UR BME '12)

Advice for current/future students

Try to ensure that you are applying your education in some way – be that a club (Engineers Without Borders plug), research opportunity, company, what have you. I think it's so easy to get weighed down by problem sets, exams, and papers that you forget that you are learning information that is relevant to the "real world" and you can really make a difference right now.

Words to live by

Maybe there is some UR "Meliora" influence but I love the quote: audentes Fortuna iuvat, The Latin translation I prefer is "Fortune favors the brave". My translation is - never be afraid to ask, try, or fail!

Hobbies

Traveling, eating delicious food that my boyfriend cooks (also UR alum, Duncan Weals!), ballet dancing, reading, hiking and enjoying nature, rooting for the Buffalo Bills

GAUTHAM HONNAVARA SRINIVASAN

MS, 2014

Gauthum pictured with brother Viny Honnavara and sister-in-law Pushpa at Yellowstone National Park

Current position

I'm a software engineer at SAIC/USPTO focused on processing large volumes of data and performing analytics using Java and other software tools. The most rewarding part of my job is coding and getting to learn new things every day.

Why UR?

The UR BME program offered a great variety of courses that I was interested in. But the one thing that stood out and strongly influenced my decision to choose UR was the guidance from the Rochester Indian Association and my student coordinator Donna Porcelli. Being an international student, I had a ton of doubts about a lot of different things. Donna and RIA were extremely supportive throughout the admission process and guided me in the right direction. I also received a great scholarship that ultimately sealed the deal.

Favorite UR memory

My most memorable moments were with my roommates and friends from RIA. We met up to watch movies, play games and participate in organized events such as Diwali and Holi, which really enriched my experience.

Degrees awarded

Dear BME Alumni,

Whether it's been a long time since BME 101 or just a few short years, I would be delighted to hear from you. Please keep me posted on all your successes!

Best,

Diane Dalecki,
Chair of BME
dalecki@bme.rochester.edu

For more information on applying to one of our graduate programs, please contact Graduate Program Coordinator Donna Porcelli at donna.porcelli@rochester.edu or 585.275.3891. To learn more about biomedical engineering at the University of Rochester, visit www.bme.rochester.edu and follow us on Facebook.

MS

October 2015

Seth Anderson
Lisa Benison
Ryan Blank
Deborah Cooper
Ying-Ju Chu
Nathan Couper
Jayne Gavrity
Laura Hobbs
Kevin Howard
Courtney Kodweis
Heng Li
Dana Phelan
Chad Pickering
Kierstan Ryan
Megan Stockdill
Benjamin Vespone

March 2016

Anas Abidin
Chun Mei Chen
Langchen Fan
Wen Huang
Zejin Li
Raul Rodriguez
Jonathan Stone

May 2016

Zoe Guengerich

PhD

August 2015

Youssef Farhat
"Identification of PAI-1 as a Biological Target for the Promotion of Scarless Flexor Tendon Healing"

October 2015

Adam Bosen
"Visual Capture and Recalibration of Auditory Spatial Perception"

William Okech
"Mechanosignaling from Extracellular Matrix Fibronectin Mediates Endothelial Cell Responses to Flow"

Supriya Ravichandran
"Discovery and Characterization of Antibodies that Bind Nanoparticles"

Drew Scoles
"Expanding the Applications of Adaptive Optics Scanning Light Ophthalmoscopy"

March 2016

Jonathan Langdon
"Development of Single Track Location Shear Wave Viscoelasticity Imaging for Real-Time Characterization of Biological Tissues"

May 2016

Andrew Law
"Brain-Computer Interface Control with Small Motor Cortex Ensembles"

Samreen Jatana
"Immunomodulatory Effects of Nanoparticles in a Mouse Model of Skin Allergy"

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