

DEPARTMENT OF
BIOMEDICAL
ENGINEERING
AT THE UNIVERSITY
OF ROCHESTER

FALL 2018



UNIVERSITY of
ROCHESTER

UR BME MISSION

DISCOVER, CREATE, AND
EDUCATE TO ENGINEER
EVER BETTER SOLUTIONS IN
BIOMEDICAL RESEARCH
AND HEALTHCARE

on the cover

about this publication

This magazine is an annual publication of the Department of Biomedical Engineering at the University of Rochester. For questions or comments about this issue, or to request a hard copy, please email Diane Dalecki at dalecki@bme.rochester.edu.

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research areas & affiliations

research areas

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

bme-affiliated research centers & institutes

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

Elsie Fan, a senior PhD candidate in the lab of Laurel Carney, the Marylou Ingram Professor of Biomedical Engineering, assembles an electrode used in her research in auditory processing of complex sounds.



BME Chair Diane Dalecki (left) mentors Holly Coleman (right), a student at Missouri University of Science and Technology, as part of the NSF-sponsored REU summer research program titled "Advancing Human Health, from Nano to Network" at the University of Rochester.

message from the chair

As 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 achievements of our BME students, faculty, and staff. This year our BME faculty members had outstanding success in securing new funding for their research laboratories. Their successes include new grants from the NIH, NSF, and other agencies on BME topics including salivary gland engineering, nanoporous membranes for cancer detection and hemodialysis, tendon biomechanics and mechanobiology, multisensory processing and neuroengineering, biomedical ultrasound for tissue engineering and regenerative medicine, therapeutic biomaterials, and other exciting topics (pages 7-10). Additionally, many of our faculty have developed productive industry partnerships to translate their research advances to commercial products and clinical practice.

I am particularly delighted to introduce our three newest Assistant Professors in the Department of Biomedical Engineering, Michael Giacomelli, Kanika Vats, and Whasil Lee (page 11). These outstanding new faculty members add to our strength in biomedical optics, cellular mechanics and mechanotransduction, and tissue engineering, and will also provide new educational opportunities for our students.

Our talented BME undergraduate and graduate students continue to garner numerous awards and honors (pages 16-19). BME students have been recipients of new fellowships, won design and entrepreneurial competitions, and have been recognized with additional awards and honors. The new National Academy of Engineering Grand Challenges Scholar Program in the Hajim School of Engineering and Applied Science is providing our BME students with exciting opportunities to expand their educational experiences (page 14). Be sure to also review some of our BME students' projects that were presented at the Hajim School Design Day (page 20).

I'm also delighted to share with you some outstanding honors of our faculty and staff (pages 5 & 13). Special congratulations are in order for Taimi Marple, our BME Undergraduate Coordinator. Taimi was this year's recipient of the Dottie Welch Student Enrichment Award in recognition of her outstanding dedication to our undergraduate students and program. Laurel Carney received the Edmund A. Hajim Outstanding Faculty Award, and Danielle Benoit was presented a Distinguished Alumni Award from the University of Maine. 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



faculty awards

PROFESSOR SCOTT SEIDMAN RECEIVES WADSWORTH C. SYKES ENGINEERING FACULTY AWARD

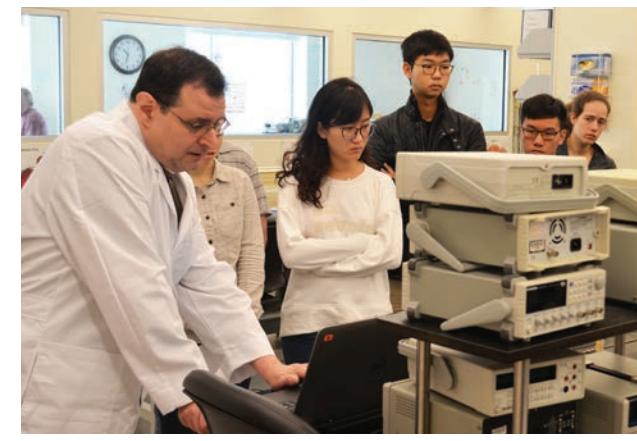
Congratulations to Professor Seidman who received the Wadsworth C. Sykes Engineering Faculty Award from the University of Rochester Hajim School of Engineering and Applied Sciences. The award enabled Professor Seidman to develop a new online course titled "Interfacing with Microcontrollers."



Laurel Carney, the Marylou Ingram Professor of Biomedical Engineering

PROFESSOR BENOIT RECEIVES UNIVERSITY OF MAINE FRANCIS CROWE ENGINEERING DISTINGUISHED ALUMNI AWARD

Professor Danielle Benoit was presented with the 2018 University of Maine Francis Crowe Engineering Distinguished Alumni Award during the University of Maine's graduation ceremonies on May 12. The award, presented by Hermant P. Pendse, chair of chemical and biomedical engineering and Dana N. Humphrey, dean of the college of engineering, recognizes outstanding service to the field of engineering. As a distinguished member of the Francis Crowe Society, Professor Benoit will now be known as Distinguished Engineer Danielle S.W. Benoit, Ph.D., '02.



Professor Scott Seidman (left) teaching BME undergraduate students

PROFESSOR LAUREL CARNEY RECEIVES HAJIM OUTSTANDING FACULTY AWARD

Congratulations to Professor Laurel Carney, the Marylou Ingram Professor of Biomedical Engineering, who received this year's Edmund A. Hajim Outstanding Faculty Award. Laurel is a world renowned expert in auditory processing systems. She has been recognized widely for her research achievements through election as a Fellow of the Acoustical Society of America (ASA), as Fellow of the American Institute for Medical and Biological Engineering (AIMBE), and with the William and Christine Hartmann Prize for Auditory Neuroscience, one of the highest honors awarded by the ASA. Her work in the field of auditory systems and signal processing is prolific and internationally recognized by both the engineering and neuroscience communities. Professor Carney is also an outstanding educator. At the University of Rochester she has been honored as the Professor of the Year in Engineering twice, and as the BME Faculty Member of the Year four times. Professor Carney is an incredibly valuable mentor to both her students and to our BME faculty. She is simply a fantastic BME faculty member and a treasured member of our university!



Professor Benoit (middle) receiving the award alongside Prof. Hemant Pendse (left) and Dean Dana Humphrey (right)

new patents



US Patent
9,899,212

Methods for depositing a monolayer on a substrate

University of Rochester

● Inventors: Alexander Shestopalov, James McGrath, Xunzhi Li

● Issued February 20, 2018



US Patent
9,949,950

Compositions and methods for controlled localized delivery of bone forming therapeutic agents

University of Rochester

● Inventors: Danielle Benoit, Edward Puzas, Maureen Newman, Tzong-Jen Sheu

● Issued April 12, 2018



European Patent
2,349,328

Protecting and repairing cartilage and musculoskeletal soft tissues

University of Rochester

● Inventors: Randy Rosier, Michael Zuscik, Susan Bukata, Edward Puzas, Hani Awad

● Issued May 30, 2018

funding news

For information on how to support the research of our BME faculty, please contact Derek Swanson at derek.swanson@rochester.edu or 585.273.1341



Professor Jim McGrath
Nanomembrane Capture and Characterization of Cancer-Derived Exosomes in Urine
Sponsor: U.S. Department of Defense

This project will develop a novel nanomembrane technology for non-invasive analysis of urine to enable rapid and sensitive diagnosis of bladder cancer.



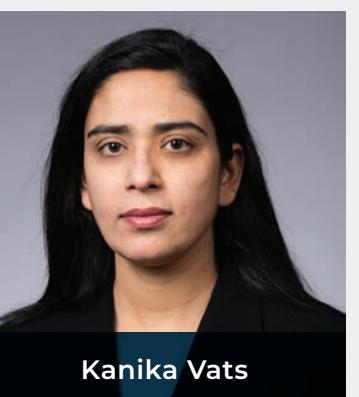
Professor Edmund Lalor
Natural Audiovisual Speech Encoding in the Early Stages of the Human Cortical Hierarchy
Sponsor: National Institutes of Health (NIH)

This project will employ new approaches for studying natural audiovisual speech integration in the healthy human brain in order to gain insight on how brains combine speech information from vision and sound, with a view to informing future clinical research in several patient populations.

new appointments



Dean Johnson



Kanika Vats



Richard Waugh

Dean Johnson was promoted to Scientist in the BME department. Dean's research is dedicated to advancing silicon nanomembranes for innovative biomedical applications.

Kanika Vats was promoted to Assistant Professor (Instruction) of Biomedical Engineering. See page 11 for more on Professor Vats' teaching and research expertise.

Rick Waugh was named the Vice Provost and Associate Vice President for Research at the University of Rochester.



Professor Diane Dalecki and Professor Denise C. Hocking
Fibronectin Mimetics and Synergistic Ultrasound Therapy for Wound Healing in Aging
Sponsor: National Institutes of Health (NIH)

The goals of this project are to advance our pre-clinical fibronectin matrix mimetics to the treatment of chronic dermal ulcers associated with aging, to use information obtained from these studies to identify mechanisms of extracellular matrix remodeling that become dysregulated with age, and to identify synergistic actions of fibronectin matrix mimetics with adjuvant wound therapies, specifically therapeutic ultrasound.



Professor Danielle Benoit
Endothelial Cell Signaling in Regeneration
Sponsor: National Institutes of Health (NIH)

This work investigates the role of endothelial cells in salivary gland regeneration, delineating both signaling and functional aspects.



Professor Catherine K. Kuo
Tendon Tissue Engineering Informed by Lysyl Oxidase Regulation of Embryonic Tendon Mechanical Properties
Sponsor: National Institutes of Health (NIH)

This project will investigate the role of lysyl oxidase (LOX) in regulating tendon mechanical property development. The goal is to develop novel LOX-based strategies with stem cells to promote healing of injured tendons.

funding news cont.



Professor Greg Gdowski

Optimizing and Validating an EMG-Based Fetal Monitor to Identify True Preterm Labor

Sponsor: Sponsor: PreTel, Inc.

This project will advance a new method of fetal monitoring based on novel sensors for electromyography.



Professor Jim McGrath

Nanomembranes for Cancer Detection and Surveillance

Sponsor: National Science Foundation, NSF-I-CORPS

This project will evaluate the commercial value of nanomembrane technology developed at the University of Rochester for the purification of nanoscale vesicles called exosomes from raw biofluids.



Professor Edmund Lalor

Early Visual Processing Deficits in Schizophrenia: Investigating the Two-stream Hypothesis

Sponsor: Brain & Behavior Research Foundation

This project seeks to investigate the sensitivity and specificity of two novel EEG methods that index visual processing with a higher degree of precision and control than traditional approaches.



Professor Diane Dalecki

High-Frequency Quantitative Ultrasound Systems for Tissue Engineering

Sponsor: CEIS/NYSTAR and Imaginant, Inc.

The overall goal of this project is to develop and implement quantitative ultrasound systems for non-invasive, non-destructive characterization of engineered tissue constructs.



Professor Jim McGrath

Database of Fluid Flow in Nanomembrane-Based Microdevices

Sponsor: Health Sciences Center for Computational Innovation (HSCI)

This project seeks to build a database of computational 3D flow profiles for microfluidic devices featuring the McGrath laboratory's silicon nanomembranes.



Dean Johnson (Scientist)

In Vitro Testing Platform for the Fresenius Medical Care 2008T and Small Format

Nanomembrane-Based Hemodializers

Sponsor: Fresenius Medical Care, Inc.

This grant will enable the development of a benchtop device for testing hemodialysis devices. The project will design, build, and test an in vitro model of the concentration of middle-weight molecules in the intravascular fluid volume (blood) and arteriovenous fistula access for hemodialysis that can be used to test hemodialysis devices.



Professor Danielle Benoit

Synergistic Agents to Normalize the Marrow Niche and Potentiate AML Cytotoxic Agents

Sponsor: UR Ventures

Data from this study will provide initial assessments of the therapeutic potential of a new, synergistic treatment based on bone marrow-directed delivery of marrow priming agents and AML cell-targeting cytotoxic agents.



Professor Anne Luebke and Professor Ross Maddox

NeuroDataRR. Collaborative Research: Testing the Relationship Between Musical Training and Enhanced Neural Coding and Perception in Noise

Sponsor: National Science Foundation (NSF)

This project will determine whether formal musical training is associated with enhanced neural processing and perception of sounds, including speech in noisy backgrounds. The collaborative project involves several universities: University of Minnesota, Purdue University, Carnegie Mellon University, Boston University, University of Western Ontario, and the University of Rochester.



Professor Diane Dalecki and Professor Denise C. Hocking

Developing Acoustic Patterning for Neuroengineering

Sponsor: National Institutes of Health (NIH)

The overall goal of this project is to build and test the functionality of ultrasound standing wave field exposure systems to spatially pattern neural cells within 3D hydrogels, and to identify acoustic patterning parameters that promote neural cell viability, control neural network morphology, and enhance neuronal activity.



Professor Amy Lerner

Defining and Modeling LIRIC Writing Modalities

Sponsor: CEIS NYSTAR and Clerio Vision

Laser Induced Refractive Index Change (LIRIC) can change the refractive index to produce gradient index optical corrections, and can also subtly alter cornea shape, providing a potential second modality for producing optical corrections. This project will continue and extend current research on LIRIC to better define, model, and control the process.

funding news cont.



Professor Anne Luebke

CGRP's Effect on Hearing and Balance in a Mouse Model of Migraine

Sponsor: National Institutes of Health (NIH)

The goal of this study is to establish a mouse model for vestibular migraine that will allow development and testing of new drug treatments.



Professor Jim McGrath

Isoporous Silicon Nanomembranes for Purification of Therapeutic Viruses

Sponsor: SimPore, Inc.

This proposal examines the ability of 0.2 microlit membranes to serve as filters in the final stage of production for therapeutic viruses. The project will include simulation and modeling of flow, sieving and mechanics.



Professor Diane Dalecki

Ultra-High-Frequency Ultrasound Transducer Manufacturing for Biomedical Markets

Sponsor: Jeff Lawrence Manufacturing Innovation Fund

This project will develop ultra-high-frequency ultrasound transducers, and novel manufacturing processes, for biomedical engineering and biotechnology markets.



Professor Edmund Lalor

Indexing the Dynamic Encoding of Natural Speech at the Semantic Level

Sponsor: Schmitt Program on Integrative Neuroscience (SPIN)

This project aims to develop an inexpensive, interpretable, and easily acquired neurophysiological measure of the semantic processing of natural speech. Such a measure could have significant impact on research on language development in healthy infants, as well as in children with intellectual and developmental disorders in which language processing is impaired.



Professor Jim McGrath

Computational Models of Nanomembrane Fouling

Sponsor: CEIS NYSTAR and SiMPore, Inc.

This project will examine the feasibility of using electrical resistance measurements in a microdevice to monitor the capture of exosomes in real time.

new faculty

Professor Whasil Lee completed her postdoctoral training at Duke University where she had also received her PhD in 2011. Her research interests include musculoskeletal cell mechanics, mechanosensitive ion channels, knee joint tissue development, disease and repair. The Lee Lab studies mechanically activated ion channels expressed in knee joint cells in order to gain fundamental insights into mechanotransduction-related tissue development, maintenance, and degeneration. The lab's overarching goal is to deconstruct the function of key mechanotransducing ion channels of musculoskeletal cells and to apply this knowledge to find rational therapeutic drugs that can stop the progression of osteoarthritis, reduce arthritis associated pain, and/or regenerate healthy cartilage.

I will encourage my students to be persistent in pursuing their goals, to stay open-minded to new ideas, and to cultivate their investigative abilities...I want to challenge them to get out of their comfort zone so that they can push their boundaries and discover their true passion. -Professor Lee



Whasil Lee

Professor Michael Giacomelli arrives from the Massachusetts Institute of Technology (MIT) in the Research Lab of Electronics where he was a research scientist conducting imaging research. He received his PhD from Duke University in 2012 where he worked on endoscopic imaging. Professor Giacomelli's research interests include multiphoton microscopy, surgical imaging, digital pathology, fluorescence lifetime imaging, 3D and molecular imaging. His research program focuses on the application of multiphoton and fluorescence imaging to surgical pathology and clinical medicine. The Giacomelli Lab designs custom multiphoton and fluorescence microscopes, algorithms, and electronics that enable surgical and clinical imaging of pathology in living human tissue with an emphasis on building instruments that can be directly used by clinicians and non-engineers.

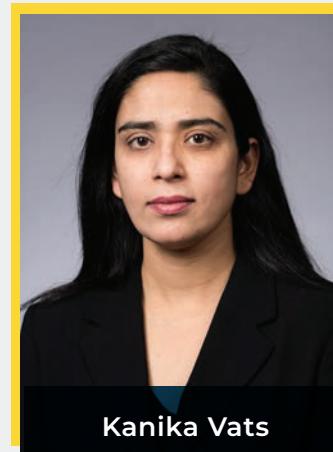
The colocation of the UR Medical Center and the world-famous Institute of Optics with the Department of Biomedical Engineering was an outstanding opportunity to combine my research interests in optics and digital pathology, which was a large factor in my decision to come to Rochester. I was also impressed with the close proximity of different programs at UR, the faculty that I met with in both pathology and surgery, and that they were excited to translate new technology into clinical practice. -Professor Giacomelli



Michael Giacomelli

Professor Kanika Vats received her Ph.D. from Pennsylvania State University in 2009, where she studied bio-nanotechnology and lipid-protein interactions using fluorescence microscopy and spectroscopy. She completed her postdoctoral training under Dr. Mark Dumont, School of Medicine and Dentistry (URMC) and under the guidance of Dr. Danielle S.W. Benoit, where she received hands-on training in biomaterial design and characterization. As a postdoctoral fellow, she developed and deployed a graduate-level course (Biomedical Nanotechnology) at the University of Rochester, as an adjunct professor. In 2014, she was hired as a full-time employee to run a vibrant, hands-on undergraduate laboratory teaching program by the Department of Biomedical Engineering and was promoted to Assistant Professor in 2017. Her teaching interests include: Biomaterials, Cell and Tissue Engineering, Introduction to Biomedical Engineering, Animal Physiology (laboratory-component), and Biomedical Nanotechnology. Professor Vats also maintains and runs multiple instruments for student research and teaches two hands-on short courses to pre-college students from across the country each summer.

In today's rapidly evolving scientific and technological times, the role of higher learning has become extremely critical. The objective of modern college education now, is not only to endow graduates with subject knowledge, but also to provide them with a lifelong zeal to learn and adapt for continuous professional development. My teaching philosophy therefore is based on three core principles: (a) imparting comprehensive fundamental knowledge with hands-on examples,(b) encouraging logical thinking for problem solving and (c) developing big picture understanding. -Professor Vats



Kanika Vats

Louisa Buckley, accompanied by her sister Rosemary, daughters of Professor Mark Buckley, helps a team of biomedical engineering seniors test out a prototype of their early childhood mobility device.



STUDENT ENGINEERS DESIGN EARLY CHILDHOOD MOBILITY DEVICE

For young children with Down syndrome, cerebral palsy, and other developmental disabilities, learning to walk can be a long-term process. And in the meantime, the children find it hard to keep up with their peers, which increases their social isolation.

A team of biomedical engineering majors at the University of Rochester, working with Leah Talbot, a physical therapist in the Rochester area, believe it can address both issues with an inexpensive, "hybrid" walker that will be portable enough to accompany the children wherever they go.

"This is right up our alley," says Joe Cappotelli '18, whose senior design project teammates are Hyun Choi '18, Devon Foglio '18, and Daniel Myers '18. "We're all in the biomechanics track of biomedical engineering. And it's a fun project, to be able to think about ways we could help these children in the future."

When the team surveyed what is currently available, they found "go-baby-go" cars — ordinary toy cars turned into personalized vehicles for young children with disabilities. These enable the 3- to 5-year-olds to keep up with their peers, but aren't that helpful from a therapeutic standpoint, because they don't require the children to actually propel themselves.

Walkers used in clinical settings, on the other hand, are often bulky and expensive — great for therapy, but not for keeping up with more mobile playmates, or for taking home.

"We've created sort of a hybrid of the two," says Myers. "This allows them to move around but also practice walking at the same time." And, Foglio adds, at a more reasonable cost compared to the therapeutic devices used in clinical settings, which range from \$700 to \$1,200.



The walker the students have designed would only cost \$150 to 200, they estimate. "We wanted to find an in between," Foglio says.

The walker consists of a frame of relatively light-weight plastic tubing, an adjustable harness in the center to support the child, steering column, and a motor/gear box/rear axle assembly to propel it.

For their initial prototype, the students worked with penciled sketches and parts scavenged from play vehicles. "We had good ideas for each of components independently, but the struggle was getting everything to work together," Myers says. The final steering column, for example, was designed with CAD drawings, then fabricated with 3D printing.

This is the second year that Talbot has worked with a biomedical engineering senior design team on a project.

"Last year's project was a treadmill with partial body weight support that I had heard about at a conference and was interested in trying with some of the children on my caseload," Talbot says. "When I spoke with the presenter at the conference, she suggested the possibility of contacting a local university's engineering department, as they are often looking for interesting projects."

This year's team "has definitely come up with a very unique idea to help children with motor delays learn to walk in a fun and active way," Talbot says. "Ideally this motorized walker will allow these children to access their environment to play with their peers while improving their cognitive, motor, and social skills."

In its current iteration, the walker could fit into an SUV, team members say. With further modifications, they hope, it will fit in the trunk of a car.

department news

BME Undergraduate Coordinator Taimi Marple wins Dottie Welch Student Enrichment Award

Congratulations to Taimi Marple, undergraduate coordinator for the Department of Biomedical Engineering, who was announced as the Dottie Welch Student Enrichment Award Winner on Design Day. This honor, which is awarded based on student nominations, recognizes a Hajim School of Engineering faculty or staff member "whose performance and dedication enriches the student experience in the tradition exemplified by Dottie Welch."

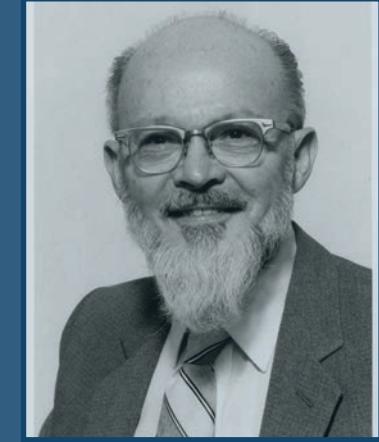
As Undergraduate Coordinator for our BME department, Taimi is the key administrator for all issues related to our undergraduate students and curriculum. She serves as the administrator for the BME Undergraduate Committee (chaired by Professor Amy Lerner) and the BME ABET Committee chaired by Professor Steve McAlevey). Her knowledge of undergraduate courses, degree requirements, AS&E enrichment programs, and the broader university is superb.

"Taimi is typically the first person our prospective undergraduate students meet and the last person our seniors say a heartfelt goodbye to at Commencement," says BME Department Chair Diane Dalecki. "She has helped all our students navigate their way through our undergraduate curriculum, provided encouragement and advice for them in challenging times, and lifted their spirits in the thick of the semester. Her door is always open and welcoming for students and faculty. In short, Taimi has made a lasting impression on our students and our entire BME department."

Taimi has been with the University of Rochester for over 25 years. She succeeded Dottie Welch as the BME undergraduate administrator in 2013. Previously, she was a graduate administrator for the Department of Pathology/URMC for nearly 10 years, and also served as an editorial associate for the journal Neurology and the managing editor for the International Journal of Radiation Oncology Biology Physics for 17 years. Taimi received her M.S. in Higher Education Administration from the University of Rochester in 2011 and her B.S. in English from SUNY Brockport.



Dottie Welch Student Enrichment Award winner Taimi Marple pictured with fellow staff and faculty members of the University of Rochester BME Department



Edwin and Pam Carstensen Family Endowment will support biomedical ultrasound research and education

The Edwin and Pam Carstensen Family Endowment was established to honor the legacy of Edwin L. Carstensen and ensure that his vision of the Rochester Center for Biomedical Ultrasound endures. Edwin L. Carstensen was a pioneer in the field of biomedical ultrasound and internationally recognized throughout his career for his advances in understanding the interaction of ultrasound fields with biological tissues. He was the Founding Director of the Rochester Center for Biomedical Ultrasound (RCBU), a multidisciplinary research center dedicated to advancing the use of biomedical ultrasound in imaging and therapy. Professor Carstensen, the Arthur Gould Yates Professor Emeritus of Engineering, was a member of the Department of Electrical and Computer Engineering at the University of Rochester for over fifty years. Professor Carstensen was a member of the National Academy of Engineering, and his outstanding scientific achievements were widely recognized with numerous awards and honors. The fund was enabled by a generous seed gift from the Carstensen family. To contribute to the Edwin and Pam Carstensen Family Endowment, please contact Derek Swanson at derek.swanson@rochester.edu or 585.273.1341.

TACKLING THE GRAND CHALLENGES

Why wait to graduate to start tackling the world's grand engineering challenges?

Biomedical Engineering majors at the University of Rochester are volunteering as part of the National Academy of Engineering (NAE) Grand Challenges Scholars Program, which is aimed at educating a new generation of engineers to tackle 14 grand challenges for engineering in the 21st Century.

Students design their own combinations of research, interdisciplinary scholarship, entrepreneurship, global experiences, and community-engaged learning to explore one of 14 grand challenges identified by the NAE, falling within the categories of safety, sustainability, health, and joy of living. Students who meet the requirements are listed at the Grand Challenges web site and receive a medal at graduation.

"This is a great way for students to take ownership of their education here and gain an edge when applying for graduate school or jobs," says Wendi Heinzelman, dean of the Hajim School of Engineering at the University of Rochester.

Eva Hansen, an undergraduate student from the biomedical engineering department, was among the first to seek recognition as a Grand Scholar at the University of Rochester. Eva recently helped install a system to provide potable water to a school in Don Juan, Dominican Republic and applied her overseas service projects towards qualifying as a Grand Challenges Scholar. Eva has also taken classes in public health and served in leadership roles in Engineers Without Borders (EWB).

"I see participation as a 'capstone' to my experiences in Engineers Without Borders," says Hansen, who explored the challenge of providing access to clean water while serving with EWB all four years as an undergraduate.



Another BME senior, Raymond Chin, also participated in the program, exploring the challenge of engineering better medicines. He has done this through:

- A DAAD Rise internship in Leipzig, Germany in 2016, engineering 3-D micro-environments to control cancer cells
- A research internship at Pfizer Pharmaceutical in 2017, studying drugs related to cardiovascular and metabolic disease
- A graduate level course on the FDA and intellectual property
- Participation in a University/FDA regulatory science competition
- Additional courses in neurological disease and the drugs engineered to treat them

Chin, says, "The Grand Challenges Program allows me to reflect on and appreciate the accomplishments I have achieved as an undergraduate."

To learn more, visit www.hajim.rochester.edu/grand-challenges/

*Top right: Eva Hansen works with other members of Engineers Without Borders to install a system that provides portable water to a school in Don Juan, Dominican Republic.
Bottom: Eva Hansen pictured with school children in the Dominican Republic
Top left: Raymond Chin in Leipzig Germany, where he completed a DAAD Rise internship, engineering 3-D micro-environments to control cancer cells*



In 2008, the National Academy of Engineering (NAE) established a set of fourteen Grand Challenges that engineers face in order to make progress toward a sustainable world, one that provides all people with more than just their basic needs and aspires to a higher level of living. The fourteen Grand Challenges range across disciplines and incorporate aspects of life ranging from the developing world to the developed world. They fall under four categories: sustainability, health, security, and joy of living.

SUSTAINABILITY

- Make solar energy economical
- Provide energy from fusion
- Develop carbon sequestration methods
- Manage the nitrogen cycle
- Provide access to clean water

HEALTH

- Advance health informatics
- Engineer better medicines
- Reverse-engineer the brain

SECURITY

- Restore and improve urban infrastructure
- Prevent nuclear terror
- Secure cyberspace

JOY OF LIVING

- Enhance virtual reality
- Advance personalized learning
- Engineer the tools for scientific discovery

STUDENT AWARDS & HONORS



BME seniors Matt Boulanger, Jack Hayden, Fredella Lee and Sue Zhang (pictured left to right) pose in the cherry blossoms on UR campus.

Harrah Newman wins Charles L. Newton Prize

Congratulations to Harrah Newman who was selected for the 2018 Charles L. Newton Prize. This honor is given to a student within the Hajim School of Engineering who shows special proficiency in some subject connected with engineering, and who has conducted research, given a presentation, or published a paper. Harrah has worked with Professor Mark Buckley since summer of 2016, where she has been involved in many different projects, leading to a first-author manuscript and presentations at three national conferences.

Shuang (Grace) Chang and Xuan (Monica) Sun win Barnard Prizes

Congratulations to Shuang (Grace) Chang and Xuan (Monica) Sun who were both awarded the 2018 Donald M. Barnard Prize. This award is given to junior or senior engineering students on the basis of personal qualification and achievement. Both have been accepted to excellent graduate programs. Shuang will pursue her PhD at Vanderbilt University and Monica will attend Duke University for her MS.

Anisha Khosla receives Gwennie Award



Anisha is pictured fourth from right at the Gwennies Award ceremony.

BME senior Anisha Khosla recently received a Gwennie award from the Gwen M. Greene Center for Career Education and Connections. The award honors partners who exemplify the Greene Center's values — respect, collaboration, diversity and inclusion, betterment, and purpose. "It's a celebration of our colleagues and partnerships across campus," said Joe Testani, assistant dean and director of the Greene Center. "Without them, we wouldn't be able to fulfill our mission."

Ken Sims' abstract selected for STAR award

The Society For Biomaterials presented Kenneth Sims Jr., a graduate student in the lab of Danielle Benoit, with a Student Travel Achievement Recognitions (STAR) Award. STAR Awards are given for outstanding abstracts submitted by students and present a major opportunity to recognize research excellence and develop future leaders within the Society. Ken presented an



oral presentation on "Enhancing Design of Nanoparticles for Anti-Biofilm Drug Delivery" during the "Racing for the Surface: Recent Development in Antimicrobial and Osteoinductive Biomaterials" session of the Society for Biomaterials 2018 Annual Meeting and Exposition: Exploring the Nexus of Research and Application held in Atlanta, Georgia in April of 2018.

providers, along with an easy to navigate user interface that older adults can access as both a website and a mobile application.

Jacques Kouevi wins G. Harold Hook Prize

Congratulations to Jacques Kouevi who was selected for the G. Harold Hook Prize, which recognizes students for outstanding interest in engineering. Jacques has shown determination, persistence and passion for engineering. He clearly loves to learn about new technology and is passionate about design and using engineering to improve healthcare. Jacques will be remaining at Rochester to pursue an MS in Biomedical Engineering through the Center for Medical Technology & Innovation (CMTI) program.

Graduate research assistant receives award

At the annual Orthopaedic Research Society meeting, Maureen Newman's podium presentation, titled "Development of Bone-Targeted Polymer Conjugates of Wnt/β-catenin Agonists to Stimulate Fracture Healing," was awarded the International Section for Fracture Repair Podium Award. Congratulations Maureen!

Geoffrey Rouin Named United Soccer Coaches All-American



A fantastic senior season has culminated in BME undergraduate student Geoffrey Rouin of the Rochester men's soccer team earning All-American honors as announced by the United Soccer Coaches. Rouin, a third team Division III All-American in 2017, broke out in 2017, scoring a career high 14 goals, and also two assists for 30 points, the most points scored in a single-season by a Rochester player in 11 years.

The senior started all 21 games for Rochester and scored seven game-winning goals, tying the Rochester single-season record. He recorded both goals in a thrilling 2-1 comeback win over #16 Amherst in the NCAA Sweet 16 round of the Division III Tournament, helping Rochester advance to the national quarterfinals this year, matching the team's best ever run in the postseason tournament.

Ninoshka Fernandes and team win first place at New York Business Plan Competition



Ninoshka (on left) at the New York Business Plan Competition Finals

Humans for Education, comprised of University of Rochester biomedical engineering PhD candidate Ninoshka Fernandes, School of Medicine doctoral candidate Daphne Pariser, and Chadia Bedetse won first place and \$10,000 in the social entrepreneurship/nonprofit track of the statewide intercollegiate New York Business Plan Competition this year. More than 100 teams competed in six tracks in the finals event hosted at SUNY Polytechnic Institute's Albany NanoTech Complex.

Hetince Zhao and UR Connected team wins Forbes Competition



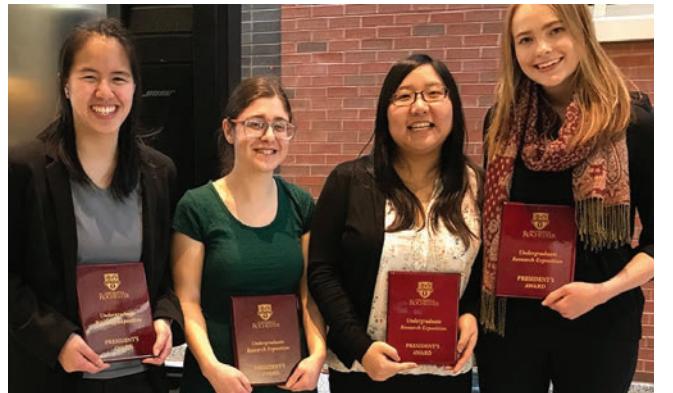
Hetince (at right) competing with other members of the UR Connected team

BME Senior Hetince Zhao and the other members of the UR Connected team, Allen Chen (neuroscience), Isaac Wong (computational biology; computer science), and Krista Phipo (cell and developmental biology), took first place and \$5,000 in the Charles and Janet Forbes Entrepreneurial Competition. The team plans to address loneliness and isolation in senior populations by aggregating community involvement resources onto a single platform, offering a web portal for service for

student awards & honors cont.

Harrah Newman wins President's Award

Congratulations to Harrah Newman for winning the President's Award at the 2018 Undergraduate Research Expo for her project, "Viscoelastic Heating of Bovine Intervertebral Disc." More than 60 students participated in the exposition this year, representing some of the most accomplished undergraduate research throughout the college.



Harrah (second from left) at the Undergraduate Research Expo

CMTI teams take second and third place in University's Regulatory Science Competition

Two teams of CMTI (Center for Medical Technology & Innovation) master's students placed well in the University's annual "America's Got Regulatory Science Talent" competition, a UR CTSO Regulatory Science Program. For the competition, students are asked to find solutions to better assess the safety, efficacy, quality, and performance of FDA-regulated products. Eric Ravinal, Justin Schumacher, Vladimir Tokarchuk, and Rebecca Amorese finished second with their proposal for an evaluation toolkit to address key issues in additive manufacturing, including 3D printing. Amanda Smith, Meghann Meyer, Emily Newman, and Evan Sosnow proposed an FDA ALERT smartphone-based mobile app that could be used to scan a QR code on the label of an FDA-regulated product to get reliable, FDA-approved information to help decide whether to purchase the product, to receive recall and warning alerts, and to report any adverse effects experienced with FDA-regulated products. The team finished third.

Second Place

Rochester Regulators: Ensuring FDA's Readiness to Evaluate Additive Manufacturing

Rebecca Amorese, Eric Ravinal, Justin Schumacher, Vladimir Tokarchuk (pictured from top left to bottom left)



Third Place

FDA ALERT: Approved Listings & Explanations of Regulated Technology

Meghann Meyer, Emily Newman, Evan Sosnow, Amanda Smith (pictured from top left to bottom left)



CMTI teams take first and second place at 12th Annual Mark Ain Business Competition

There was a strong showing for BME students in the Center for Medical Technology and Innovation (CMTI) master's program at the 12th Annual Mark Ain Business Model Competition.



CompreSure Medical, consisting of CMTI graduate students Alyssa Lopez, Gregory Dadourian, and Meghann Myer, (pictured left to right) won first place, a \$10,000 award and a spot in the UR Student Incubator at Sibley Square, which is part of NextCorps. The group designed an implant that allows for minimally invasive bone reduction of fractures, spurring improved patient recovery.



ADASI, which included CMTI master's students Amanda Smith, Rebecca Amorese, and Evan Sosnow, (pictured from left to right on opposite page) took second place, winning \$2,500 toward the implementation of their business plan. The group presented Kerrida, a disposable suction tip attachment accessory to the Kerrison Rongeur. Kerrida is intended to reduce water and increase efficiency during spinal surgery.

STUDENT FELLOWSHIPS

Graduate student Kayli Hill named Fresenius Hemodialysis Fellow

Congratulations to BME graduate student Kayli Hill who will be working with BME Scientist Dean Johnson on his grant, "In Vitro Testing Platform for the Fresenius Medical Care 2008T and Small Format Nanomembrane-based Hemodialyzers," as the Fresenius Hemodialysis Fellow. The grant will provide funding for her to develop

a benchtop device for testing both current hemodialysis devices and devices under development. Under Johnson's direction, Kayli will design, build, and test an in vitro model of the concentration of middle-weight molecules in the intravascular fluid volume (blood) and arteriovenous fistula access for hemodialysis that can be used to test both the Fresenius Medical Care 2008T Series Hemodialysis Machine and miniaturized HD delivery systems. This system will enable improved quality control with current hemodialysis systems and hasten the development of wearable hemodialysis.

Elysia Masters receives Barnard Fellowship

Congratulations to BME PhD candidate Elysia Masters (co-advised by Professor Hani Awad and Professor Edward Schwarz) who has received a Donald M. and Janet C. Barnard Fellowship from the College of Arts, Science and Engineering. These fellowships recognize outstanding achievement by PhD students in engineering and science, as evidenced through their coursework and their dissertation research work. The fellowship provides a \$3,000 stipend supplement for the 2018-2019 academic year.

Doctoral candidate receives Ruth L. Kirschstein National Research Service Award

Marian Ackun-Farmmer, a PhD candidate in Danielle Benoit's lab, has been awarded a Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (F31) grant from the National Cancer Institute (NCI) for her

project titled "Nanoparticle mediated microenvironmental targeting of CCL3 signaling for the treatment of acute myelogenous leukemia." This project is taking an unprecedented approach to treating Acute myelogenous leukemia (AML) by using a drug delivery approach to prime the bone marrow so that AML is less likely to evade standard chemotherapy. The proposed plan is expected to improve AML patient survival and will lead to development of a novel, versatile marrow-targeted system that is applicable for other types of leukemia and marrow associated diseases.



HAJIM SCHOOL OF ENGINEERING & BME DEPARTMENT AWARDS

BME GRADUATE STUDENT TA AWARD Phong Nguyen - BME 411

OUTSTANDING BME THESIS AWARD Dominic Malcolm

BME SERVICE AWARD Elysia Masters Alec Salminen

MARYLOU INGRAM FELLOWSHIP Holly Eyrich Shafaqat Rahman Edgar Rodriguez Shyanthony Synigal

DONALD M. BARNARD PRIZE Shuang Chang Xuan Sun

G. HAROLD HOOK PRIZE Jacques Kouevi

CHARLES L. NEWTON PRIZE Harrah Newman

NATIONAL ACADEMY OF ENGINEERING GRAND CHALLENGES SCHOLARS PROGRAM Raymond Chin Eva Hansen

BME FACULTY AWARD FOR UNDERGRADUATE SERVICE Anisha Khosla Kelly Tighe

BME FACULTY AWARD FOR EXCELLENCE IN UNDERGRADUATE RESEARCH Eva Hansen

BME FACULTY AWARD FOR TEACHING ASSISTANT Salah Mahmoudi

BME OUTSTANDING SENIOR Tianyu Wu

BME OUTSTANDING JUNIOR Amanda Hornick

DESIGN DAY 2018

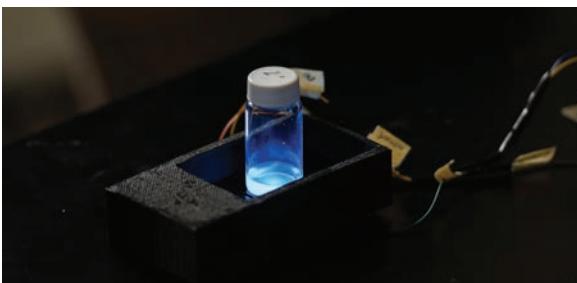


Each year, biomedical engineering students partner with companies and institutions to solve engineering problems through developing prototype medical devices and research instruments. We celebrate the culmination of our students' engineering education by hosting Design Day, where they present their projects. Both undergraduate seniors and graduate students enrolled in the Center for Medical Technology & Innovation masters program participate. 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. Some examples of this year's projects are featured on these pages. For more information on a specific project, contact Amy Lerner at amy.lerner@rochester.edu.

Dia-Beat-It

Matt Boulanger, Jack Hayden, Fredella Lee, Sue Zhang

A point of care screening device for type 2 diabetes.



Wheelchair Improvements

Hye Mi (Abby) Kim, Harrah Newman, Zijie (James) Sha, Alexandra Wolkoff, Michael Zhang
Creating a mechanism to enable wheelchair users improved ability to access their belongings.



Early Mobility for Kids

Joe Cappotelli, Hyun Choi, Devon Foggio, Daniel Myers
The creation of an early mobility system for children with developmental disabilities.



The ThighCyclers

Erik Backstrom, Kyle Ruffner, Kelly Tighe, Iain Wright
An accessory device for adaptive cycles to promote safer, more comfortable rides for individuals with leg weakness due to stroke, TBI or other medical conditions.



Quick & Repeatable Ultrasound Imaging during CPR

Vladimir Tokarchuk, Eric Ravinal
A way to reduce the time needed to find the right ultrasound image in cardiac arrest patients, in order to minimize the time that the patient's brain is not receiving oxygenated blood.



The Listen'Ears

Jeremy Deniega, Arushi Jain, Jacques Kouevi, Salah Mahmoudi

Using modern technology to analyze brain-ear interfaces to help you listen to what really matters.



C-Arm X-Ray Improvements in the OR

Shuang (Grace) Chang, Emily Grey, Chi Huang, Harshita Narang
Improved C-Arm X-Ray machines for neurosurgeries.



alumni corner

alumni profiles

Becca Slater



Hometown: Gorham, ME
Current city: San Francisco, CA
Degrees: University of Rochester, BS, 2011
University of Arizona, PhD, 2017

Current position & company: Research Scientist at Amgen

What do you enjoy most about your job?

I work in early drug development for cardiovascular disease looking at how potential drugs affect the contractility of the heart. I love that my work is both scientifically interesting and that it could really make a difference in people's lives.

Why did you choose the University of Rochester?

I wanted a school that offered great research, was strong in engineering and science, but wasn't overwhelmingly huge. I first visited campus on a cold, dark, and sleeteting spring day but somehow fell in love with it anyway. After that, I knew it had to be the right place for me.

Advice for current/future students: Do an internship. And learn how to network. It's more than just a buzzword and you probably already have a bigger network than you realize through your fellow UR alumni – reach out to us!

Hobbies: Hiking, biking, and board games

Family: My husband, Tyler, and our two dogs, Sienna and Rohan.

Nick Au Yong



Current location: Atlanta, GA
Degrees: University of Rochester, BS, 2000
University of Rochester, MS, 2003
Drexel University College of Medicine, MD, PhD 2011
University of California Los Angeles, Neurosurgery Residency 2018

Current position & company: Assistant Professor of Neurosurgery, Emory University School of Medicine

What do you enjoy most about your job?

I am a clinician-scientist with a neurosurgical practice subspecializing in neuromodulation, peripheral nerve injury and surgical treatments for pain. I also run a research lab to study new therapies to restore movement. I enjoy being able to help patients live

more fully and am inspired by them to discover better treatments.

Why did you choose the University of Rochester? University of Rochester was a perfect fit for me in many ways. I liked the close-knit community of students and faculty. I knew early on that I wanted to pursue engineering and medicine and felt that UR had extraordinary and accessible opportunities for undergraduates to get involved in medical research. This certainly was the case for me and collaborations between the engineering and medical campuses played a big role in that.

Favorite memory of UR: Enjoying the first days of summer with my friends on the quad.

Why did you choose to study biomedical engineering?

I found BME to be the most exciting and creative branch of engineering. The faculty gave undergraduates a chance to take on major research roles. For me, working with Dr. Seidman was the major defining point in my education in many ways, sending me on my current trajectory. I am also sure that Dottie Welch also played a big role in my choosing BME. She was BME's undergraduate coordinator at the time; an unwavering source of encouragement and support. She was key in helping me shape my educational experience as it evolved.

Advice for current/future students: Take the many opportunities at UR to work with faculty and students on projects outside of your comfort zone. Discover your strengths and learn about your weaknesses. Find your niche; become great at it and make that process your story. Most importantly, find faculty mentors who take genuine interests in you as a person and in your career aspirations. I certainly owe a great deal to my UR faculty mentors, and I strive to do the same in my current role.

Favorite quote: "Ever tried. Ever failed. No matter. Try again. Fail again. Fail better." – Samuel Beckett

Hobbies: Traveling and Hiking

Family: I've been married to Chantal McMahon (BME Class of 2008, pictured above) for 5 wonderful years.



Maria T. Arévalo



Hometown: Miami, FL
Current city: Athens, GA
Degrees: University of Rochester, BS, 2004
University of Rochester, MS, 2008
University of Rochester, PhD, 2011

Current position & company:

Assistant Research Scientist, University of Georgia

Describe your job:

I lead the Emerging Infectious Diseases (EID) program in the Ted Ross Lab at the Center for Vaccines and Immunology. Our research is divided into two main areas of focus: (1) designing, testing, and understanding vaccines (for Dengue, Zika, Chikungunya Viruses) and (2) understanding immunology and identifying biomarkers of disease in people infected with Dengue and Zika.

Favorite memory of UR: "Traying" in back of Danforth

Advice for current/future students: Work-life balance is important.

Where would you like to be in 5-10 years?

I will be moving on to a Research Microbiologist position for the Defense and Threat Reduction Agency (DTRA) in November of 2018. My plan for the next 5-10 years is to stay and grow within the agency, and continue working on problems of biodefense.

Hobbies: Crossfit, running, dining out

alumni news



BME alum takes third place in 2018 Mark Ain Business Competition

A BME alum ('17) Omar Soufan, who recently graduated with a masters of science at UR in a joint program between the Simon School of Business and Hajim School of Engineering, along with his teammate, mechanical engineering PhD candidate Ibrahim Mohammad, took third place in the 12th Annual Mark Ain Business Competition. Their group, Prostheses for a New Syria, received \$1,000 toward their business plan, which provides low cost, customizable 3D prostheses in areas with scarce healthcare resources.

Three BME alums awarded National Science Foundation (NSF) Graduate Research Program Fellowship (GRFP) in 2018



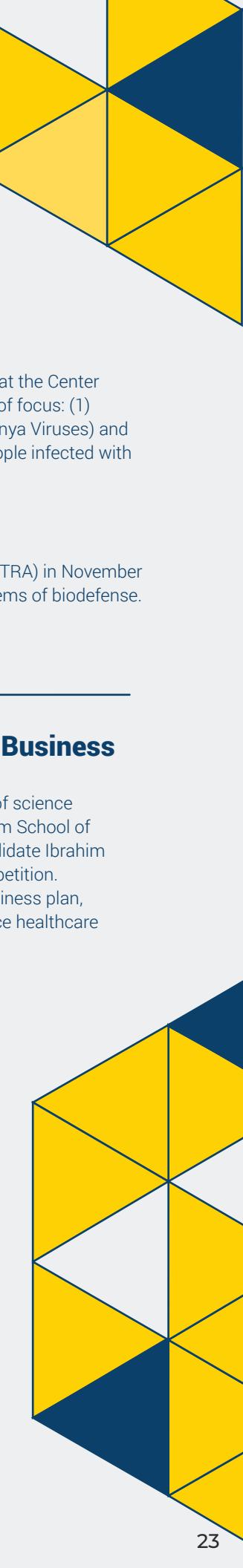
Megan Routzong, UR BME '16,
University of Pittsburgh



Brittany Schutrum, UR BME '17,
Cornell University



Janet Sorrells, UR BME '18,
University of Illinois



alumni engagement

The Department of Biomedical Engineering at the University of Rochester has an alumni base that extends across the country and around the globe. BME alumni are successful in a wide range of professions. Many alumni are excited to give back and stay engaged with the BME department at the UR. Below are some testimonials from alumni that have volunteered with different programs, as well as some suggestions for how alumni can get involved. Please reach out to us for more information on these opportunities to stay engaged with our BME department!

BME Alumni Stay Engaged with UR

BME alumni can stay engaged with the BME department through many avenues

Project Customer

Become a customer for a senior design project
(see opposite page)

Mentor

Help guide BME students (*the Real Reader program is a great way to do this – see below*)

Career Adviser

Help BME students navigate the next steps of their careers.

Collaborator

Work with BME faculty research laboratories.

Teacher

Contribute your expertise to our courses and educational programs

Donor

Support our BME students and programs through philanthropy.

Visitor

Come back to Rochester and visit us and our students!

mentor a student as a “real reader”

Interested in sharing your experience with the next generation of biomedical engineers? The Gwen M. Greene Center for Career Education and Connections is looking for Hajim School alumni who would like to work with current engineering students at UR as they develop resumes and cover letters, practice spoken communication skills, and reflect on their career goals. Volunteering as a Real Reader for WRT 273 (a required course called “Communicating Your Professional Identity”) is a meaningful way to give back without a big time commitment. For more information, please contact michelle.marks-hook@rochester.edu. Thank you to all of our BME alumni who have volunteered as Real Readers!



Sara Halton

Senior Patent Counsel at adidas Group
UR BME Alumna, BS '14
Greater Boston Area

The Real Reader program provides a great opportunity for alumni to get involved with current students. It has allowed me to hear from students about new opportunities in the department, and to answer their questions about my experiences and my career path. It's a great opportunity for alumni to get involved in a meaningful way, without requiring a large time commitment. The students with whom I've interacted are engaged and excited for the opportunity to connect one-on-one with department alumni. I highly recommend this experience to alumni looking to stay engaged with the BME department.



Nathan Alves

Assistant Professor, Indiana University School of Medicine
UR BME Alumnus, BS '07, MS '08
Indianapolis, Indiana Area

It's amazing to be able to help shape a student's future simply by sharing my experience through a few mentoring interactions over the course of a semester.



Dan Mendelson

Senior Director of Active Knees at Smith & Nephew
UR BME Alumnus, BS '10, MS '11
Greater Memphis Area

The Real Reader program is a great initiative by UR. Connecting students to graduates, helping them to refine their interview and resume skills, and preparing them for real-world applications is extremely important for students' success.

volunteer as a senior design customer

Could your company use a fresh perspective on an engineering problem? Each year, our students partner with companies to solve problems through developing prototype medical devices and research instruments. Contact amy.lerner@rochester.edu to learn more.



Boston Nyer

Co-Founder and CEO at BURN
UR BME Alumnus, BS '08
Nairobi, Kenya
“Pot Skirt Team” design (2015-2016)



W. Spencer Klubben

Business Development Manager at Corning, Inc.
UR BME Alumnus, BS '13, MS (CMTI) '14
Corning, NY
“Septis Detectis” design team customer (2016-2017)



Daniel Eversole

Product Manager, Tissue Analysis Software at Akoya Biosciences
UR BME Alumnus, BS '04
Boston, MA
“Airbrasian” design team customer (2013-2014)

BURN designs and locally manufactures improved cookstoves to save forests and lives in the developing world. In order to do that, we're continually searching for more efficient ways for families in Africa to cook. An easy way to improve heat transfer, and therefore, reduce fuel consumption is to add a skirt around the cooking pot, which dramatically increases the resonance time and surface area for heat transfer. But, this is more than a technical challenge. Customers have to like using it. They have to be willing to pay for it. It has to be easily manufactured. And it has to be flexible for pots of different sizes and shapes. The team at UR was able to navigate the three-dimensional challenge balancing cost, performance, manufacturability, and usability. My senior design project was fundamental to my development as an engineer and I hope we've been able to provide the same experience to the team working with BURN.

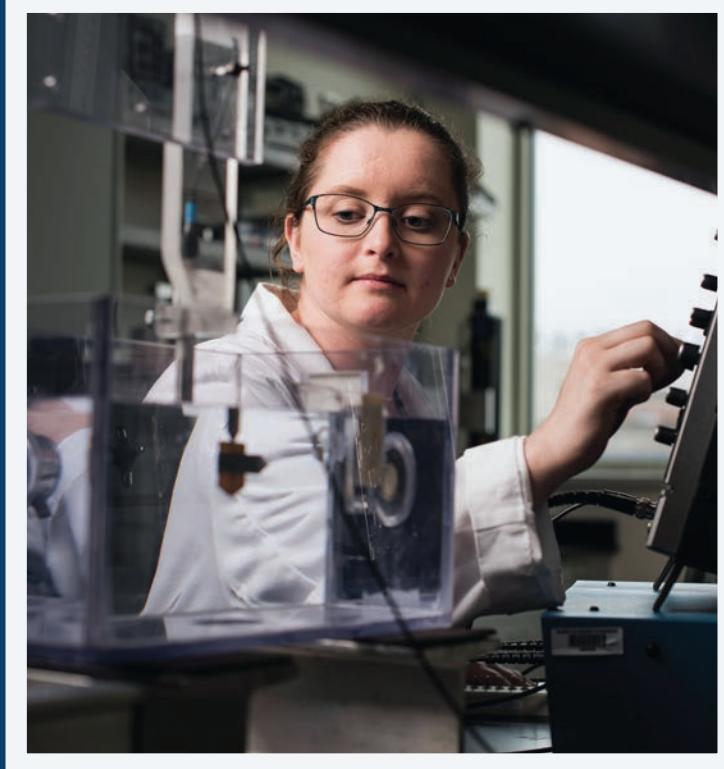


“Pot Skirt Team” members pictured from left to right: YeJin Jeong, Nikki Sroka, Jessica He, Adam Langenbucher



“Septis Detectis” team members pictured from left to right: Justin Schumacher, Dylan Latham, Kathleen Larson, Brittany Schutrum, Joshua Schum

My experience as a design customer was fantastic! Amy Lerner really has the course beautifully organized and the students were eager to hone their design skills and apply what they learned over the course of their college experience. I couldn't have asked for a better group; all members really took ownership of the final design and prototype testing. At that moment in time I was launching a startup and couldn't have thought of a better forum to test a really cool idea we had (but no resources to implement). Having gone through the same class myself, I knew students would deliver top-notch results; also I love teaching and helping students understand the importance of product design and how the said product fits into the current “medical” workflow–this was a fantastic opportunity to work closely with students who were heading down the same path as myself and I felt I could provide guidance based off my own experiences. The students really made the technology a reality. Not only did they develop a prototype but they developed a wound model for testing. More impressively, their prototype performance was better than the current gold standard used for wound debridement (cleaning) and they only spent half the allotted budget for development.



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. Its mission encompasses research, education and innovation.



RESEARCH EDUCATION INNOVATION

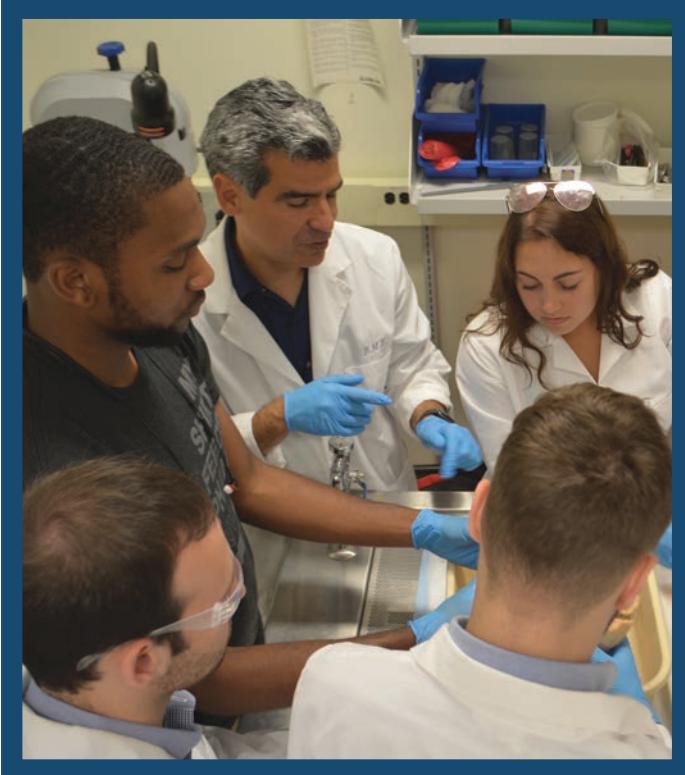
Interested in the RCBU?

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

Centers within BME

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



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 medical center, 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

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

MS

October 2017

David Abplanalp
Michelle Esponda

March 2018

Ibrahima Bah
Abigail DeJohn
Danielle Desa
Elysia Masters
Phong Nguyen
Clyde Overby
Alec Salminen
Pengyi Wang

May 2018

Zachary DeJager
Nicole Keenan

PhD

October 2017

Dominic Malcolm
"Nanoparticle-Mediated siRNA/miRNA Delivery to Mesenchymal Stem Cells"

December 2017

Eric Comeau
"Ultrasound Standing Wave Field Technology for Cell Patterning and Microvessel Network Formation In Vitro and In Situ"

Christopher Farrar

"The Influence of Extracellular Matrix Fibronectin on Platelet-Derived Growth Factor Signaling"

Center for Medical Technology & Innovation (CMTI) MS, May 2018

Ian Baranowski
Spencer DeCinque
Kerry Donnelly
Saadedine (Dean) El-Homsi
Margaret Ferrari
Brittany Garrison
Bethany Lennox
Kyle Meyers
Caeli Quiter
Lauren Seitz
Courage Tsagbe

Sara Nowacki

"Short-Term Parathyroid Hormone Treatment Aids in Early Cartilage Repair but Cannot Rescue Matrix-Assisted Repair"

March 2018

Yuchen Wang
"Development of Controlled Release Systems for Fracture-Targeted Therapeutic Delivery"

Daniel Marnell

"Investigating the Mechanics of the Mammalian Cochlear Partition Using a Novel Microfluidic Device"



CONNECT WITH US

Any questions or comments about this publication or our programs? Interested in getting involved with UR BME? A former student just wanting to say hi? We would love to hear from you.



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585.275.7378



Email:
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WWW.FACEBOOK.COM/UOFRBME



DEPARTMENT OF BIOMEDICAL ENGINEERING



SCHOOL OF
**MEDICINE &
DENTISTRY**
UNIVERSITY *of* ROCHESTER



HAJIM
SCHOOL OF ENGINEERING
& APPLIED SCIENCES
UNIVERSITY *of* ROCHESTER

