RIT | Kate Gleason College of Engineering
Department of
Biomedical Engineering

2023-2024 Newsletter
Vol. 8

ANNUAL NEWSLETTER

Contents

Welcome to the eighth edition of our department newsletter!

I am immensely proud of the dedicated faculty and staff who tirelessly work to advance the frontiers of biomedical technology and education. Their unwavering commitment to excellence drives our department's success and ensures that we remain at the forefront of cutting-edge research and educational innovation.

Within these pages, you will discover selected inspiring stories that showcase the remarkable achievements of our students, faculty, and alumni. From groundbreaking research initiatives to the exceptional accomplishments of our students both in and out of the classroom, each story serves as a testament to the enduring spirit of collaboration and innovation that defines our department.

As we reflect on the past year's accomplishments and look ahead to the future, I extend my sincerest gratitude to all who have supported and contributed to our program's continued success. This marks my eighth and final year as department head, and it's been an incredible journey witnessing the growth and achievements of our community. Together, we will continue to push the boundaries of what is possible and inspire the next generation of biomedical innovators.

Warm regards,

Steven Day

Department Head

RIT BME Faculty & Staff

2024 AIMBE Fellow

Prof. Karin Wuertz-Kozak was inducted into the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows. Becoming an AIMBE Fellow signifies inclusion among the top 2% of medical and biological engineers, representing the most accomplished individuals across academia, industry, education, clinical practice, and government.

Trustees Scholarship Award

Prof. Tom Gaborski was awarded the Trustees Scholarship Award. The Trustees Scholarship Award recognizes faculty who have demonstrated a strong record of academic scholarship over a sustained period.

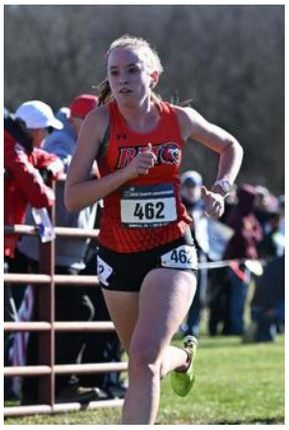
New Staff

Ian Brookes
Laboratory Manager

Ian joined the department in June 2023. He received a BSc and a MSc from The University of Chester, UK in the field of Sport and Exercise Sciences (Physiology). Ian's past experience includes working as part of technical teams at a number of UK universities and as the Senior Technical Specialist at the Advanced Wellbeing Research Centre in Sheffield England. Ian is a keen road cyclist and since moving to Rochester has also taken up sailing on the local lakes.

Student Achievements

NCAA DIII Women's Cross Country Championships



Amelia Gilbert finished in the top half of the runners at the NCAA Division III Women's Cross Country Championships at Big Spring High School in Carlisle, PA, finishing the 6k course in 22:30.2.

Outstanding Undergraduate Scholar Awards

Mikkael Lamoca, Nick Despins, Olivia Ernst, Rachel Hamilton, Taylor Schofield, Brendan Cappon (through MechE), and Jonathan Hacker (through SOIS) were recognized as 2024 Outstanding Undergraduate Scholars. Since 1976, the outstanding undergraduate award recognizes the top one percent of RIT students each year. These students have completed at least 83 credit hours of study and have a cumulative GPA of at least 3.85.

Dr. Peter Roughley Award

Janitri Babu, a doctoral student in the Biomedical & Chemical Engineering PhD program, was named the 2024 winner of the Dr. Peter Roughley Award by the Orthapedic Research Society (ORS) Spine Section. Janitri's doctoral work aims to understand the role of the ion channel TRPC6 in intervertebral disc degeneration and its relevance as a therapeutic target in degenerative disc disease and low back pain.

Fulbright Scholar

Mikkael Lamoca has been award the prestigious Fulbright Scholarship. Supported by the program, he will spend 10 months at the National University of Singapore studying the neuroprotective effects of the stem cell secretome. Mikkael is graduating with an MS in Science, Technology and Public Policy and a BS in BME. His long-term goal is to become a physician-scientist.

Emerging Leader Award

The KGCOE Emerging Leader Award recognizes recent alumni who provide outstanding service to RIT, their profession, or community. Maria Romero-Creel BS '17, is an Associate Program Manager at Syneos Health where she consults for pharmaceutical companies specializing in the management of FDA-required drug safety Risk Evaluation and Mitigation Strategies (REMS) programs.

Multidisciplinary Senior Design

Multidisciplinary Senior Design (MSD) Projects prepare students for modern engineering practice through a team-based design experience. Students apply the skills and knowledge acquired in earlier coursework to implement solutions to engineering problems while adhering to customer requirements and recognized standards.

An Auscultation-Based Automatic Blood Pressure Cuff

Many doctors question the accuracy of automatic blood pressure cuffs. That news surprised biomedical engineering student Aidan Hughes and led him to pitch his idea to make a automatic blood pressure cuff that can provide more accurate, reliable measurements.

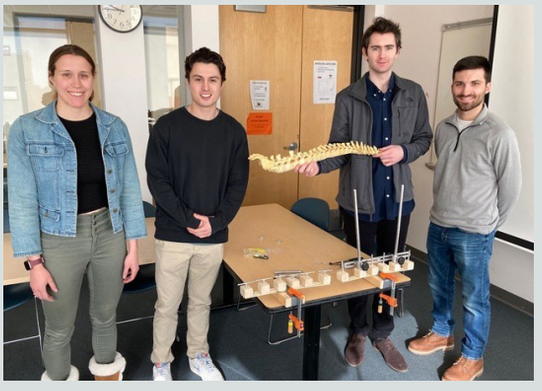
Auscultation, or the act of listening to internal body sounds with a stethoscope, is currently the gold standard for blood pressure measurements, but requires a trained professional with significant experience to conduct the test. Most automatic blood pressure cuffs used today are easy to use, but are unable to "listen" for the characteristic sounds, known as Korotkoff sounds, and thus have a tendency to report inaccurate results.

"Current automatic blood pressure cuffs sense vibrations in your blood vessels through non-auditory means and estimate blood pressure from this information. This approach suffers from variability in the reported measurements because the vibrations are not the same from person to person," said Hughes.

The team's new-and-improved automatic blood pressure cuff uses a few different approaches to "listen" for the Korotkoff sounds that healthcare workers use for their measurements. The hope is that by "listening" for these sounds, rather than the current methods for sensing vibrations, the accuracy of the blood pressure measurement will improve.

Hughes, and teammates Amelia Gilbert, Barak Binyamin, Logan Clasby, Ayush Jha, and Brandon Watkins spend time designing, troubleshooting, and innovating to further refine their prototype.

Spinal Deformity Correction System



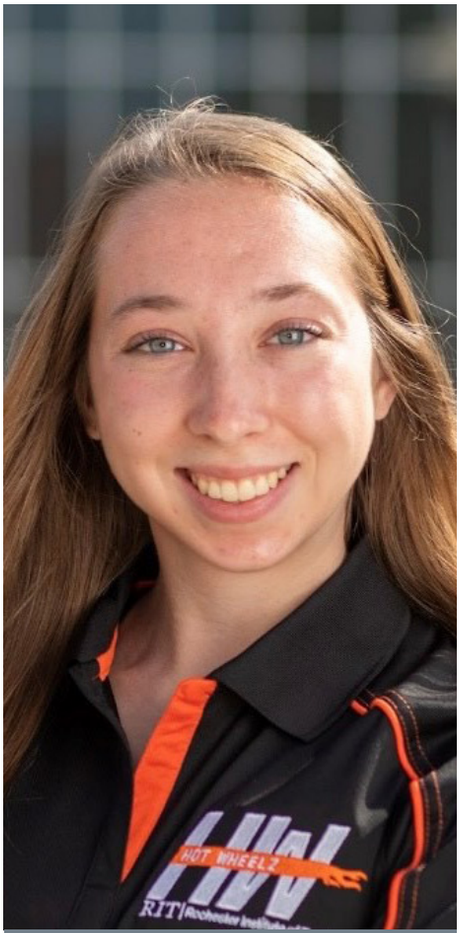
Samantha Russell, Aidan Daudier, John Kiernan, and Brandon Kostek

A spinal deformity correction system is used during surgical procedures when a surgeon needs to manipulate and maintain the spine in a specific orientation during the surgery. This type of system allows the surgeon to orient and lock the spine in the correct alignment by providing leverage in all 3 dimensions. The ideal device should be sterile, avoid interference with the actual surgical operation, and provide accurate angle measurements of spinal orientation. The team has designed a device that allows for a surgeon to set spinal rods above and below a surgical site and then manipulate the positioning of the spine by incrementally adjusting and locking the correction angle.

Faces of BME

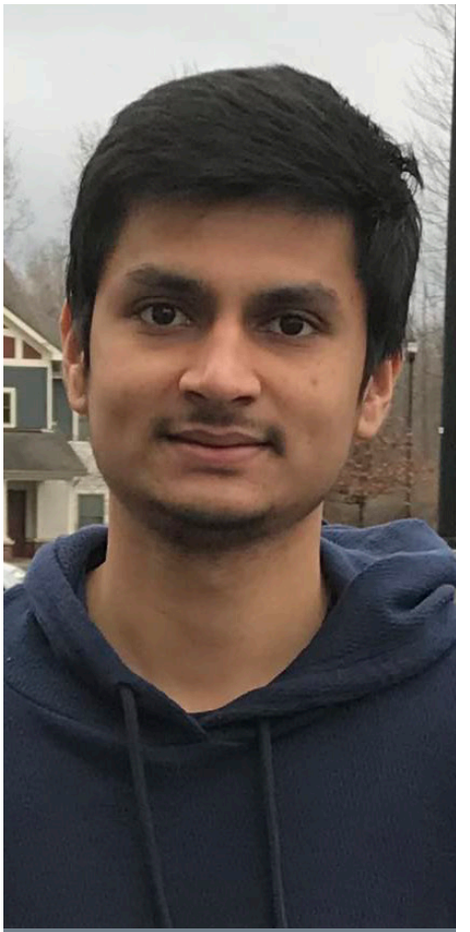
Shane Guasteferro
4th year
Biomedical Engineering

Shane is deeply engaged in the performing arts both on and off-campus. He serves as a section leader in the RIT Jazz ensemble and is a co-founder of "The Jive," an RIT-based jazz quintet known for its dynamic live performances, which have enriched RIT festivals, donor symposiums, and teaching celebrations. He has been an active member of the RIT rowing team and dedicates his time as a youth leader at his local church. Upon graduation, Shane plans to work as a process engineer in the healthcare industry.



Madison Dziulko
4th year
Biomedical Engineering

Madison has been involved in RIT Hot Wheelz (a predominantly female solar vehicle performance team) for four years, holding a leadership position for three years. She helps lead a small group of students to design and build a solar car. She is also co-president of RIT Club Field Hockey. Madison plans on continuing her career in the medical device industry after completing co-ops at Insulet Corporation, The Jacobs Institute, Abiomed, and Viant Medical.



Neil Joshi
5th Year
BME & ChE PhD Program

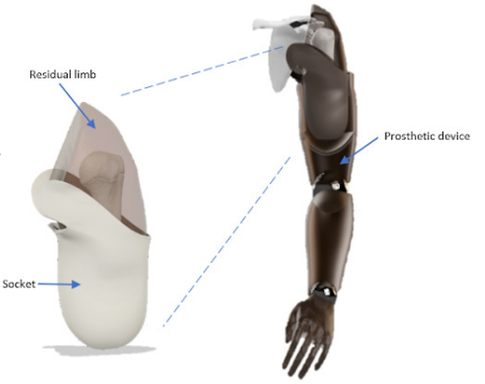
Neil is a doctoral student from Mumbai, India. His research work focuses on understanding the signals that promote directional cell movement in the tumor environment. Outside of the lab, he loves playing soccer and his team has won the RIT intramurals several times. Neil has also represented RIT at an intercollegiate badminton tournament. Neil aims to defend his dissertation in Spring 2025, and plans to continue his work developing techniques to better understand human disease.

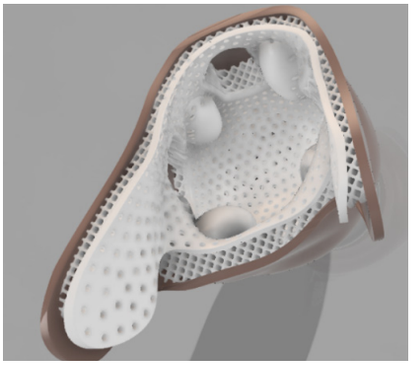
Research Projects

BME faculty have $3M+ in active external grant support. They have been awarded new research grants totaling $1.4M+ and added $700k+ in equipment grants over the past year.

Using Lattice Structures to Improve Prosthesis Design

There is an unmet need for access to functional prosthetic devices across the globe. Each prosthesis must be individually tailored to suit a person's anatomical, sociocultural, economic, and personal needs. Additive manufacturing (AM)-- with its comparatively low cost per part for low volume production-- offers promising potential for addressing the need for bespoke "one-off" devices in an impactful way. Dr. Jade Myers is harnessing AM capabilities to produce geometries difficult or impossible to create using subtractive or formative methods, like CNC or injection molding.

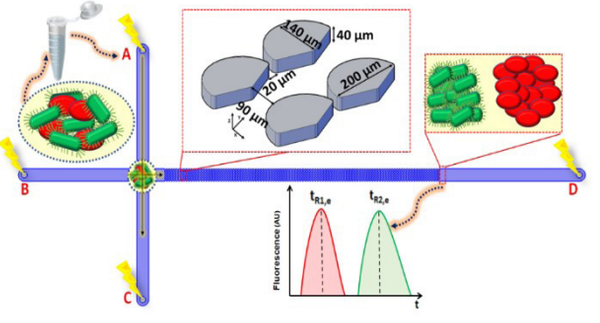




New capabilities include improved prosthetic sockets with density-graded lattices to create thin cushioning layers that increase performance and comfort. A number of custom prosthetic designs are possible, ranging from futuristic models that highlight technological advances in lattice application and generative design, to biologically realistic prostheses designed for users living in areas where sociocultural stigma related to disability may be high. Incorporating density-graded lattice sockets into low-cost printable prostheses can allow greater economic access to devices .

Microfluidic Electrokinetic Separations of Bacterial and Yeast Cells

The Lapizco-Encinas laboratory is focused on developing microscale electrokinetic methodologies for the rapid analysis, separation and purification of microbes. Recent work published in "Separation of Cells and Microparticles in Insulator-Based Electrokinetic Systems", combines mathematical modeling and experimentation to separate three distinct binary mixtures of unicellular organisms by exploiting differences in their dielectric properties. This methodology was used to successfully separate microorganisms that differed both in biological domain (prokaryote vs eukaryote) as well as size. All separation resulted in well resolved electropherograms and experimental results were in agreement with modeling.



Where Are They Going?

Spencer Davis

Research Associate
CMC Quantitative Science
Moderna

Nick Despins

Biomechanical Research
Technician
RunDNA

Samantha Russell

Research Assistant
Analytical Development at
Interius Biotherapeutics

Lauren Audi and Nick Luey

Associate scientists, LCMS
Q2 Solutions

Robin McMahan

University of Rochester
BME PhD Program

Amelia Gilbert and Aidan Hughes

Cornell University
BME PhD Program

Where Are They Now?

Andrew Short	**'22**	Clinical Specialist
Maya Vanderhorst	**'22**	Associate Device Development Engineer
Lauren Switalski	**'21**	Fabrication Engineer
Sara Whitney	**'21**	Manufacturing Quality Engineer
Ramsey Doolittle	**'21**	Research Investigator Cell Therapy
Maggie Brooks	**'21**	Fulbright Scholar at Univerisity of Southampton
Amanda Goodhines	**'20**	Senior Regulatory Engineer
Jeremy Abbey	**'20**	Quality Engineer
Shannon Gulvin	**'20**	Scientist, Upstream Vaccine Process R&D
Emily Lazarus	**'20**	Materials Scientist
Emilie MacKinnon	**'20**	Design Quality Engineer
Philip Tinder	**'19**	Site Process Engineer
Alison Kahn	**'19**	Certified Prosthetist Orthotist
Nathan Schuler	**'19**	Medical Student
Isaac Arabadjis	**'18**	Senior Quality Compliance Analyst
Christine Dobie	**'18**	Senior Mechanical Engineer
Chantel Charlebois	**'17**	Clinical Field Engineer
Kelly Dunn	**'16**	Senior Staff Biomechanics Systems Engineer
August Allen	**'16**	Chief Technology Officer
Amy Zeller	**'16**	Medical Student
Geni Rupley	**'15**	Manager, Research & Development

stryker®

REGENERON science to medicine®

MERCK

University of Southampton

ZIMMER BIOMET

ALCHEMY Orthotics & Prosthetics

UNIVERSITY OF IOWA CARVER COLLEGE OF MEDICINE University of Iowa Health Care

WHOOP®

Takeda

OcuCell

UIC THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE PEORIA CHICAGO ROCKFORD URBANA

BME Co-op Superstars

Our program requires students to complete 48 total weeks of co-op to graduate. These co-op stars have completed 60+ weeks.

BME Co-op & Career Statistics

397
BME Graduates

150+
Employers of Graduates

400+
Employers of Co-ops

Career Seminar Series

Questions like "What types of careers can I pursue as a BME?" and "How will the things in learn in college be useful in my job?" can be complicated to answer. Our department hosts a semester-long career seminar series to inform our students about the BME field by exposing them to the unique experiences of other students, alumni, faculty, and working engineers. Our goal is to provide opportunities for students to build professional relationships and learn valuable insights that will help them succeed beyond RIT.

Congratulations Class of 2024!

Corinne Amato
Lauren Audi
Addie Beishline
Nea Bergendahl
Michael Bermingham
Lydia Blatnik
Emily Burgit
Maggie Carey
Mitchell Carpenter
Roman Czornobil
Abby Dale
Spencer Davis
Nick Despins
Curran Dillis
Tyler Eisman
Olivia Ernst
Jayden Galli
Michaela Geffert
Amelia Gilbert
Jenna Gilbert
Divina Gomes
Madeleine Goulet
Conner Griffin
Jonathan Hacker
Rachel Hamilton
Sam Hebbar
Katherine Howell
Aidan Hughes

McKenna Joint
Adam Kaye
Ellie Knox
Brandon Kostek
Mikkael Lamoca
Ian Lane
Justin Loudis
Nicholas Luey
Iskender Mambetkadyrov
George McGregor
Robin McMahan
Keegan Ocorr
Sean Pacilio
Kevin Plich
Kyle Poorman
Barry Richter
Jessica Ritz
Samantha Russell
Anthony Salerno
Mitch Schauer
Taylor Schofield
Rani Shrivastava
Andrew Slegaitis
Connor Strauss
Justin Vidas
Samuel Wagoner
Neil Williamson
Siobhan Yostpille