

# RIT

**Kate Gleason** College of Engineering  
Department of  
Biomedical Engineering



# ANNUAL NEWSLETTER

## Contents

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- 03.**  
RIT BME Faculty & Staff
- 04.**  
Student Achievements
- 05.**  
Multidisciplinary Senior Design
- 06.**  
Faces of BME
- 07.**  
Research Projects
- 08.**  
Where are They Going?
- 09.**  
Where are They Now?
- 10.**  
BME Co-op Superstars
- 11.**  
Co-op and Career Statistics

**W**elcome to the sixth annual newsletter of the RIT Department of Biomedical Engineering. We can't fit everything that we've done, but I hope that this annual publication gives you a sense of the activities and accomplishments of our students, faculty, and staff during the past year.



We continue to demonstrate how experiential learning through co-op can prepare students to contribute to the world immediately after graduation. And we continue to show how undergraduate and graduate education, including our recently established PhD in Biomedical and Chemical engineering, integrate seamlessly to support funded research programs. Our productivity and funding are very strong for a relatively small faculty.

Thank you for your interest in the department and this newsletter.

-Dr. Steven Day

# RIT BME Faculty & Staff



Missing Dr. Blanca Lapizco-Encinas and Dr. Iris Asllani

The department faculty have secured over \$1.9M in funding in the past year from Federal (NIH, NSF), Industry (Sartorius), Foundation (Scleroderma Foundation), and internal RIT sources. Faculty and students have published over 50 peer reviewed journal and conference papers in the past year.

Faculty Member	Project Title
Vinay Abhyankar	Commercializing the $\mu$ SIM: A Modular Platform for the Development and Analysis of Barrier Tissue Models
Jennifer Bailey	Supplementing Theoretical Modeling with Empirical Data for Improved Design
Steven Day	Development of Blood Delivery Networks for Silicon Nanomembrane-Enabled Low-Volume Membrane Oxygenators
Steven Day	Multifunctional VAD Technology for High-Risk Pediatric Patients
Thomas Gaborski	The $\mu$ SiM-hBBB - a human BBB platform for the study of brain injury mechanisms during systemic infection
Thomas Gaborski	Feasibility of Size Measurement and Characterization of Nanoparticles Using a Sartorius Virus Counter
Blanca Lapizco-Encinas	Harnessing nonlinear electrokinetic effects for microparticle identification and separation in microfluidic devices
Cristian Linte	Biomedical Computing and Visualization Tools for Computer-integrated Diagnostic and Therapeutic Data Science
Michael Richards	Modulation of Insertional Achilles Tendinopathy by Multiaxial Mechanical Strains
Michael Richards	Non-invasive measurement of human hand flexor tendon forces using ultrasound elastography
Karin Wuertz-Kozak	A novel 3D scleroderma skin model to test therapeutic TRPC6 modulation
Karin Wuertz-Kozak	TRPC6 as a diagnostic biomarker and therapeutic target in scleroderma
Zhi Zheng	Measurement and relationship of physiological arousal and stress in children with ASD and caregivers

## New Staff Members



**Tabitha Vick**  
Academic Advisor

Tabitha joined RIT in January 2020 and began advising BME students in fall 2021. She completed her master's degree in college counseling and has previous

experience in counseling, residence life, and teaching. "Kindness and compassion are the words that I live by and they guide my focus and dedication to working with students in higher education."



**Megan Andrews**  
Academic Advisor

Megan joined RIT in January 2022 and is from the Syracuse, NY area. She has her master's degree in student affairs administration from Binghamton University

and has previous experience in admissions. "When I am not advising students, I'm either reading, sewing, or starting a new project."



# Student Achievements

## Writing Award

Jolie Crunelle, a second-year Biomedical Engineering major from Charleston, S.C., representing the Department of Science, Technology, and Society, for “Cultivating Trees and Consciousness: The Success of Environmental Activism in Guatemala when Grown through Feminist Social Justice Theory.” She also received the Mary C. Sullivan Women’s & Gender Studies Writing Award for this work.



## Excellence in Student Life

The award recipient: Maya Vanderhorst, 5th year Biomedical Engineering major.

RIT has been honoring students for this award since 1964 as a way to recognize students who were able to find the balance between academic success and student engagement. Students have been selected for this honor based upon having GPAs over 3.4, and holding significant leadership positions within RIT-related activities. All award recipients are graduating in 2022.

## Community Impact Awards

The award recipient: Christian Waldschmidt, a 2nd year Biomedical Engineering major.

Alfred L. and Ruby C. Davis Scholarship, given to students who have demonstrated significant effort toward the improvement and quality of campus, and administered by Financial Aid.



## Outstanding Undergrad Award

Cara Guernsey, Cassie Robinson, Maya Vanderhorst, and Shane Lockhoof were recognized as 2022 Outstanding Undergraduate Scholars.

The outstanding undergraduate award recognizes the top one percent of RIT students each year. Students awarded with this distinction have completed at least 83 credit hours of study and have a cumulative grade point average of at least 3.85 for university work completed as of last year’s spring term.

# Multidisciplinary Senior Design

Multidisciplinary Senior Design (MSD) Projects prepare students for modern engineering practice through a multidisciplinary, 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.

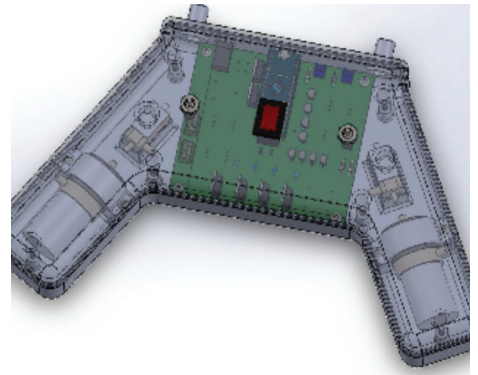


## Medical Finger and Toe Warmer for ICU Patients

In the Intensive Care Unit (ICU), there are situations where patients must be given a medication that constricts blood vessels to increase the systemic blood pressure and keep the patient alive. This treatment can cause a condition known as Symmetrical Peripheral Gangrene where blood flow to the patients' hands and feet is dramatically decreased. The lack of blood flow can cause in tissue death and require amputation of the affected extremities. There are currently no approved medical devices to treat Symmetrical

Peripheral Gangrene. The team designed a device to help maintain or increase the blood flow in the extremities of ICU patients using heat and sequential compression. The device needed to be portable enough to be moved between hospital rooms and simple enough to be applied by the patient care team in less than one minute. The device also needed to have active control systems to ensure that the heat or pressure applied to the patient would not cause any physical harm. The team designed a custom printed circuit board (PCB) and used an Arduino Microcontroller to control the heating ele-

ments, air pump motors, and diagnostic sensors in the handmade heating and compression device. The sponsor (Rochester Regional Hospital), has filed a provisional patent on the technology. BME students involved include: Lauren Smith and Madison Latour.



## Physiological Signals to Fun

The brain communicates with muscles using electrical signals that initiate contractions allowing you to flex, lift, or otherwise exert your muscles. The goal of this project is to provide the user with a visual representation of their muscle movement, both in the form of a graph and mechanical movement via motors.

The final design of this project allows the user to attach electrodes to their forearm or bicep and create a geometric drawing. The electrodes collect physiological signal and translates this information into a speed for the motor to spin. The large motor is connected to the large gear, and there is a direct correlation between the amount the user flexes and the speed at which the motor spins. The small motor is connected to a belt, which moves the pen back and forth upon flexion to increase the geometric options for the drawing. BME students involved include: Katie Leon, Madelyn Ostermann, and Noah Bennett.



# Faces of BME



## Kel Hakim

5th year Biomedical Engineering graduate

After a trip to Guatemala with Engineering World Health, I decided to commit to building testing machinery for a better future. I've done on campus research, as well as community service trips with my fraternity, and am an active admissions ambassador, welcoming hundreds of families to RIT's campus each year.



## Mehran Mansouri

Biomedical and Chemical Engineering PhD

I chose RIT because of two reasons: 1) Participating in Interdisciplinary programs and research, and 2) Finding faculty with relevant research to my interests. I'm working on designing microfluidic platforms for mimicking barrier tissue models and tissue microenvironments.

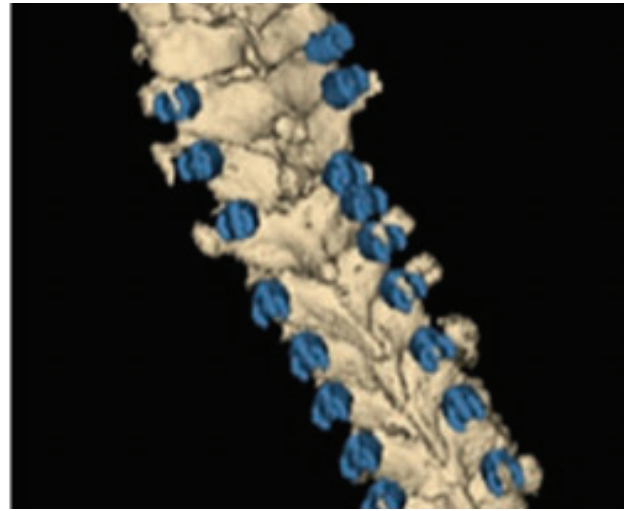
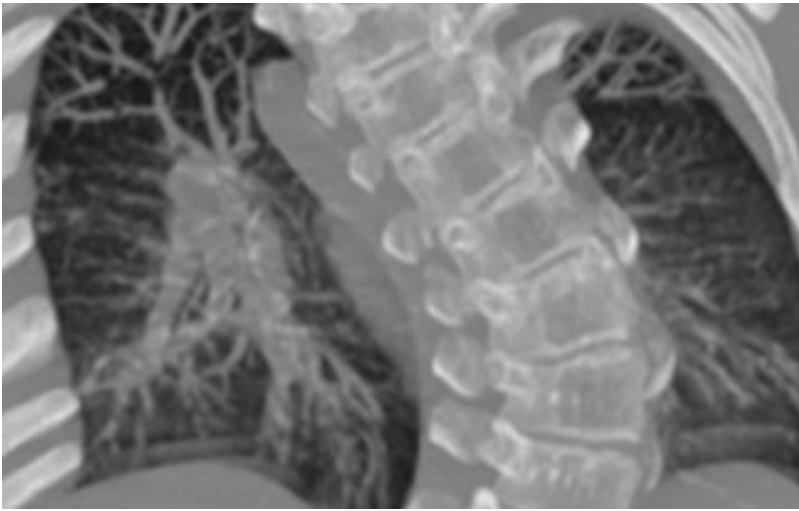


## Krittika Goyal

Microsystems Engineering PhD

I came to RIT for my graduate program for exposure to path-breaking research, hands-on experience in advanced labs, excellent faculty, and to work with motivated teams solving real-world projects. I'm working on improving the signal quality from dry electrodes to overcome the challenges of in-home physiological monitoring devices.

# Research Projects



## Biomedical Modeling, Visualization and Image-guided Navigation (BiMVisIGN) Lab

Effective utilization of biomedical informatics to develop versatile visualization tools will enable more accurate and timely disease diagnosis and less invasive therapies. These tools will impact a larger patient population, enabling access to healthcare, while improving the efficacy of current approaches. Research in the BiM-VisIGN lab focuses on the development, implementation and validation

of innovative computational bioinformatics tools that leverage biomedical computing, modeling & visualization to improve disease understanding, diagnosis and treatment. These tools help 1) quantify and characterize anatomy and physiology to detect and track disease progression; 2) plan and simulate optimal treatments; and 3) clearly “see”, safely “reach” and effectively “manipulate” sites

inside the human body with minimal invasiveness and trauma. Our research program integrates four synergistic research themes that together contribute to effectively visualizing and interacting with heterogeneous biomedical data. The images show a CT image and volume rendered virtual model of a deformed spine instrumented with pedicle screws for spinal deformity correction surgery.

*The BiMVisIGN Lab is led by Dr. Cristian A. Linte.*

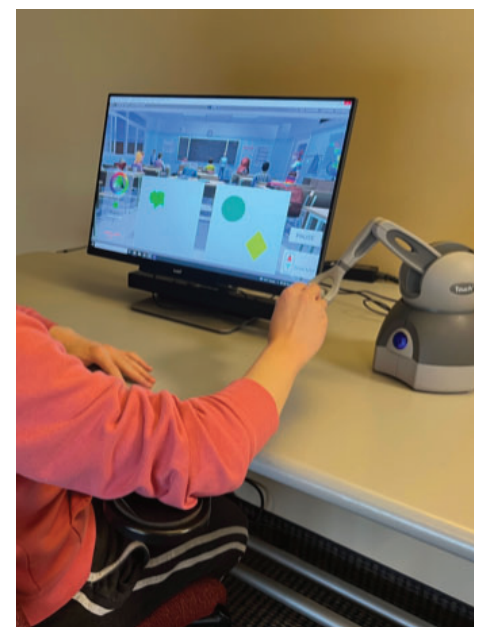
## The Intelligent Interaction Research Lab

We are a group of engineers who work closely with psychologists, cognitive scientists, social workers, nursing experts, and other professionals. Our research focuses on the design, development, and validation of advanced interactive technologies to help individuals with mental/cognitive disabilities.

Currently, we are investigating the sensory pattern and differences in children with Autism Spectrum Disorder and typically developing children through a newly designed virtual classroom. Using virtual

reality, precisely controlled sensory (e.g., visual, auditory, and touch) stimuli can be delivered naturally mimicking those in real-life scenarios. Users' responses to these stimuli are detected in high resolution by advanced human behavior sensing technologies, such as eye-tracking and haptic sensing. Through computational data mining, sensory patterns that cannot be disclosed using traditional assessment instruments are revealed.

*The Intelligent Interaction Research Lab is headed by Dr. Zhi Zheng.*





# Where Are They Going?



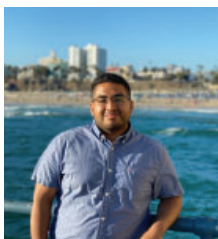
**Rachel Strader**

I plan to attend Duke University in Durham, NC and pursue a PhD in Biomedical Engineering.



**Caitriona McLaughlin**

I will be joining Moderna, Inc. in Norwood, MA as a Research Associate in their Analytical Science & Technology Department.



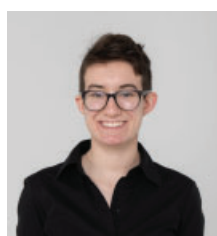
**Edgardo I Franco Jr.**

I plan to attend the University of Rochester in Rochester, NY and pursue a PhD in Biomedical Engineering.



**Michaela Mesiti**

I will be joining the US Air Force as a biomedical engineer at Wright Patterson Air Force Base near Dayton, OH.



**Katie Leon**

I will be joining DEKA Research and Development in Manchester, NH as a Junior Systems Engineer.



# Where Are They **Now?**



**Anup Jonchhe, 2019**

Cambridge, MA

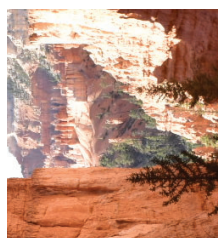
Anup designs and builds data processing pipelines and information management workflows with the PRISM Lab Cancer Program at the Broad Institute.



**Tony Yosick, 2019**

Syracuse, NY

Tony is a continuous improvement engineer at Baxter, Inc. and he will be beginning his PhD in Biomedical Engineering at University of Rochester in Fall 2022.



**Sierra Chimene, 2021**

Philadelphia, PA

Sierra is an associate engineer for large molecule drug product development at Janssen Pharmaceutical Companies of Johnson & Johnson.



**Erin Butler, 2021**

New York, NY

Erin is completing a MS degree in mechatronics and robotics at NYU.



**Spencer Perry, 2019**

Albany, NY

Spencer is finishing his 3rd year of medical school at Albany Medical College and plans on applying to cardiothoracic surgery residency programs.



**Mark Truskinovsky, 2021**

Rochester, NY

Mark is completing a MS degree focused on medical device design and development at the University of Rochester



**Charles Okehie, 2021**

Leesburg, VA

Charles is a development engineer on the Physician Requested Optimization Team at Stryker.



**Conor McKaig, 2018**

Rochester, NY

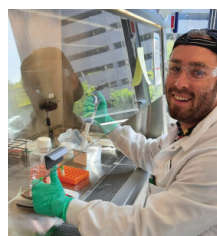
Conor is a Product Support Scientist at Ortho Clinical Diagnostics working on building up and supporting manufacturing for a new line of diagnostics assays.



**Kaylie McEntire and Matthew Sullivan, 2021**

Cambridge, MA; Boston, MA

Matt is a Research Associate in Oncology at Moderna Inc. and Kaylie is a Regulatory Specialist for hematologic malignancy clinical trials at Beth Israel Deaconess Medical Center. They are engaged and getting married in 2023.



**Jim Cummings, 2018**

Cambridge, MA

Jim is an engineer at Intellia Therapeutics and works on their new in-house bioreactor to produce gene therapy vectors for their rare disease pipeline.





# 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 of co-op.



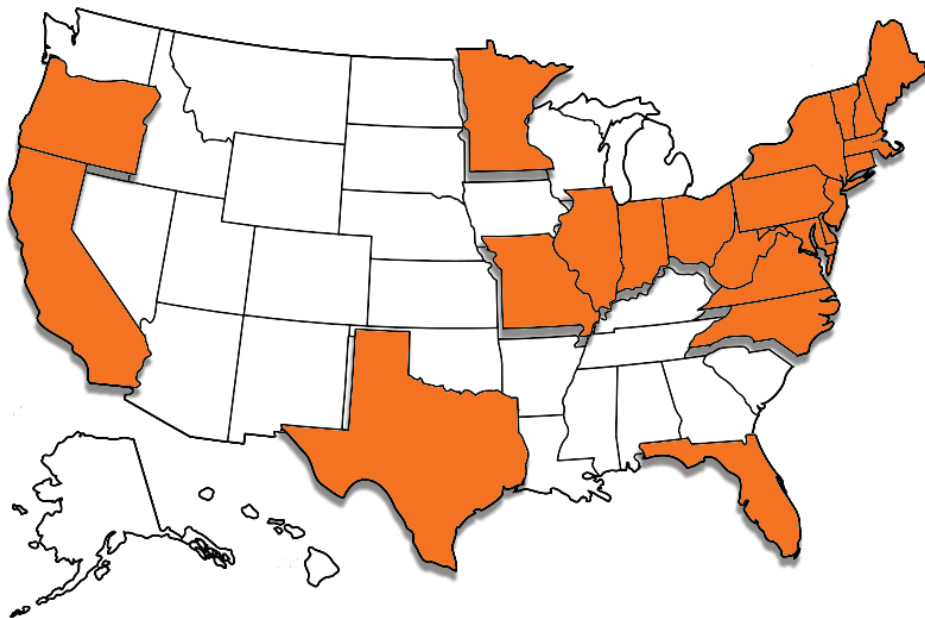


# Co-op & Career Statistics

## Across the country

A part of pursuing a BME undergraduate degree here at RIT, students have the opportunity to complete co-ops for a duration of a summer and an academic semester.

Many students have taken up positions across the U.S. They gain skills and experience from working in a new professional environment. Students are often offered a full time position after graduation.



## Top Employers

Hill-Rom

Johnson & Johnson

B+L

BAUSCH + LOMB

ABIOMED

moderna™  
messenger therapeutics

121

Employers  
of Graduates

335

Graduates  
in BME

312

Employers  
of Co-ops

# Congratulations Class of 2022!

\*\*\* Noah Walter Gallmann Bennett  
\* Katlynn Marie Bisesi  
\*\*\* § Claire Abigail Bratton  
Morgan Bremer  
\*\*\* Zachary William Browne  
\*\*\* § Mercy Chado  
\*\*\* Marisa Beth Cohen  
\*\* Amanda Nicole Coogan  
\*\* § Andrew John Cook  
Dawsen Cole Crum  
\*\*\* John Walter Louis Raketsky-  
Czukkermann  
\*\*\* Edgardo Ismael Franco Jr.  
Tyler Scott Franklin  
\* Luke James Green  
\*\* Kel Sebastian Hakim  
\*\* Austin Christopher Head  
\*\*\* Kyle Patrick Jerreld  
Rhannon Mikaela Jimenez  
\* Stephen Larson  
Madison Alexandria Latour  
\*\* Katie Elizabeth Leon

Jamie Nicole Leonardo  
\*\*\* Andrew Marcellin  
\* Caitriona Rose McLaughlin  
Michaela Christine Mesiti  
\* Sarah Elizabeth Miller  
\* Madelyn M. Ostermann  
\* Matthew John Pencille  
Alexander John Prunoske  
\*\* Colette Amelia Rigas  
\*\*\* § Cassie May Robinson  
Joshua Ray Nielo Samodal  
\*\* Michael Edward Schrader  
\*\* Andrew Joseph Short  
\*\*\* Lauren Rose Smith  
Trevor Aaron Snow  
Krystyna Elaine Sterio  
\*\*\* Rachel Louann Strader  
Liam Andrew Stuart  
\*\*\* Julia Lyn Vaillancourt  
\*\* § Katelyn Woolley