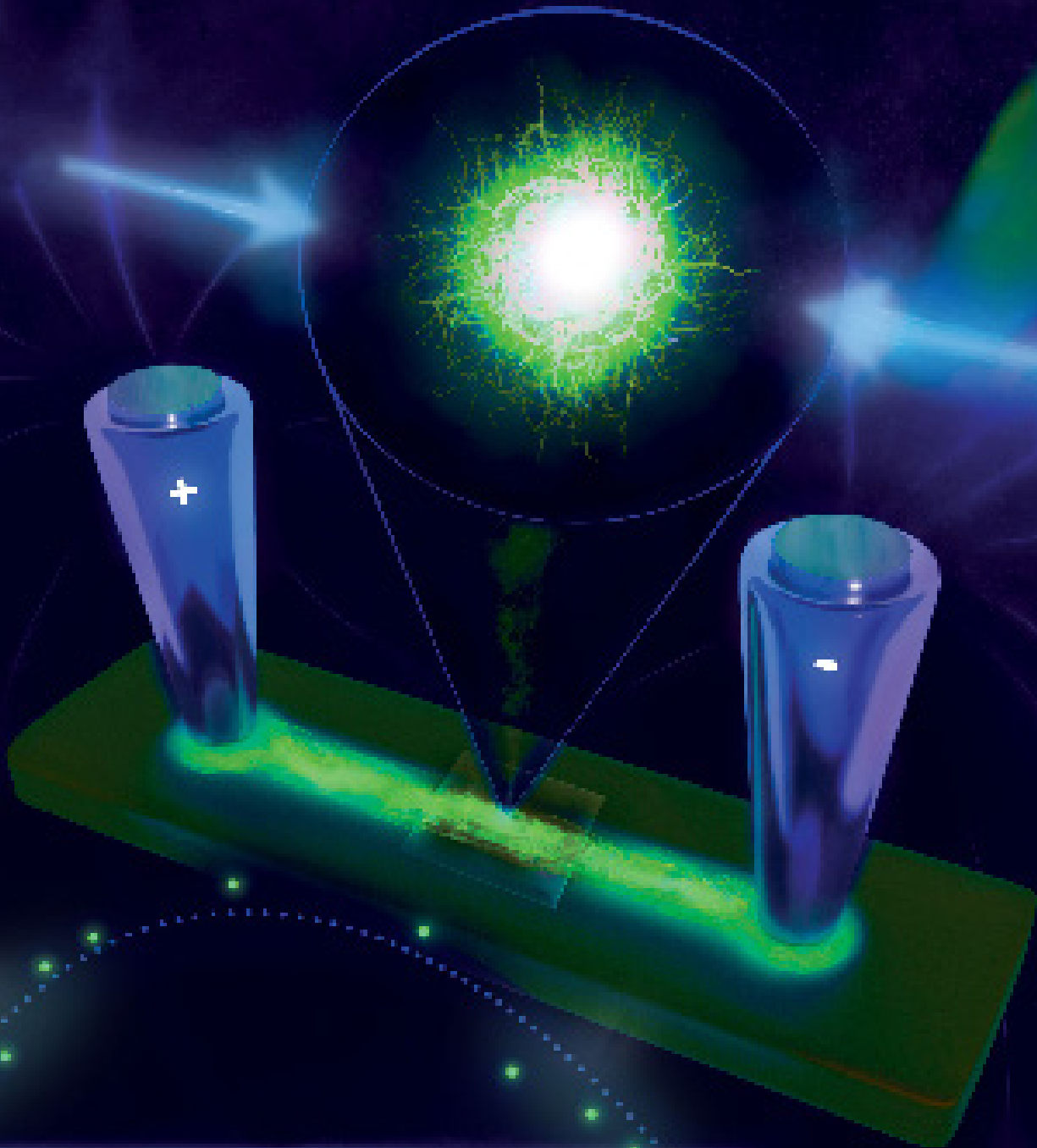


# RIT

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



**2022-2023 Newsletter VOL. 7**

# ANNUAL NEWSLETTER

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### Cover Page:

Microparticle in a microfluidic device under the effects of electroosmosis and linear and nonlinear electrophoresis. Prepared by BME undergraduate student Olivia Ernst and designed by Joanne Park '23 MFA.

It is with great pleasure that I introduce the latest edition of our department newsletter. As the head of the Biomedical Engineering department, I am very proud of the work being done by our talented faculty and staff. They create technologies and



tools that contribute to improved human health and they continue to improve a world class curriculum to train the next generation. Our students are doing great things inside and outside of class and our alumni are thriving.

This newsletter is an excellent opportunity to showcase the accomplishments of our students, faculty, and staff and a testament to the ongoing success of the department. Inside these pages, you will find stories of collaboration, groundbreaking research, and inspiring student successes.

Thank you for your continued support and interest in our program.

Sincerely,  
Steven Day

# RIT BME Faculty & Staff



## 2023 Department Accolades

### Advising Excellence

Tabitha Vick was honored for Provost's Excellence in Academic Advisor.

### Outstanding Service

Jade Meyers was honored with the Bruce R. James '64 Distinguished Public Service Award.

### PI Millionaires

Vinay Abhyankar and Karin Wuertz-Kozak joining those receiving \$1 million or more in cumulative external funding.

### Faculty and Service Excellence

Blanca Lapizco-Encinas was awarded Provost's Excellence in Faculty Mentoring and the 2022 AES Distinguished Service Award.

### 2022 KEEN Engineering Unleashed Fellow

Jennifer Bailey was named for outstanding leadership in undergraduate engineering education.

## New Faculty



### Travis Meyer

Lecturer

Travis joined the department in the Fall of 2022. He received a B.E. from Vanderbilt University and a Ph.D. from Georgia Institute of Technology. His research experience in graduate school and

post-doc was in the fields of nanomedicine, polymer synthesis, and DNA nanotechnology. In his free time, he enjoys reading and playing board games.

## Promotions

- **Steven Day** and **Tom Gaborski** were promoted to Professor.
- **Vinay Abhyankar** was awarded tenure and promoted to Associate Professor.
- **Jennifer Bailey** was promoted to Principal Lecturer.
- **Renee Milliken** was promoted to Office Manager.

# Student Achievements



## Outstanding Undergraduate Scholar Awards

Amelia Gilbert, Makenzie Kommer, Lily Mussallem, and Emma Oar were recognized as 2023 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 grade percentage average of at least 3.85 for university work completed as of last year's spring term.

## Student Leadership Awards

Ann Byerley, Cara Guernsey, Grace Reinartz and Shane Lockhoof were honored with the Excellence in Student Life award. They maintained GPAs over 3.4 and held significant leadership positions within RIT-related activities. Rafi Karim was honored with the H. Preston Herring Award (RA of the Year) and the International Student Outstanding Service Award. Grace Reinartz and Lauren Zeglen were honored with the 2023 Legacy Leader Award for leaving an impact on RIT and the Rochester community.



## Fulbright Scholar

Maggie Brooks '21 received a Fulbright Award to pursue her goal of improving access to quality prosthetic devices in low-resource areas. She will be getting a master's in Amputation and Prosthetic Rehabilitation at the University of Southampton in England. While in England, she will be engaging with the community by volunteer coaching for an artistic swimming team and getting involved in the university's baking society.

## Emerging Leader Award

The KGCOE Emerging Leader Award recognizes recent alumni who have graduated within the past 10 years and provide outstanding service to RIT, their profession, or community. Last year's 2022 honorees were August Allen '16 and Andrea Mazzocchi '16. This year's honoree, Sean Bellefeuille '20, is a veterinary student at Cornell University and CEO of Med Dimensions, a novel medical models company whose mission is to make surgery safe and simple.



# 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.

## Continuous Glucose Monitoring for Dogs and Cats

Diabetes technology is at the forefront of the modern healthcare industry. One of these devices is a continuous glucose monitor (CGM), a device that determines the blood sugar levels in those who have diabetes without the need for a finger prick. However, these solutions are focused on the human species. Currently, diabetic animals receive daily insulin injections, follow a strict, special diet, and a good fitness regimen to keep their blood sugar stable. This senior design project presents a large-scale CGM that hopes to put owners at ease and allow veterinarians to explore animal endocrinology and diabetes in depth.

The prototype communicates sensor data to a collar attachment,

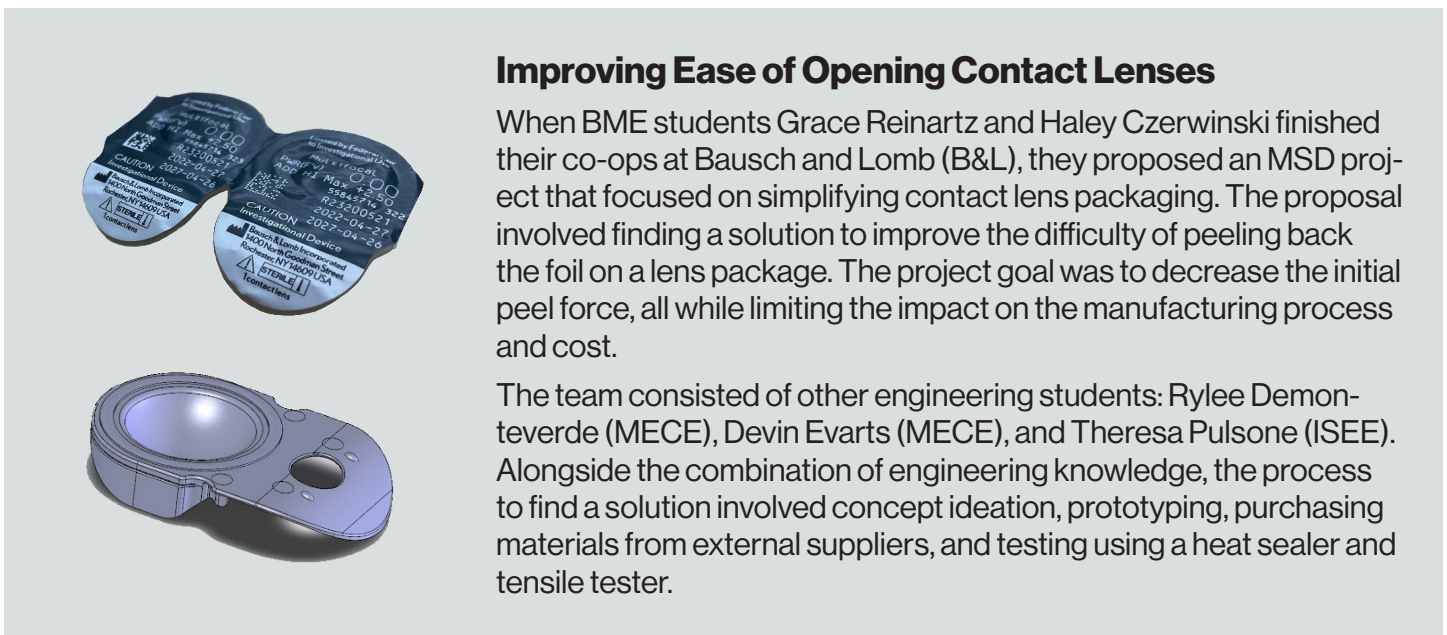
which then sends data to a smartphone that can be visualized by the user.

The team is composed of 3 senior BMEs, Lily Mussallem, Lauren Zeglen, and Anya Filosi, who are working alongside Joey Testa (EE), Renee Banagan (MECE), and Ryan Snyder (CE). They are guided by Dr. Cory Stiehl and client Don Pophal. The team was inspired by animal micro-chipping, implantable physiological signal monitors, and even small GPS devices, like the Air Tag.

The BME seniors have been able to explore the realm of electrochemical biosensors, physiological monitoring systems, and even semiconductor development



and manufacturing. “The most interesting part to me was learning how microelectronic sensors are manufactured for biosensor applications,” said Filosi. “The best part about this project was the opportunity to connect with a lot of different people and departments at RIT,” said Zeglen. “We met a lot of impressive people who helped us throughout the design process.”



## Improving Ease of Opening Contact Lenses

When BME students Grace Reinartz and Haley Czerwinski finished their co-ops at Bausch and Lomb (B&L), they proposed an MSD project that focused on simplifying contact lens packaging. The proposal involved finding a solution to improve the difficulty of peeling back the foil on a lens package. The project goal was to decrease the initial peel force, all while limiting the impact on the manufacturing process and cost.

The team consisted of other engineering students: Rylee Demonterverde (MECE), Devin Evarts (MECE), and Theresa Pulsone (ISEE). Alongside the combination of engineering knowledge, the process to find a solution involved concept ideation, prototyping, purchasing materials from external suppliers, and testing using a heat sealer and tensile tester.

# Faces of BME



## Taylor Schofield

4th year  
Biomedical Engineering

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Taylor is a member of the RIT Western Equestrian Team, and served as the 2020-2021 captain. Also, she is the Genesee County 4-H Beef Club leader and organizes monthly meetings for the 60+ members. Local youth learn about the beef industry and raise a steer to be sold at the Genesee County Fair. Taylor is also a youth gymnastics coach at MCA Gymnastics and plays the flute in the Batavia Concert Band.



## Max Likens

5th year  
Biomedical Engineering

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Max helped re-found the A Space campus group, helped organize outreach events within the RIT and Rochester community and served as treasurer. They also sing barbershop with Surround Sound, coordinated recording of an album, and served as business manager. Additionally, Max has been an avid member of the RIT Bird-watching Club and volunteers for Shriners Children's Hospital in Massachusetts.



## Rylee Demonteverde

5th Year  
Mechanical Engineering

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Since 2018, Rylee has been a BME Student Office worker. She has greeted people at the front desk and helped prepare important documents like flyers, co-op logs, and designed the newsletter layout. She is also involved in intramural soccer, WE@RIT and New Student Orientation. In May, she will graduate with a bachelor's and master's in Mechanical Engineering. She plans on working in the medical device industry.

# Research Projects

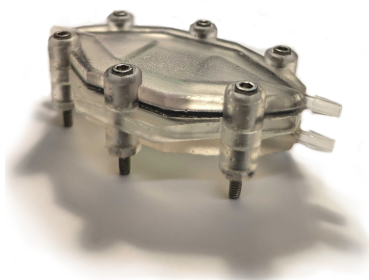
The department faculty have secured over \$2.5M in funding over the past year from Federal (NIH, NSF, Army) and Industry (Sartorius) sources. Faculty and students have published over 50 peer reviewed journals and conference papers in the past year.

Faculty Member	Project Title
Vinay Abhyankar	Directed Cell Motility Along Gradients in Extracellular Matrix Fiber Alignment
Vinay Abhyankar	Collaborative Research: Microengineered Tumor-Mimetic Collagen Landscapes to Test the Role of Prognostic Structural Cues on Cell Migration Through the Extracellular Matrix
Vinay Abhyankar	Electrokinetic lithography: in situ microengineering of anisotropic 3D collagen matrices
Thomas Gaborski	FMSG: Bio: Advancing Extracellular Vesicle Biomanufacturing of CRISPR-Edited Human iPSC-derived MSCs with Next-Generation Purification
Karin Wuertz-Kozak	Development of size-selective capture and release membranes for purification of extracellular vesicles
Thomas Gaborski	Feasibility of Size Measurement and Characterization of Nanoparticles Using a Sartorius Virus Counter
Thomas Gaborski	The uSiM-hBBB - a human BBB platform for the study of brain injury mechanisms during systemic infection
Blanca Lapizco-Encinas	Purification of bacteriophages using cascade-driven electrokinetic separation
Karin Wuertz-Kozak	Substrate Stiffness, Topography, and TRPV4 in AF Mechanotransduction
Karin Wuertz-Kozak	A novel 3D scleroderma skin model to test therapeutic TRPC6 modulation

## Collaboration with the University of Rochester and SiMPore

The BME department has an established collaboration between the University of Rochester and SiMPore, a local manufacturer of novel ultra porous silicon nitride membranes. Several federal grants fund this joint effort and aim to integrate silicon nanomembranes developed by SiMPore with the tissue chip expertise and technology development capabilities at RIT and UR. This collaboration aims to explore a broad range of scientific questions and novel applications. Of the several projects completed or underway, we feature two here.

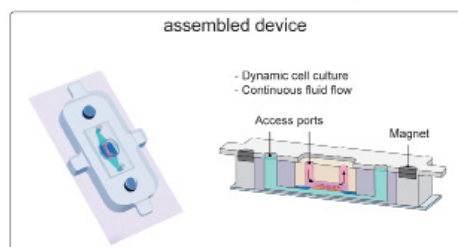
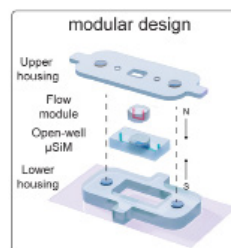
### Miniaturized ECMO



A significant problem when treating life-threatening lung problems in newborns and infants is the large size of lung function replacement devices (known as extracorporeal membrane oxygenators). Steven Day's lab aims to miniaturize the size of such devices to a scale more appropriate for newborns, accomplished through the use of highly permeable silicon nanomembranes instead of polymer membranes typically used in currently approved devices. This project focuses on the design of blood flow path so that gas exchange may occur more efficiently, thereby reducing problems such as bleeding and clotting.

### Modular Microfluidics

A second project in Vinay Abhyankar's lab is developing a microfluidic tissue chip platform to introduce fluid flows to endothelial cells cultured on a silicon nanomembrane. The optical clarity of the nanomembrane enables real-time visualization of immune cell transmigration across the endothelial barriers. Compatibility with standard cell biology protocols allows end-point analysis such as gene-level readouts to be performed with a simple workflow. The goal is to provide a platform to support barrier tissue research in engineering and biology-focused laboratories, with specific applications related to the blood-brain barrier.



# Where Are They Going?



**Ann Byerley**

I will be starting medical school at LSU Health Science Center New Orleans in the Fall of 2023.



**Rafi Karim**

I will be working as a Research Associate at Moderna in Cambridge, MA.



**Aoife Cannon**

I will be working in the RNA Chemical Biology group at Moderna in Cambridge, MA.



**Makenzie Kommer**

I will be working as a Test Engineer at Baxter in Skaneateles, NY.



**Kelsie Fobare**

I will be working for L3 Harris in Rochester, NY as a Senior Production Planner.



**Emma Oar**

I will be working for Moog Inc. in East Aurora, NY as an Associate Engineer in the Space and Defense Group.





# Where Are They Now?



**Ian Morency '15**  
San Diego, CA

Ian earned an MS in Engineering Management at Tufts University and works as a Sr. Partner Solutions Engineer for Imprivata.



**Tyler Roneker '17**  
Buffalo, NY

Tyler is an R&D Engineer at The Jacobs Institute and completing an MS in Product Development at RIT.



**Morgan Stoessel '15**  
Rochester, NY

Morgan is currently working as a Medical Device Engineer at Bausch and Lomb.



**Adriana Coll De Peña '20**  
Providence, RI

Adriana is a 3rd Year Biomedical Engineering Ph.D. Candidate in the Tripathi Laboratory at Brown University.

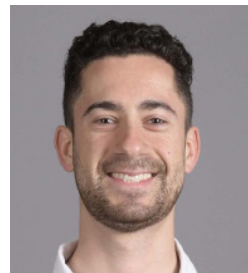


**BROWN**



**Geni Rupley '15**  
Cincinnati, OH

Geni is a Senior R&D Biomedical Engineer at AtriCure, while simultaneously completing an MBA at Indiana University.



**Joey Mylott '20**  
Baltimore, MD

Joey earned his MS in BME from the Wake Forest University School of Medicine and works for the Baltimore Orioles as a Biomechanist.



**Ana Peredo '17**  
Miami, FL/Greenwich, CT

Ana earned her PhD at the University of Pennsylvania and is an Investment Associate at Soleus Capital Management, L.P.





# 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.

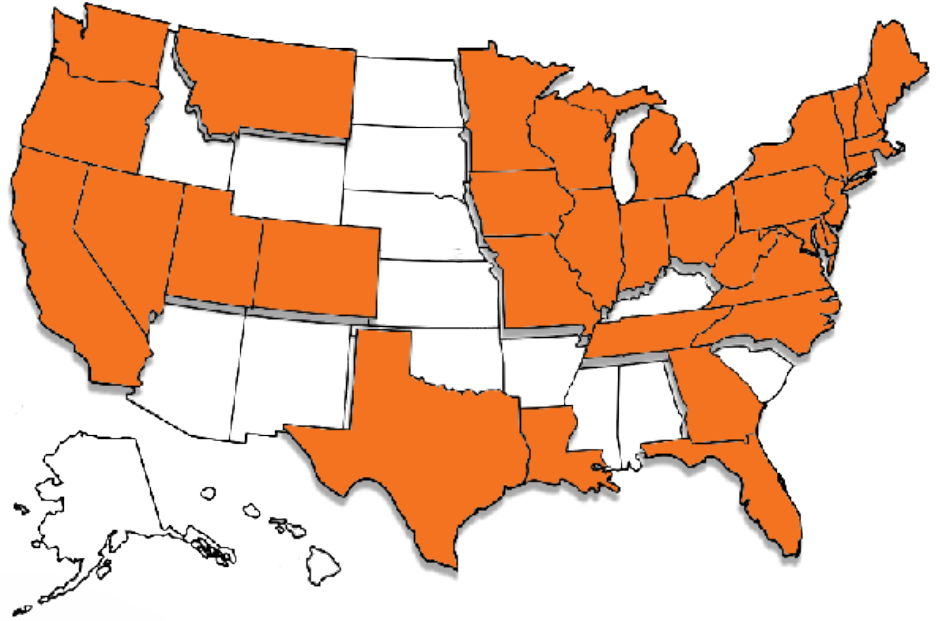


# Co-op & Career **Statistics**

## Across the country

Students complete 48 weeks of co-ops and apply academic knowledge to real world problems.

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.



**341**

BME  
Graduates

**149**

Employers  
of Graduates

**380**

Employers  
of Co-ops



"At LifeLens Technologies, I worked on evaluating raw materials and processing conditions. I worked on starting up and modifying their manufacturing process within a small company setting, along with research and development responsibilities revolving around material evaluations to improve product functionality."

- **Claudia Vondra**  
5th Year BME



"At Steris, I felt like I was valued since day one and they trusted me to complete important projects on my own. I was able to develop a lot of technical skills such as DOEs, data analysis, 3D printing, laser engraving, and injection molding. Along with technical skills, this experience really polished my personal skills, mainly communication, team work, and organization."

- **Matthew Johnson**  
5th Year BME

# Graduate and PhD Programs

Undergraduate education remains a core value of the department, but we now have several associated graduate programs, as well.



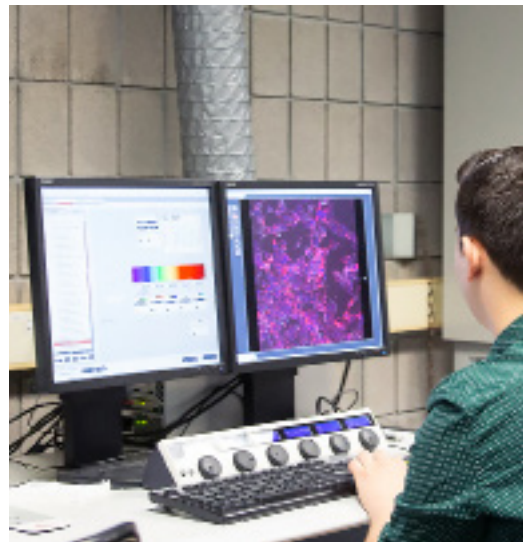
**MS in Science, Technology, and Public Policy** focuses on public policy affecting the environment, transportation, biomedical science, and scientific developments. This is a great fit for those interested in the regulatory side of BME.

We have an application for an **MS in Biomedical Engineering** pending with New York State. When approved, this one year program will include the opportunity for paid co-op and include an emphasis on the Biodesign process.

Through a combination of counting three courses (9 SCH) towards both a BS and MS degree, and reducing the required weeks of co-op in order to allow an additional semester of courses, students can obtain a BS and MS degree in the same 5-year period as our BS in our Dual Degree program. Prospective students can be conditionally accepted to **Dual Degree** programs when applying for their BS degree through our recently established **Accelerated Scholars** program.

The Saunders College of Business **Online Executive MBA** program now includes a concentration in Life Sciences that includes courses delivered by Biomedical Engineering and the College of Science.

Approximately 30 PhD students are advised by Biomedical Engineering faculty in programs including our recently launched **PhD in Biomedical and Chemical Engineering**, as well as established PhD programs in Microsystems Engineering and Imaging Science.



# Congratulations Class of 2023!

Eric Ansteth  
\* Jarrett Bailey  
Liam Berrin  
Evan Bilafer  
\*\* Conor Bollin  
Brandon Boncella  
\*\*\* Allison Buser  
\*\*\*§ Ann Byerley  
\*\* Aoife Cannon  
Samantha Chan  
Kathryn Comerford  
\*\*\* Meghan Courtney  
Haley Czerwinski  
\*\* Seth Dash  
\*\* Austin Davis  
Nicholas Doherty  
\*\* Sean Duffy  
\*\*§ Jonathan Eastman  
\* Christopher Falcone  
\* Anya Filosi  
Benjamin Fischer  
\* Nathaniel Fisher  
\*\*\* Kelsie Fobare  
\*\* Kayla Grossman  
\*\*\* Cara Guernsey  
\*\*\* Sloan Howard

James Jablonski  
\* Matthew Johnson  
\* Rafi Karim  
\* Ethan Klesch  
\*\*\* Makenzie Kommer  
Maxwell Likens  
\*\*\*§ Shane Lockhoof  
\*\*\* Lily Mussallem  
\*\*\* Catherine Musumeci  
Daniel Nadel  
\*\*\* Emma Oar  
\*\* Grace Reinartz  
Jacob Reyingoudt  
\* Christopher Sherman  
\*\* David Silver  
Olivia Sitter  
\*\*\* Joe Spagnuolo  
Brennen Szysh  
\*\*\* Maya Vanderhorst  
\*\* Claudia Vondra  
\*\*\* Sydney Weingart  
Jacob Wells  
Otto Wilson III  
Max Yu  
\*\* Lauren Zeglen  
\*\*\* Margaret Ziemann