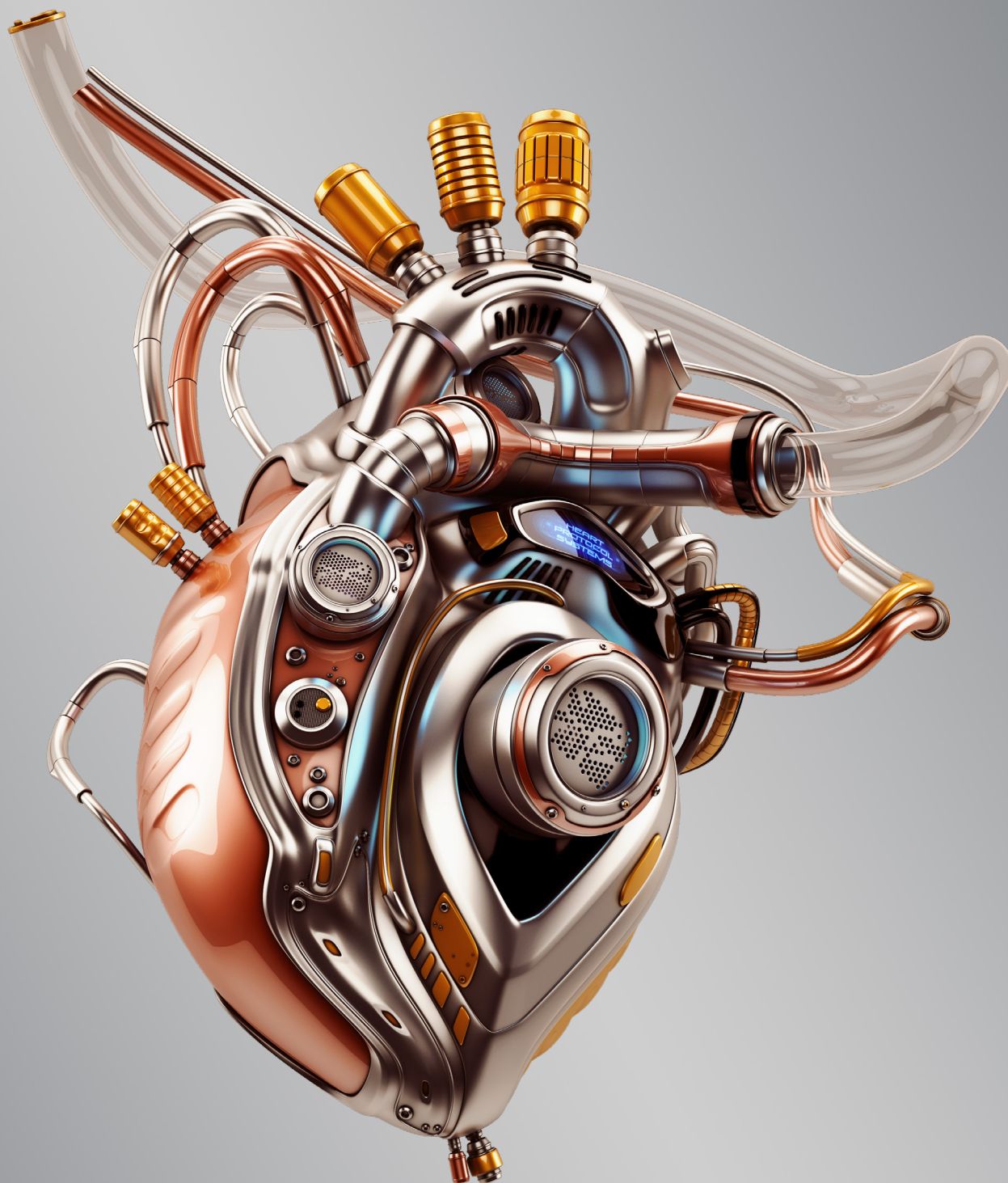


RIT

Kate Gleason College of Engineering
Department of
Biomedical Engineering



2018-2019 Newsletter
VOL.3

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RIT

Rochester
Institute of
Technology

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Congratulations!

Letter from Department Head



Welcome to the third annual newsletter of the RIT Department of Biomedical Engineering. We had another exciting year in the department, and continue to demonstrate how experiential learning through co-op can prepare students for industry, academic research, and medicine. We continue to show how undergraduate and graduate education can be integrated seamlessly into federally funded research.

We will graduate forty-eight students this year, having grown quickly from the inaugural class in 2015. I couldn't be more proud of the success of our students within classes, labs, jobs, and clubs. Our alumni have gone on to top graduate and professional programs, and more than two hundred fifty companies have hired our students for co-op and full-time positions.

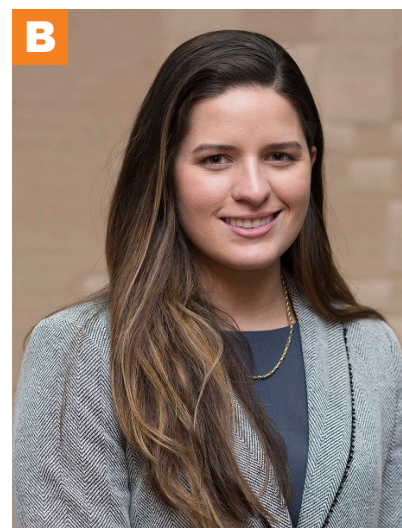
Our students continue to amaze and impress me. They balance classwork with a wide variety of extra-curricular activities. Within this newsletter, we highlight student athletes within BME RIT. Their management of academics and athletics, through teamwork and hard work is truly commendable.

We welcomed one new faculty member to the department this year and two of our faculty were tenured or promoted. Everyone is involved in highly relevant research projects with strong collaborators; Our productivity and funding is very strong for a relatively small group of faculty.

Thank you for your interest in the department. Best wishes for another successful and productive year!

Steven W Day

Student Achievements



A Haiti became a classroom for more than a dozen RIT students, including fourth year BME student Emily Lazarus and 2018 graduate, Issac Arabadjis. The pilot course was designed to match students at RIT with partners from a Haitian nonprofit called SEE Fanm—Sante (Health), Edikasyon (Education), Ekonomi (Economy) for Fanm (Women)—to establish sustainable business products and services, primarily for health care and education.

B Adriana Coll De Peña, who is a double major and Master's student, is the Gosnell School of Life Sciences 2019 Research Scholar recipient. Designed for students who want intensive research experience, the program offers students the opportunity to write proposals, provide regular progress reports, present at a seminar, and publish a final report. Many of these reports appear in peer-reviewed scientific publications.

C Chiara Young, a third year student, received the Patrick P. Lee Foundation Scholarship for the 2019-2020 academic school year. This prestigious scholarship is given in recognition of a student's academic accomplishments and their demonstrated commitment to campus and community engagement. The Patrick P. Lee Foundation is dedicated to supporting outstanding students like Chiara.

D Emma Kurz, a third year student, joins an elite group of students who have completed a minimum of 83 credit hours of study and established a cumulative grade point average of at least 3.85 for all work completed at RIT as of the previous Spring term. In doing so, she was recognized with an Outstanding Undergraduate Scholar Award. Emma accredits Mrs. Vibber, her high school math teacher, on having the largest impact on her education.

BME Athletes

This academic year, more than 10% of BME students were playing a varsity sport at RIT. *Our students made up more than 20% of the women's soccer team!* These 32 students balance commitments to academics and athletics daily. They succeed both on and off the field/court/rink because of their time-management, discipline, and teamwork.



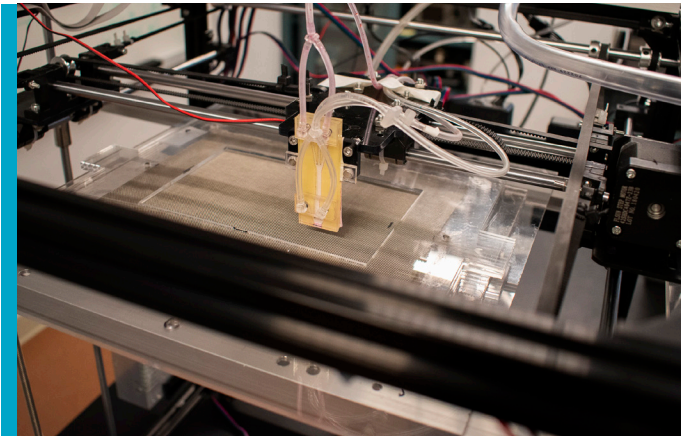
Athletes: Erin Butler - Soccer, #22; Katherine Cameron - Lacrosse, #22 (C); Kayla Grossman - Soccer, #20; Colette Rigas - Lacrosse, #2; Krystyna Sterio - Lacrosse #22; Rachel Strader - Soccer #17; Julia Vaillancourt - Softball, #6 (C); Katelyn Woolley - Soccer, #3

Team Participation

Soccer (W)	6	Softball	2
Crew (M)	3	Basketball (M)	1
Swimming/Diving (M)	3	Hockey (M)	1
Wrestling	3	Hockey (W)	1
Lacrosse (W)	3	Swimming/Diving (W)	1
Baseball	2	Tennis (W)	1
Crew (W)	2	Track and Field (M)	1
Cross Country (W)	2		

Multidisciplinary Senior Design Projects

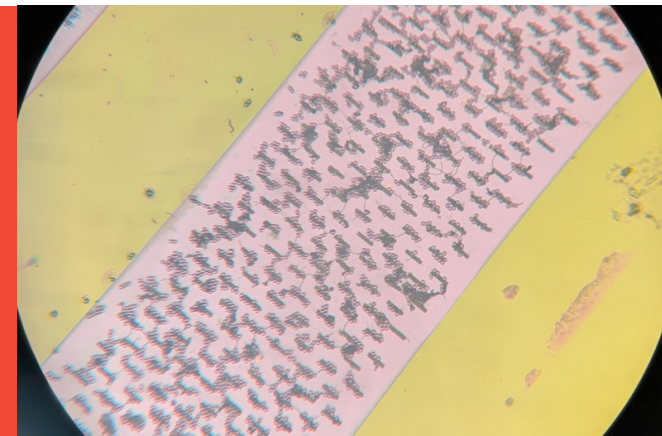
Multidisciplinary Senior Design (MSD) Projects prepare students for modern engineering practice through a multidisciplinary, team-based design experience. Students apply the skills and knowledge acquired in earlier coursework to implement solutions to engineering problems while adhering to customer requirements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



Members: Moises Gomez, Reed Truax, Matt Freyman, **Matt Williams (BME)**, **Aaron Gaylord (BME)**, Nicole Mazzola (BME), Taylor Fowler

Biometric Driver Monitoring

In order to understand how to improve a driver's performance, it's necessary to gather and analyze data about their state and condition as they drive. The purpose of a biometric and vital monitoring system is to acquire said data to see where improvements can be made to driver ergonomics and comfort. The goal is to develop a system, integrated with a car's data acquisition system, to monitor a driver's biometrics such as temperature, muscle force, and heart rate, and do so reliably in a racing environment while adhering to the FSAE rules and safety regulations.



Members: **Cassie Walinski (BME)**, **Spencer Perry (BME)**, **Akash Patel (BME)**, Connor Murdock

Microfluidic 3D Bioprinter

This project is focused on retrofitting an off-the-shelf printer to print biomaterials by using a microfluidic process called hydrodynamic focusing. Hydrodynamic focusing by means of disposable printheads would allow a printer to cheaply and easily print multiple biomaterials out of a single printhead. This design and prototype will serve as a proof of concept for future iterations which will be able to print multiple materials, including cells, in three dimensions, in a sterile environment.



Members: Bryan Lilly, Michael Crenella, Yuri Yakovlev, Lucas Wong, Derek Schomer, **Paige Byers (BME)**, **Sarah Wilkes (BME)**, Alexander Bowman

Alternative to Lateral Flow Assay (LFAs)

LFAs are used to diagnose patients by detecting disease specific biomarkers. The goal is to create a low-cost rapid diagnostic prototype that is more efficient than currently used products. The rapid diagnostic device should also be marketable to under-resourced clinics. The image to the left depicts the novelty of the SimPore microslit membrane. By capturing 10.1 micron beads on a membrane with 8 micron slits, the SimPore membrane allows us to concentrate and purify an STD-related bacteria for further analysis.



Members: **Kathryn Cyr (BME)**, Austin Goddard, Allison Crim, Solomiya Vysochanska, Alaiya Tunteke, Brady Sweeney

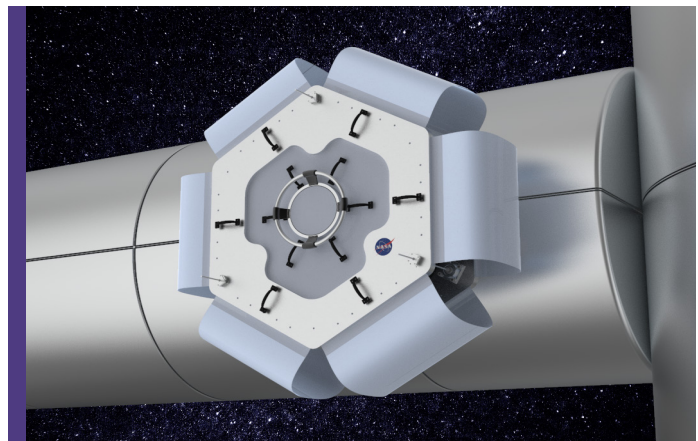
Modified Ride-On Car for Toddlers

University of Delaware's Go Baby Go! Program creates customizable ride-on cars for children with limited mobility to open up their cognitive, social, and motor development. The goals for this project are to analyze current designs from Go Baby Go! and modify the ride-on car to be used by a child with disabilities and controlled by the caregiver if needed. Some areas to be improved upon on these current designs are client specific controls, stability, physical support, and remote assistance.



Working on the Microfluidic 3D Bioprinter MSD project has been a great learning experience. Not only does it integrate concepts learned in class such as biomaterials and mechanics, but it also incorporates skills gained during my co-op experiences including microfluidic system design and working with a multidisciplinary engineering team."

Nicole Mazzola
5th Year Biomedical Engineering



Members: Matty Putnam, Michael Garcia, **Ethan Griswold (BME)**, Jim Grace, Justin Law, Jake Van Cuyck, Brandon Lau, and Tajbid Rahman

XHab Deployable Crew Lock Structure

A Lunar Orbital Platform-Gateway (LOP-G) is a proposed intermediate platform for future NASA expeditions into deeper space. A critical element to the LOP-G is the crew-lock structure which allows crew members to go between the pressurized environment of the LOP-G and the vacuum of space. The goal of the project is to design, build, and test a 1/4 - 1/6 scale version of a 2-man inflatable/deployable crew-lock for training astronauts on Earth. This project will help further NASA and RIT's research and understanding of soft, deployable structures for deep-space travel.

MSD Projects and affiliated BME students

1. *Automatic Breast Pump Cleaning System* - Kyla Driver
2. *Wearable Interface 3* - Timothy Preskenis
3. *Game-based Dexterous Prosthetic Hand Trainer* - Anup Jonchhe, Kenneth Nepomuceno, Forrest Shooster
4. *Motorized Stander - Human and Environment Interface Unit* - Jacqueline Becker, Ryan OHara
5. *Wheelchair Accessible Restroom Facility* - Donald Phan
6. *Enhanced Portable Walker with Arm Rests* - Ryan Guidi, Alison Kahn
7. *Skin-to-Skin Baby Sling Garment for use in NICU* - Alyssa Clymer, Alessandro Fabiano, Alyssa Tatti
8. *Modular Shoe* - Haley Gallagher
9. *Personal Data Collection System for Essential Tremor Evaluation II* - Frank Howard, Xavier Kerns, William Shambach
10. *Tremor Mitigation Test Rig II* - Nicholas D'Avanzo, Daniel Horrigan, Garrett Quiel
11. *Overcomer* - Rachel Mahoney, César Borges
12. *Continuous Glucose Monitor* - Nathan Schuler, Kayla Stephan
13. *Cell Factory* - Philip Tinder, Christa Vuglar, Anthony Yosick
14. *Hospital Bedside Table* - Kazi Rahman
15. *Robotter 2.0* - Mia Garbaccio
16. *Climate ConStroller* - Emily Reynolds
17. *Indoor Dry Toilet Base Re-Design and Manufacturing* - Ricky Ko
18. *Monitoring System for Blackberry High Tunnel* - Laura Konieczko
19. *Black Soldier Fly Composter Improvements* - Haley Avery
20. *Hydro-Turbine Powered Water Purifier* - James Haviland
21. *Low Cost Fundus Camera* - Tomer Artzi
22. *Agriculture Value Chain Improvement Project* - Adele Julianelle

Faculty Achievements



Dr. Steven
Day



Dr. Vinay
Abhyankar



Dr. Iris
Asllani



Dr. Jennifer
Bailey



Dr. Edward
Brown

Welcome

Michael Richards joined the Biomedical Engineering faculty in August of 2018. He received his B.S. in Biomedical Engineering from the University of Rochester and a Ph.D. in Biomedical Engineering from Boston University. Following his Ph.D., Dr. Richards held a post-doctoral position at the University of Michigan, where he researched the clinical application of novel medical imaging technologies used to quantify the mechanical property changes associated with breast cancers. He also held a post-doctoral position and, subsequently, a research professor position at the University of Rochester Medical Center, where he studied the mechanical property changes associated with various cardiovascular diseases. Since joining RIT, Dr. Richards has taught Introduction to Biomedical Engineering, Systems Physiology I, and Quantitative Physiological Signal Analysis Lab.

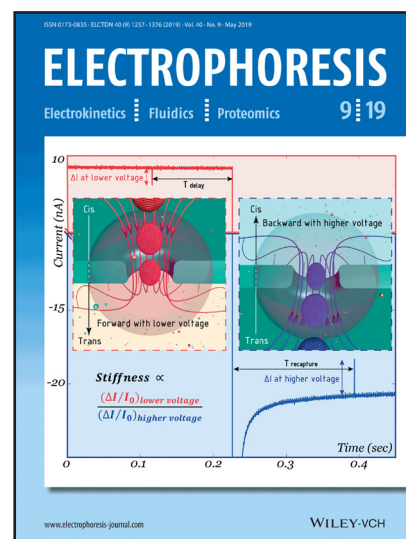
Awards

- Cristian Linte was awarded tenure and promoted to Associate Professor of Biomedical Engineering and Blanca Lapico-Encinas was promoted to Professor of Biomedical Engineering
- Blanca Lapizco-Encinas was selected to be the first female Editor-in-Chief of the journal *Electrophoresis*
- Cristian Linte was recognized with the IEEE Region 1 Outstanding Teaching and Education in an IEEE Area of Interest (University or College) Award
- Cristian Linte and Thomas Gaborski were recognized as PI Millionaires, a designation given to RIT researchers who have received external-funding of \$1 million or more since 2000
- Steven Day was part of a group of authors from various academic institutions and the FDA who received the 2018 Cardiovascular Engineering and Technology (CVET) Journal's Most Cited Award at the BMES Annual Meeting
- Work from Thomas Gaborski's laboratory was featured on the cover of *Small*

Faculty Scholarship

68 Works of Scholarship, 28 Peer Reviewed Papers

https://www.researchgate.net/institution/Rochester_Institute_of_Technology/department/Department_of_Biomedical_Engineering





Dr. Thomas
Gaborski



Dr. Blanca
Lapizco-Encinas



Dr. Cristian
Linte



Dr. Michael
Richards



Dr. Cory
Stiehl

External Research Grants

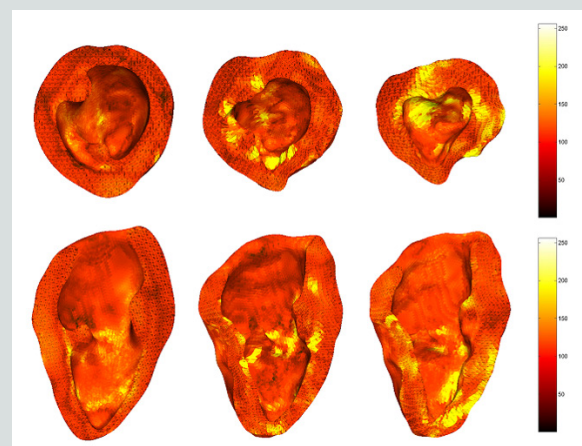
Michael Richards received three subawards from the National Institutes of Health. His first grant, “*Modulation of Insertional Achilles Tendinopathy by Multiaxial Mechanical Strains*”, looks at measuring mechanical properties associated with insertional Achilles tendinopathy (IAT) and the development of novel treatment strategies. His second grant, “*Ultrasound Elastography For Non-Invasive Assessment of Tendon Healing*”, looks to measure the mechanics of scar tissue following tendon injuries to help identify new therapeutic drugs to improve healing. His third grant, “*s100a4 Signaling in Fibrotic Diabetic Tendon Healing*”, studies the healing process of tendon, quantified using three-dimensional ultrasound assessment of scar tissue volume, following injuries and surgical repair.

Vinay Abhyankar received a subaward from Office of Naval Research (ONR). The award is titled, “*Identification of Physiological Mechanisms Mediating Blast-induced Brain Injury using Tissue Engineered Biomimetics*” and will support development of an in vitro model of the brain vasculature to study injury mechanisms in response to explosive blasts.

Featured Focus

Cristian Linte was awarded two major research grants during the past academic year. His R35 program project grant from the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH) encompasses a broad spectrum of research in His lab that focuses on the development and validation of new medical image computing, modeling and visualization techniques in support of more efficient and less invasive diagnosis and therapy for cardiac, vascular and orthopedic applications.

His second grant was awarded by the Office of Advanced Cyberinfrastructure of the National Science Foundation (NSF) to support collaborative research between RIT’s BME and School of Mathematical Sciences and Electrical Engineering and Computer Science at the University of Kansas Lawrence. This project is aimed at developing a computing framework that integrates medical image computing, high-order meshing and biomechanical modeling to build models that portray heart biomechanics from high-resolution medical images to quantify, visualize, and non-invasively appraise cardiac function.



4D (3D + time) quantification and visualization of myocardial contractility from cardiac magnetic resonance imaging.

Where are they going?



Spencer Perry

Spencer will be attending medical school at Albany Medical College in the hopes of becoming a trauma surgeon. He is interested in advances that can be made in regards to decreasing medical waste to decrease the costs, improve the sustainability of the field, and increase quality of care for patients.



Tony Yosick

Tony will be working with Hill-Rom in their Global Supply Chain Leadership Rotational Program. This two-year rotational program is aimed at gaining exposure to cross-functional positions throughout a variety of engineering levels of the company and management.



Donald Phan

After graduation, Donald will be working for Bausch and Lomb as a Quality Assurance specialist. His interests involve quality control because he is often involved in project phases that require on-time delivery, resource management, and helping others to achieve shared goals.



Alyssa Tatti

After graduation, Alyssa has been hired to work with Becton Dickinson in their Engineering Development Program. She will participate in three different research and development rotations in various locations. Her first rotation will be in early stage development of hernia devices with BD's Warwick Rhode Island.



183

Total BME graduates



77

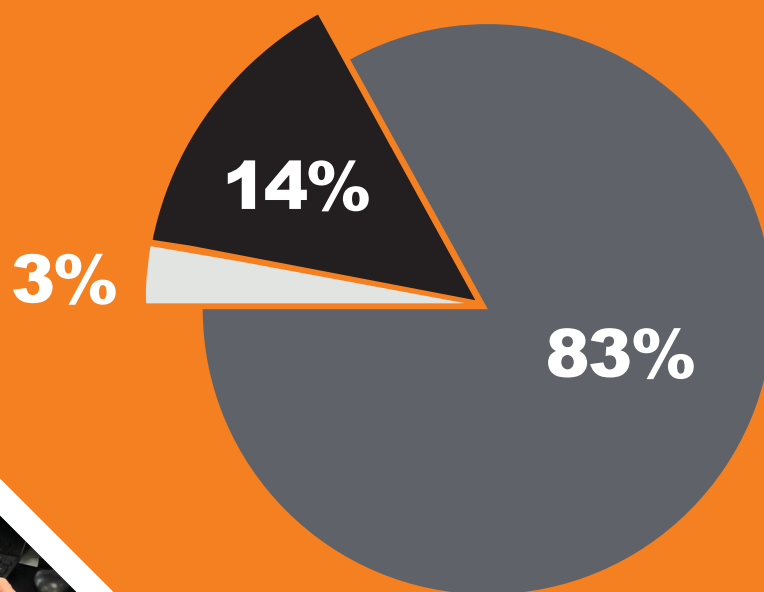
Total employers of BME graduates

Where are they now?

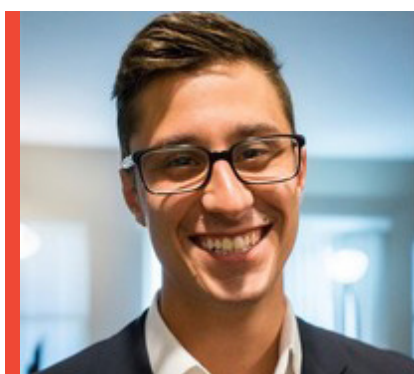


Ben Boseck '17

Since graduation, Ben has worked at LSI SOLUTIONS® in a handful of exciting and challenging roles. He started in the Engineering Department as a Product Design Engineer. In that position, Ben was responsible for working on the development of medical devices focused on improving various surgical procedures for both the patient and the doctor. Since August of 2018, Ben has transitioned into the role of Project Manager in the Discovery (Research and Development) Department.



- Full-time employment
- Further full-time study
- Alternative plans



Michael Kormos '17

Since graduation, Michael has been working as a Senior Field Service Technician for Abbott Laboratories. Everyday, he works alongside physicians and hospital staff to install, service, and troubleshoot 3D cardiac imaging systems used in Cath labs. As a field engineer, he has been able to travel to over 200 hospitals in 20 states. However, in the next few months his traveling will come to an end, as he has accepted a role as an EP Technical Services Specialist with Abbott. Over the next year, Michael will be training to assist during pacemaker and loop recorder implants.



Emily Kimber '18

Emily's Bachelor's degree in Biomedical Engineering has landed her at Toyota as a Crash Safety Engineer. She saves lives with the work she does, while having fun crashing cars - in a safely controlled environment, of course. Everyday, she uses her Biomedical knowledge to make and improve dummy kinematics through tuning vehicle restraints. The opportunities that Emily has been afforded are a direct result of the education she received at RIT.

Congratulations Class of 2019!

Tomer Artzi
Haley Madison Avery
Jacqueline Elaine Becker
Paige E. Byers **
Alyssa May Clymer **
Adriana Coll De Peña **
Kathryn Cyr
Nicholas Ryan D'Avanzo *
Kyla Andrews Driver
Alessandro Fabiano
Haley Arleen Gallagher **
Mia Genevieve Garbaccio
Aaron J. Gaylord
Christopher Daniel George
Ethan David Griswold **
Ryan Nicholas Guidi

James Ruegger Haviland
Daniel Paul Horrigan
Frank C. Howard
Anup R. Jonchhe * §
Adele Julianelle *
Alison Rachel Kahn * §
Saviera Isseas Kerns
Ricky Ko
Laura Ashley Konieczko
Rachel Elizabeth Mahoney
Nicole Elizabeth Mazzola ***
Kenneth Michael Nepomuceno
Ryan Robert OHara
Akash Sunil Patel *
Spencer J. Perry *** §
Donald Luan Phan

Timothy David Preskenis
Garrett Edward Quiel **
César Augusto Rabello Borges Filho
Kazi Anisur Rahman
Emily Anne Reynolds ** §
Nathan Albert Schuler *
William Travis Shambach *
Forrest Zachary Shooster ** §
Kayla Marie Stephan *
Alyssa Marie Tatti **
Philip Andrew Tinder III
Christa Nicole Vuglar
Cassandra R. Walinski
Sarah Nicole Wilkes
Matthew James Williams *** §
Anthony Joseph Yosick **

* cum laude

** magna cum laude

*** summa cum laude

§ Honors Program