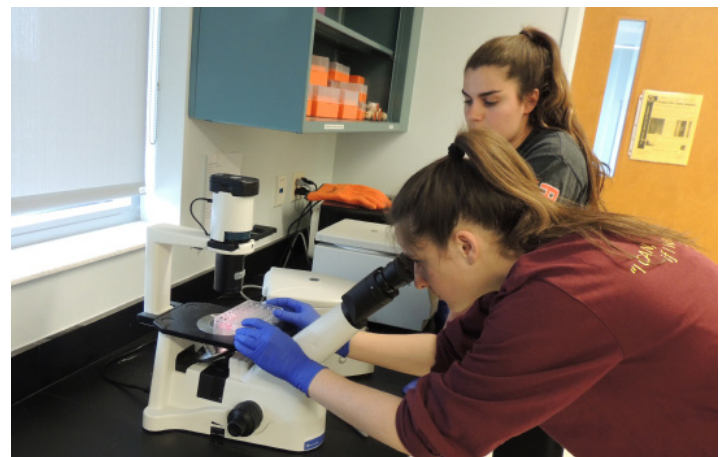
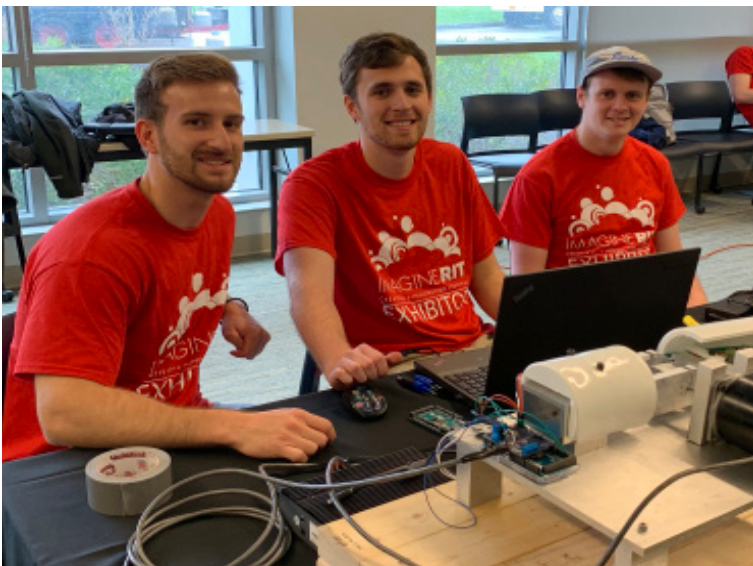
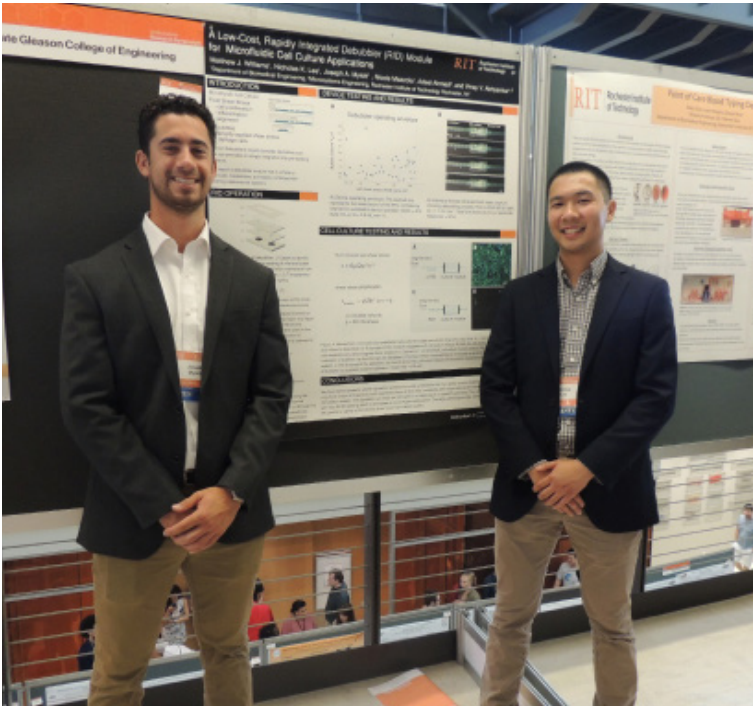


# RIT

Kate Gleason College of Engineering  
Department of  
Biomedical Engineering



Are you interested in healthcare and problem solving?  
Learn about the various opportunities the Biomedical Engineering program at RIT has to offer!

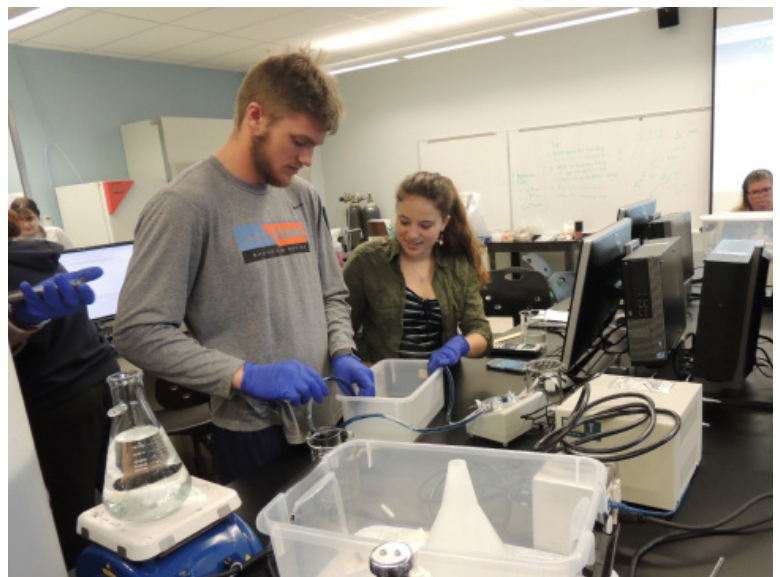
# Biomedical engineers focus on technological solutions to treat or alleviate biological or medical problems.

Biomedical engineers are intimately involved in the development of system devices and techniques to address health issues. This is a multidisciplinary endeavor requiring expertise from a wide range of professionals, including engineers from the classical disciplines such as chemical, electrical, and mechanical engineering. To be fully successful, the multidisciplinary team must have at least one member who possesses a comprehensive understanding of the highly variable and intricate

nature of the biomedical system along with the quantitative and analytical engineering skills needed to precisely define the challenge that is being addressed. This combination of skills allows the team to assess the relative effectiveness of plausible solution strategies. The biomedical engineer brings this special combination of skills and education to the team.

## The RIT Biomedical Engineering Program produces graduates who:

- > Draw upon the fundamental knowledge, skills, and tools of biomedical engineering to develop system-based engineering solutions that satisfy constraints imposed by a global society.
- > Will enhance their skills through formal education and training, independent inquiry, and professional development.
- > Will work both independently and collaboratively, and demonstrate strong leadership skills, accountability, initiative, and ethical & social responsibility.
- > Can successfully pursue graduate degrees at the Master's and/or Ph.D. level.



# Biomedical Engineering

## Bachelor of Science Degree

The purpose of the BS degree program in Biomedical Engineering (BME) is to deliver a focused undergraduate engineering curriculum that targets the biomedical enterprise from a highly quantitative and analytically rigorous perspective. Undergraduates will have the ability to contribute significantly to the development of new knowledge, understanding,

and innovative solutions in the health care industry across a wide variety of health-care related applications. The Biomedical Engineering BS degree is a five year program. It culminates in the fifth year with a full multidisciplinary capstone design experience that integrates engineering theory, principles, and process within a collaborative environment that bridges engineering disciplines.

### Accreditation

Rochester Institute of Technology is fully accredited by the Middle States Association (MSA) of Colleges. The Biomedical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

### Job Outlook

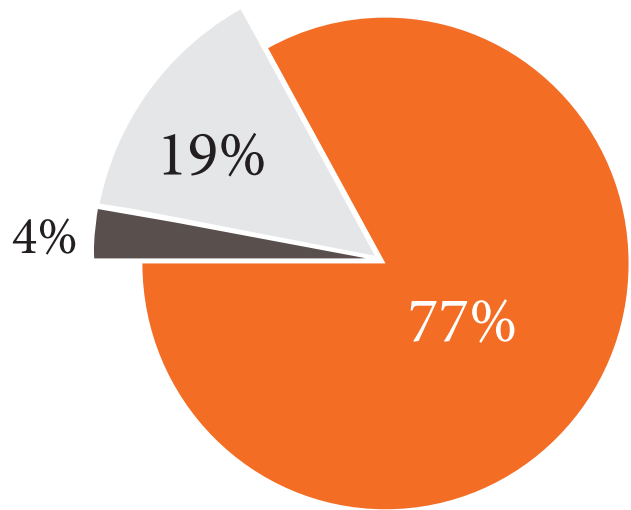
Employment of biomedical engineers is projected to grow 7% from 2023-2033, much faster than the average for all occupations. Growing technology and its application to medical equipment and devices, along with an aging population, will increase the demand for the work of biomedical engineers. (Source: U.S. Bureau of Labor Statistics O.O.H.)



# Where are they now?

## And where are they going?

At RIT, our BME students and graduates are doing great things! Learning in the classroom and gaining real world experience prepares our students to make a difference. From conducting research, working in laboratories, becoming trauma surgeons, and even crash safety engineers, our graduates are making a positive impact doing what they love.



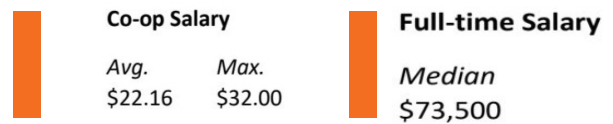
### Class of 2023

- > 52 graduates
- > 2,789 accumulated co-op weeks

### Class of 2024

- > 56 graduates
- > 2786.5 accumulated co-op weeks

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



For more information and data, visit [rit.edu/careerservices](http://rit.edu/careerservices)



397

Total BME Graduates



>150

Total employers of BME graduates

## Companies that have hired 20 or more BME co-ops!


# Cooperative Education

## Experience That Pays

RIT co-op gives you the chance to test what you've learned in the classroom in real world situations. When you're in the lab testing a new theory in quantum physics, reading a textbook on cognitive psychology, or computing net present value in a finance problem, you may wonder how your studies fit your future career. Our co-op program gives you a chance to find out. If you're like many RIT students, understanding how theoretical knowledge is actually used in the real work place will give you the incentive you need to work harder when you come back to campus for your academic terms.

**Work with the Best**

Your RIT co-op experience will be as exciting and interesting as you make it. You may choose to work for one of nearly 2,000 employers that annually hire RIT students, or you may design your own co-op with a company we have not worked with in the past.

Last year about 3,500 students completed more than 5,700 co-op assignments across the United States and in nearly 30 foreign countries. Students held positions in private business and industry as well as government agencies and nonprofit organizations.

While you're working on co-op, you'll meet other professionals in your field. You'll be able to consult on professional issues and talk with them about your goals. These professional contacts may help you identify job openings in your field and get you started on the road to your lifetime career goals.

Co-op may help you pay for your college education. At RIT, no tuition is charged for the semesters/summers you are employed as a co-op student. Instead, your employers may pay you a full-time salary. Last year, RIT co-op students earned more than \$34 million. You'll find that your co-op earnings can go a long way towards helping finance your RIT education.

**RIT's co-op program is the 4<sup>th</sup> oldest and one of the largest in the world.**

Co-op gives you experience to set yourself apart from other graduates in your career field!



# BME Course Map

FALL	SPRING	FALL	SPRING	SUM	FALL	SPRING	SUM	FALL	SPG	SUM	FALL	SPRING
<b>BIME 181</b> Intro to BME 1	<b>BIME 191</b> Intro to Program BME 3	<b>BIME 200</b> Musculoskeletal Biomechanics 3	<b>BIME 370</b> Biomaterials Science 3		<b>BIME 410</b> Systems Physiology I 3	<b>BIME 411*</b> Systems Physiology II 3		<b>BIME 497</b> Multi-Disc Senior Design I 3		<b>BIME 498*</b> Multi-Disc Senior Design II 3		
<b>CHMG 141</b> Gen Chem I 3	<b>CHMG 142</b> Gen Chem II 3	<b>BIME 250</b> Biocystems Process Ana. 3	<b>BIME 391*</b> Biomechanics & Biomat. Lab 2		<b>BIME 407</b> Medical Device Design 3	<b>BIME 491</b> Syst. Physio. & Signals Ana. Lab 1		<b>Prof Tech Elective Lower</b> 3		<b>Prof Tech Elective Upper</b> 3		
<b>CHMG 145</b> Chem Lab I 1	<b>CHMG 146</b> Chem Lab II 1	<b>BIQG 140</b> Cell & Molecular Bio Eng I 3	<b>BIQG 240</b> Cell & Molecular Bio Eng II 3		<b>BIME 360</b> Examined Signal & Analysis 3	<b>BIME 450</b> Analysis of Complex Biocys. 3		<b>BIME 460</b> Dynamics & Cirt Biomed Sys. 3				
<b>YOPS 1</b> RIT 386: RIT Connections 0	<b>PHYS 211</b> Univ Phys I 4	<b>PHYS 212</b> Univ Phys II 4	<b>BIME 320</b> Fluid Mechanics 3					<b>BIME 492</b> Quant. Physio. Sig. Ana. Lab 1				
<b>MATH 181</b> Project-Based Calculus I 4	<b>MATH 182</b> Project-Based Calculus II 4	<b>MATH 221</b> Multi Var. & Vector Calculus 4	<b>MATH 231</b> Differential Equations 3		<b>MATH 251</b> Prob. & Stats for Engineers I 3	<b>ISEE 325</b> DOE for BME 3		<b>Open Elective</b> 3		<b>Open Elective</b> 3		<b>Open Elective</b> 3
<b>Lib Arts &amp; Sci*</b> 1st Year Wing 3	<b>Wellness I</b> 0	<b>EGEN 099</b> Co-op Prep Seminar 0	<b>BIME 099</b> BME Career Seminar 0			<b>Open Elective</b> 3		<b>Wellness II</b> 0				<b>Lib Arts &amp; Sci GE Elective</b> 3
<b>Lib Arts &amp; Sci</b> Perspective I 3	<b>Lib Arts &amp; Sci</b> Perspective II 3		<b>Lib Arts &amp; Sci</b> Perspective III 3					<b>Lib Arts &amp; Sci</b> Immersion I 3				<b>Lib Arts &amp; Sci</b> Immersion III 3
<b>Credits: 15</b>	<b>18</b>	<b>17</b>	<b>17</b>	<b>CO-OP</b>	<b>16</b>	<b>15</b>	<b>CO-OP</b>	<b>16</b>	<b>CO-OP</b>	<b>16</b>	<b>15</b>	<b>15</b>
												<b>128</b>

**KEY**

- Course title & description** (points to BIME 101)
- Steps Do corresponding to the required prerequisite** (points to prerequisite icons)
- Steps Do corresponding to the required corequisite** (points to corequisite icons)
- Steps Do** (points to BIME 101)
- Credit hours** (points to credit hour value)
- Attributes include that the course is being transferable** (points to transferable icon)
- Steps D for the course** (points to D icon)

For information about Advanced Placement credit, visit <https://www.rit.edu/registrar/transfer-and-test-credit>

This planning document is a tool to help you visualize your course sequence. Please refer to your AAR for a complete overview of your degree requirements. Course names and numbers are subject to change.

## Common Electives

Electives taught within the BME department:

- > Tissue Engineering
- > Advanced Topics in Tissue Engr
- > Advanced Quantitative Cell Culture
- > Bioprocess Engineering
- > Bioanalytical Microfluidics
- > Stress Analysis and Biomechanics
- > Hemodynamics
- > Medical Imaging Systems
- > 3D Technologies for Prosthetics

Electives in other engineering departments:

- > Biopharmaceutical Engineering
- > Ergonomics and Human Factors
- > Biomechatronics
- > Applied Biomaterials
- > Biomedical Sensors & Transducers

## First Year

- > Intro to Biomedical Engineering (BIME-181)
- > Intro to Programming for BME (BIME-191)
- > General Chemistry I & II and labs (CHMG-141/145/142/146)
- > University Physics I with Lab (PHYS-211)
- > Calculus I & II (MATH-181/182)
- > First Year Writing
- > Arts & Science Perspective (2 courses)
- > Wellness Education
- > Year One

## Second Year

- > Intro to Musculoskeletal Biomechanics (BIME-200)
- > Biosystems Process Analysis (BIME-250)
- > Intro to Biomaterials Science (BIME-370)
- > Fluid Mechanics (BIME-320)
- > Biomechanics & Biomaterials Lab (BIME-391)
- > BME Career Seminar (BIME-99)
- > Cell & Molecular Biology for Engineers I, II (BIOM-140/240)
- > Differential Equations (MATH-231)
- > Multiple Variable & Vector Calculus (MATH-221)
- > University Physics II with Lab (PHYS-212)
- > Co-op Prep Seminar (EGEN-099)
- > Art & Science Perspective (1 course)
- > Co-op Summer

## Third Year

- > Co-op Fall
- > Systems Physiology I (BIME-410)
- > Biomedical Signals & Analysis (BIME-360)
- > Medical Device Design (BIME-470)
- > Probability & Statistics for Engineers I (MATH-251)
- > Arts & Science Perspective (1 course)
- > Co-op Summer

## Fourth Year

- > System Physiology II (BIME-411)
- > Numerical & Statistical Analysis of Complex Biosystems (BIME-450)
- > Quantitative Physiological Signal Analysis Lab (BIME-491)
- > Design of Experiments for Biomedical Engineers (ISEE-325)
- > Arts & Sciences Immersion (1 course)
- > Open Elective
- > Co-op Spring
- > Co-op Summer

## Fifth Year

- > Multidisciplinary Design I & II (BIME-497/498)
- > Dynamics & Control of Biomedical Systems (BIME-460)
- > Systems Physiology Control & Dynamics Lab (BIME-492)
- > Professional Technical Electives (2 courses)
- > Arts & Sciences Immersion (2 courses)
- > Open Electives (6 credits)
- > Gen Ed Elective (3 credits)
- > Wellness Education

# BS IN ENGINEERING + MS IN SCIENCE, TECHNOLOGY, & PUBLIC POLICY =

## AN ENGINEER WITH A DIFFERENCE!

"I did the BS/MS to gain a broader perspective on topics that may be useful for my career. This program taught me how to critically evaluate FDA policies and develop creative and realistic solutions to improve them."



*Krista Stanislow*

*Process Sciences Associate at Regeneron*

*BS, Biomedical Engineering, 2020*

*MS, Science, Technology and Public Policy, 2020*

Easy Application Process

Most Can Finish Both Degrees in 5 Years

Now Also Available: BS in Biomedical Engineering +  
MS in Biomedical Engineering, or  
MS in Industrial and Systems Engineering



# Biomedical Engineering Clubs

Outside of classes, there are BME focused clubs that can provide more career development and hands on opportunities!



## BIOPRINT

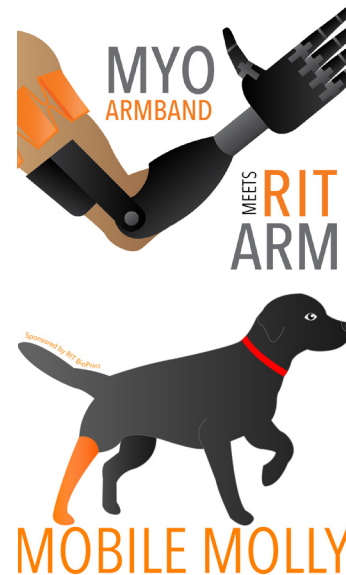
BioPrint is an interdisciplinary club hosted by the Biomedical Engineering Department at the Rochester Institute of Technology. Projects will focus on the exploration of 3D technologies in the medical field. The club has two overarching goals. The first is to provide students with the opportunity to further their knowledge in disciplines such as 3D modeling and design, 3D printing, and material testing. The second is to promote collaboration and teamwork by fostering a venue for small teams focused on specific, yet multidisciplinary projects. We hope to attract students from different majors and with different skills to create a community with a common goal of advancing 3D technologies in the medical field.

### HIGHLIGHTS

**Application:**  
Utilize CAD modeling and 3D printing to solve real life problems and help those in need.

**Connection:**  
Interact with other students and people of differing backgrounds to work on various projects.

**Career:**  
Increase the opportunity of a co-op or full time job by adding related technical skills and experience to your resume.



## BIOMEDICAL ENGINEERING SOCIETY

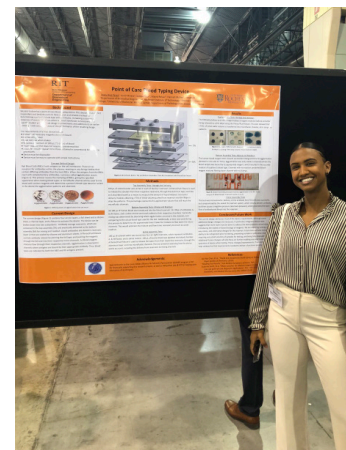
We build and support the biomedical engineering community locally, nationally, and internationally with activities designed to communicate recent advances, discoveries, and inventions; promote education and professional development; and integrate the perspectives of the academic, medical, governmental, and business sectors. As a student chapter, our goal is to promote professional development, community within the department, and a public understanding of what biomedical engineering is.

### HIGHLIGHTS

**Mentorship:**  
First year students have the opportunity to pair with an upper class BME student for guidance about the program and professional development.

**Conferences:**  
Students who conduct research within the program can attend the national conference and exhibit their projects to fellow BMES members outside of RIT.

**Community:**  
There will be meetings that involve study sessions, various career panels, and guest speakers. These meetings aim to foster networking among fellow classmates, faculty, and other organization partners.



## Opportunities to Go Abroad

- > Study Abroad Program gives you the opportunity to learn beyond the classroom and develop skills to be successful both personally and professionally in a rapidly changing global society. BME Students usually participate in this program in the Spring of their 2<sup>nd</sup> year. To learn more visit <https://www.rit.edu/academicaffairs/global/study-abroad>
- > Work Abroad Program aims to expand the opportunities for our students and graduates to broaden and enhance their global perspectives and experiences. The program is designed to expand RIT's employer partnerships to offer more international cooperative education, internship and other related work experiences. For further interest, contact Maria Richart, Associate Director for International Outreach, at [mjroce@rit.edu](mailto:mjroce@rit.edu).
- > Engineering World Health is a fall course (BIME 395) that will prepare you for the repair work you'll do in Guatemala. You'll learn diagnostic and problem solving skills in electrical and biomedical engineering and receive training on troubleshooting common problems with electrical and medical equipment. During winter break, you'll travel to Guatemala to work with Engineering World Health hospital partners. It's an opportunity to experience the local culture by living in a homestay with local families, learning basic Spanish language, and participating in cultural excursions.

## Campus Support Services

- > BME Academic Advisor assists students with their academic needs, which includes providing accurate information, solutions to academic challenges, and setting goals and expectations.
- > Office of Career Services and Cooperative Education provides services to cover every aspect of the job search and the career development process.

- 
- > Bates Study Center provides free tutoring services each semester in the areas of mathematics, chemistry and physics.
  - > Academic Success Center offers a variety of services for students experiencing academic difficulty and suspension.

- > KGCOE Engineering Student Services Office provides a place for engineering students to find advising, support, and counseling.
- > Engineering Support Services offers a wide variety of services for engineering deaf and hard of hearing students.

Student Health Service, Wallace Center, Center for Religious Life, Public Safety, Counseling Center, Disability Services Office, English Language Center, The North Star Center for Academic Success & Cultural Affairs ...and many more.

# Faculty & Staff



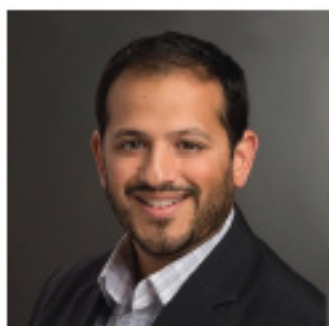
**Thomas Gibbons**  
Professor  
Department Head



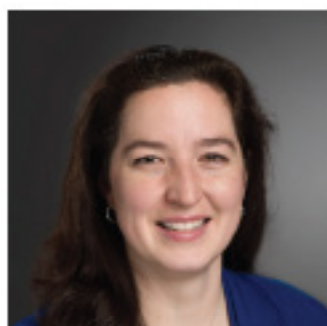
**Vicki McElroy**  
Office Manager



**Ian Brookes**  
Lab Manager



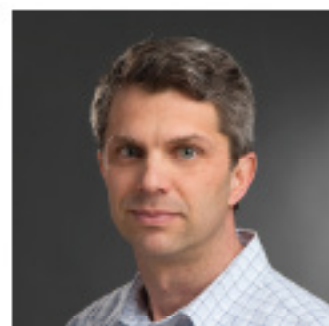
**Vinay Abhyankar**  
Associate Professor  
Ph.D. Program Director



**Jennifer Bailey**  
Principal Lecturer  
Undergraduate Director



**Edward Brown**  
Associate Professor



**Steven Day**  
Professor



**Bianca Laptook-Enolman**  
Professor



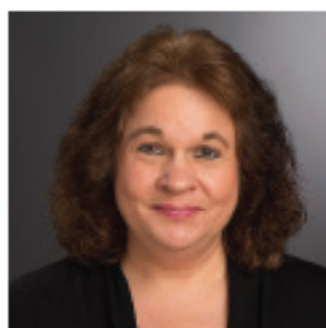
**Cristian Lima**  
Professor



**Travis Mayer**  
Lecturer



**Michael Richards**  
Assistant Professor



**Cory Stahl**  
Senior Lecturer  
M.S. Program Director



**Karin Wuerb-Kozak**  
Kate Gleason Professor



RIT Nondiscrimination Statement

For more information contact:  
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Vikki McElroy at [vlmbme@rit.edu](mailto:vlmbme@rit.edu)  
[www.rit.edu/kgcoe/biomedical/](http://www.rit.edu/kgcoe/biomedical/)