R·I·T

KATE GLEASON
COLLEGE OF ENGINEERING

“SCIENTISTS EXPLORE WHAT IS; ENGINEERS CREATE WHAT HAS NEVER BEEN.”

Theodore Von Karman (1881–1963), father of modern aerospace engineering

Kate Gleason (1865–1933)

COLLEGE NAMED FOR ENGINEERING PIONEER

RIT’s College of Engineering is named in honor of Kate Gleason, in recognition of her significant personal and professional accomplishments and the ongoing support of the Gleason Foundation. Ms. Gleason, who died in 1933, was America’s first female engineering student and the first woman to be elected a member of the American Society of Mechanical Engineers. Today, RIT’s Kate Gleason College of Engineering proudly continues a tradition of equal opportunity and excellence in engineering education.

CONTENTS

* Offered by the B. Thomas Golisano College of Computing and Information Sciences

The Kate Gleason College of Engineering

www.rit.edu/kgcoe

Make an impact

RIT's Kate Gleason College of Engineering prepares you to make a powerful impact in all kinds of businesses and industries.

Five major principles distinguish an RIT engineering education and drive everything we do:

- Excellence in teaching
- Learning by doing
- Working as a team
- Exploring industry-inspired problems
- Preparing graduates for a global economy

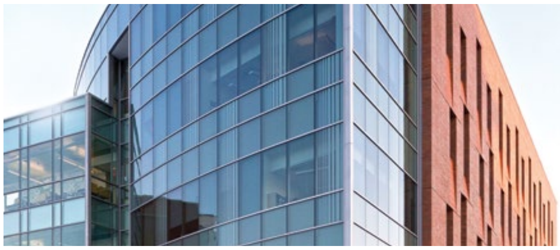
The Gleason College is also known for creating cutting-edge programs such as our undergraduate major in microelectronic engineering, a master's degree program in sustainable engineering, and doctoral programs in engineering and microsystems engineering. All are inspired by a critical need in our society for individuals with specialized expertise in these areas.

All of our undergraduate majors are five-year programs that include four years of academic study and approximately one year of paid **cooperative education work experience**. Through co-op, students gain paid, professional work experience in their career field before they graduate. In the fifth year of study, students take two semesters of senior design. This enhances their engineering education through a capstone design experience that integrates engineering theory, principles, and processes within a collaborative environment.

We have an outstanding record of achievement in engineering education, producing graduates who are well versed in current engineering practice, educated to lead technical innovation and develop next-generation products and processes, and dedicated to continual improvement in their professional work.

I encourage you to explore the Kate Gleason College of Engineering and RIT's innovative and stimulating environment.

Doreen D. Edwards
Professor and Dean
Kate Gleason College of Engineering



Kate Gleason College of Engineering

Undergraduate students: 2,888

Graduate students: 580

Faculty: 112

Experiential learning: 48 weeks of co-op required; study abroad and undergraduate research encouraged

Outcomes rate: 97%

Alumni: 15,000

Degrees offered: BS, MS, ME, Ph.D.

Rankings and recognition:

- *U.S. News & World Report* ranked RIT's Kate Gleason College of Engineering No. 61 nationally for undergraduate engineering programs among universities where the highest degree is a doctorate.
- *Aviation Week* ranked RIT third nationally as one of the key schools companies prefer when recruiting and hiring in critical skill areas for the aerospace and defense industries, according to its annual "Workforce Study."
- *College Factual/USA Today* ranked RIT No. 9 in engineering-related fields

Research highlights:

- Transportation—including the engineering of new vehicle systems, innovative distribution systems, enhanced security, and safety
- Energy—focusing especially on novel energy storage and new energy collection technologies
- Communications—building on extensive expertise in signal processing, sensing, and networking
- Health Care—creating better devices, advancing informatics, and improving delivery systems
- Nano-science and Microsystems Engineering—the enabling technology behind technologies in telecommunications, imaging, electronics, and biomedical diagnostics and treatment

Career-focused Programs

Undergraduate education is our highest priority

You'll have direct contact with professors who have extensive experience in the classroom and are internationally respected for their technical expertise and contributions to industry. Through their professional activities, including applied research and consulting, our professors work at the forefront of their engineering disciplines. Small classes encourage one-on-one interaction, and our students and faculty work in an atmosphere of close collaboration on industry-sponsored projects, research, and independent study.

Cooperative education

All of RIT's engineering programs require approximately one year of co-op work experience. Co-op typically takes place in your third, fourth, and fifth years, and you'll alternate blocks of work and on-campus study. Co-op offers you distinct and diverse opportunities to apply classroom education to "real-world" problems and projects through **full-time, paid work experiences** in companies and organizations from small startup firms to Fortune 500 corporations.

High-tech facilities

The Kate Gleason College of Engineering has outstanding facilities for teaching and learning. Laboratories are equipped with a broad array of modern equipment and instructional tools thanks to strong support provided by leading industry partners. The college boasts a 10,000-square-foot clean room for the fabrication of integrated circuits, plus an integrated circuit design center—the largest of its kind in the nation for undergraduate education. All engineering departments have laboratories with state-of-the-art computer workstations running industry-standard software, which can be used for 2D design, 3D solid and surface modeling, computer simulation, and testing.

BOEING	BAUSCH + LOMB	TOYOTA	Google	CISCO
Wegmans	ExxonMobil	Carrier	HARRIS	GM
WelchAllyn	IBM	NASA	Microsoft	intel

Selected examples of our industry partners

Multidisciplinary teams

Our engineering programs emphasize project-based learning, teamwork, and interaction among students. Multidisciplinary teams are a reality in every industry, and you'll get plenty of exposure to these kinds of teams at RIT.

Industry connections

Our strong ties with leading corporations, government agencies, professional associations, and other industry organizations have enabled us to shape our engineering programs to the needs of today's marketplace. Each degree program has an advisory board to ensure that our academic programs are providing a curriculum that is current with industry needs and standards.

Graduates in demand

The Kate Gleason College of Engineering has an outstanding record of producing high-caliber graduates with comprehensive technical knowledge and skills, relevant work experience, and sharp engineering minds. Consistently, 96 percent of our graduates are employed full time or are enrolled in graduate school within six months of graduation. Graduating seniors are eligible and encouraged to begin the process of professional licensure by sitting for the Fundamentals of Engineering portion of the New York State Professional Engineering examination during their final semester. Most state boards provide for reciprocal licensure if you pursue your engineering career out of state.

Majors and options

Biomedical Engineering

Chemical Engineering

Computer Engineering

Electrical Engineering
- Computer Engineering Option
- Clean and Renewable Energy Option
- Robotics Option

Industrial Engineering
- Ergonomics Option
- Lean Six Sigma Option
- Manufacturing Option
- Supply Chain Management Option

Mechanical Engineering
- Aerospace Option
- Automotive Option
- Bioengineering Option
- Energy and the Environment Option

Microelectronic Engineering

Software Engineering*

Engineering Exploration Option+

+ Allows freshmen to explore various disciplines for one year before selecting a major

* Offered by the B. Thomas Golisano College of Computing and Information Sciences (see page 29)

HOT WHEELZ

RIT's Hot Wheelz Formula SAE Electric Hybrid Team made history when they arrived at the national Formula Hybrid competition in May 2016. The 38-member team is the first and only all-female team to compete at the event. The team finished third in the electric category with a single-seat electric race car that they built from the ground up. The team, whose members are all undergraduate students, did all of the engineering, welding, and sourcing of components, as well as negotiating sponsorship deals, crowdsourcing, and making a project management plan. In addition to placing third overall, the team placed first in project management and was recognized with the GM Spirit of Formula Hybrid Award and the Fiat Chrysler Automobiles Gracious Professionalism Award. Their achievements have drawn the attention of executives at leading automotive manufacturers.

"I hope they understand how big of an accomplishment it is just getting to the competition," said Alba Colón, who spoke to RIT's *University Magazine* in a story about the team. Colón is the program manager at General Motors and lead engineer for Chevy Racing, which is behind NASCAR stars Jeff Gordon, Danica Patrick, and Dale Earnhardt Jr. "Little girls are going to say, 'One day I want to do that. I want to be like them.' What they are doing is a big deal."

The Kate Gleason College of Engineering values diversity and provides an environment that promotes a high quality of life for all of our students. The college is proud to be among the nation's leaders in the number of women and underrepresented minorities among its faculty.

There are more than 20 student organizations associated with the Kate Gleason College of Engineering (see page 31). Here are examples of clubs and organizations with a special focus on women and racial/ethnic diversity.

American Indian Science and Engineering Society (AISES)

AISES is dedicated to increasing American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, First Nation, and other indigenous peoples in STEM fields and other related disciplines.

Women in Engineering (WE@RIT)

Women in Engineering at RIT is dedicated to expanding the representation of women engineers and to preparing women for leadership within the engineering profession. Hundreds of women engineering students participate in our programs and events each year, such as Kate's Community, Prospective & New KGCOE Women Students Programs, and Pre-Engineering Programs for middle and high school girls in summer camps on campus to encourage young women to consider careers in engineering.

National Society of Black Engineers (NSBE)

NSBE is dedicated to the academic and professional success of African-American engineering students and professionals. NSBE offers its members leadership training, professional development, mentoring opportunities, career placement services, and more!

Society of Hispanic Professional Engineers (SHPE)

Through its events and programs, SHPE helps its members in professional development, academic excellence, and personal growth, with an emphasis on helping the community.

Society of Women Engineers (SWE)

SWE is a national organization committed to helping women achieve their full potential in careers as engineers and leaders. Our section of SWE is dedicated to providing an environment for RIT's STEM students to enhance their professional, leadership, and social skills.

Society of Asian Scientists and Engineers (SASE)

SASE is dedicated to the advancement of Asian heritage scientists and engineers in education and employment so that they can achieve their full career potential.

Programs of Study

Biomedical Engineering

www.rit.edu/biomedical

LINDSAY DEMBLOWSKI

Hometown: McKees Rocks, PA
Major: Biomedical Engineering
Co-op Placements: Clinical Intern, Omnyx; Materials Engineering Co-op, MSA; Research Intern, Thermal Gradiant

Lindsay Demblowski spent the summer of 2013 in Rwanda as part of Engineering World Health's Summer Institute. She was part of a team that trained students and technicians to repair medical equipment, such as incubators, syringe pumps, oxygen concentrators, and endoscopes. Demblowski, who serves as president of RIT's student chapter of Engineering World Health, also planned a trip to Guatemala, which took place during winter intersession. Volunteering her time has become her passion. "It's something that has always made me feel like I had a purpose," says Demblowski. Service trips such as these provide an opportunity for students to gain a global perspective on how engineering can have a beneficial effect in resource-poor communities. "Trips such as this can be life-changing experiences for the students and challenge them to think creatively when trying to solve real-world problems," says Iris Asllani, faculty adviser to the Engineering World Health student group and associate professor of biomedical engineering. Demblowski adds: "This experience is much more to me than fixing medical equipment. Rwanda is the most amazing place I have ever been. In a place where past history defines Rwandans in the eyes of all foreigners, you would never know a major genocide happened here only 20 years ago," she says. "I hope to eventually pursue tissue engineering, and hopefully make it possible to do organ transplants in every country around the world."

Biomedical engineers solve complex problems pertaining to health care and the human body. They develop these innovative solutions by applying their in-depth engineering perspective with their vast knowledge of the complex, interactive system of the human body.

Biocompatibility testing, engineering artificial organs and tissues, developing new drug delivery systems, creating or modifying innovative medical devices, enhancing medical imaging techniques, or designing procedures to meet regulatory requirements are just a few examples of the work performed by a biomedical engineer.

What is biomedical engineering?

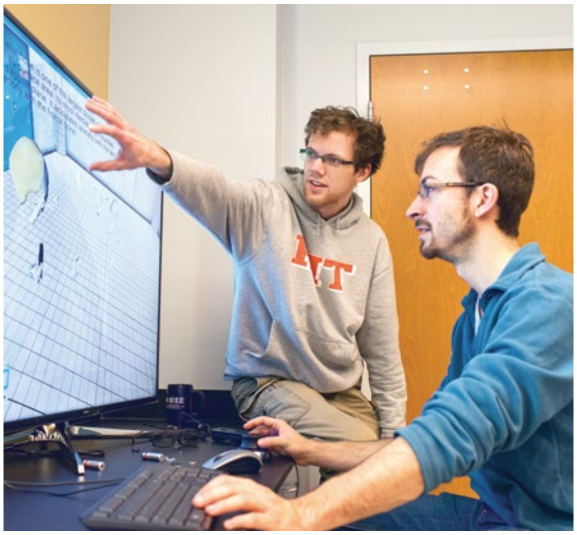
Biomedical engineering leverages the vast knowledge of biology and medicine to solve problems focused on health care and the human body. Biomedical engineers work in multidisciplinary teams that often include scientists and medical practitioners in addition to other engineers to develop solutions to these complex problems. They play a key role in developing and defining the engineering requirements and specifications necessary to bring devices and protocols to fruition.

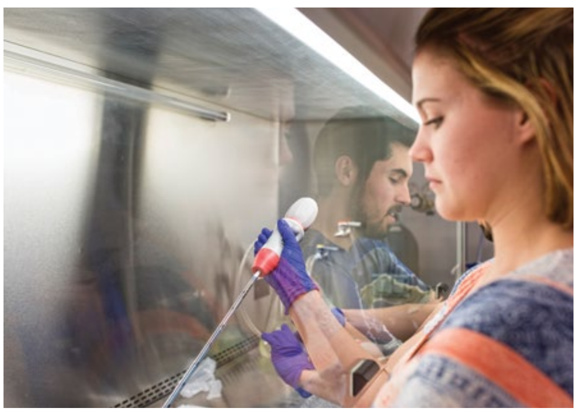
A comprehensive curriculum

The biomedical engineering major emphasizes a strong knowledge of biological sciences and a rigorous quantitative approach to problem solving, particularly as it relates to human physiology. It is essential that biomedical engineers develop an intimate and precise understanding of the human body—the living system for which they develop devices and procedures. Our curriculum stresses the development of a solid set of quantitative, analytical, and design skills that are specifically targeted toward biomedical endeavors. Throughout their studies, students consistently correlate their engineering skills to human physiology and learn how engineering analysis and problem-solving methodologies can be leveraged toward the successful creation of devices, systems, and treatments related to biomedical applications.

Students can also develop deeper understandings of an area within biomedical engineering by choosing a concentration in:

- tissue and cell engineering
- signal processing





What you'll study

First and Second Years
- First Year Writing
- Year One: College Experience
- Introduction to Biomedical Engineering I
- Introduction to Programming for Biomedical Engineering
- General and Analytical Chemistry I, II with Labs
- Project-Based Calculus I, II
- University Physics I, II
- Musculoskeletal Biomechanics
- Biosystems Process Analysis
- Cell & Molecular Biology for Engineers I, II
- Differential Equations
- Biomechanics and Biomaterials Lab
- Fluid Mechanics I
- Multivariable & Vector Calculus
- General Education—Liberal Arts and Sciences
- Wellness Education (2 courses)
- Co-op Prep Seminar

Third through Fifth Years
- Systems Physiology I, II
- Biomedical Signals & Systems Analysis
- Probability & Statistics I
- Biocompatibility and the Immune System
- Biomedical Device Engineering
- Numerical & Statistical Analysis of Complex Biosystems
- Dynamics & Control of Biomedical Systems
- Design of Experiments for Biomedical Engineers
- Quantitative Physiological Signal Analysis Lab
- Systems Physiology Control and Dynamics Lab
- Professional Technical Electives (2 courses)
- Multidisciplinary Senior Design I, II
- Free Electives (2 courses)
- General Education—Liberal Arts and Sciences
- Cooperative Education* (2 semesters plus 2 summers)

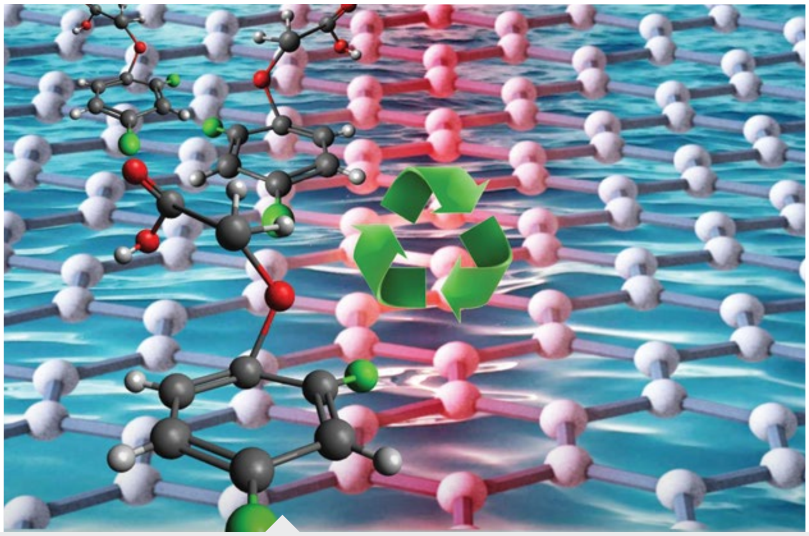
* RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

- image processing
- microfluidics

Research opportunities
The biomedical engineering faculty are actively involved in research, and they encourage undergraduate students to participate in research endeavors. Research studies encompass a wide range of focus areas that include the analysis of ECG signals, image guided surgery, functional MRI, microfluidic device development, and the use of ultrathin membranes to study cell properties and behavior. Faculty members also collaborate on research projects with colleagues from other departments and universities as well as clinicians, faculty, and researchers from area hospitals.

Chemical Engineering

www.rit.edu/chemical



MULTI-SCALE ANALYSIS

RIT prepares its students to meet the growing needs of industry, yet also provides them with a strong background for graduate study if so desired. The chemical engineering major addresses traditional as well as current scientific, engineering, and industrial trends. As a graduate, you will have a firm and practical grasp of engineering principles and underlying science associated with traditional chemical engineering applications, and will learn to tie together phenomena across multiple length scales, from nano-scale to the macro-scale.

NANOTECHNOLOGY APPLICATIONS

Our faculty have significant expertise in the application of chemical principles to nanotechnology for energy storage, energy transmission, separation processes, and gas storage. They actively engage undergraduate students in their research through independent studies and employ students for research co-ops. It is very common for these students to be first-authors on peer-reviewed journal publications.

What is chemical engineering?

Virtually every aspect of the modern industrial economy is critically dependent upon chemical engineering for manufacturing bulk and specialty chemicals as well as high-tech materials needed to create a limitless array of value-added products. Chemical engineering integrates the core scientific disciplines (chemistry, physics, biology, and mathematics) with sophisticated engineering training to transform raw materials or chemicals into more useful or valuable forms, invariably in processes that involve chemical change. Chemical engineers work on multidisciplinary teams to produce the everyday chemicals and novel materials that are at the heart of virtually every product and service that enhances our quality of life. Examples include nanoscale composites, pharmaceuticals, plastics, fibers, metals, and ceramics. Key applications include the development of alternative energy systems, immunological agents, and strategies to minimize the environmental impact of technological advancements.

How is chemical engineering different from chemistry?

The lines between the function of chemists and chemical engineers can be blurred in industry, but a general distinction can be made between the function of the two disciplines and the training involved. Perhaps the clearest distinction can be made in the area of chemical transformation. Typically, chemists develop new molecules via chemical reaction, examine the underlying mechanisms involved, and make precise measurements of both physical and organic chemistry parameters on a bench scale in small volumes. Once a new molecule is created, chemical engineers determine how to manufacture and purify it on a larger scale. Using their knowledge of scientific principles (physical and organic chemistry integrated with physics, mathematics, and biology), engineering principles (heat transfer, mass transfer, and fluid flow), and design constraints (such as economics, environmental requirements), chemical engineers develop processes to manufacture raw materials with desired purity on a scale that meets the demands of virtually every industry in our modern society.

What can you do with the degree?

Chemical engineers are able to mitigate pollution issues via their training in separation processes, and can purify gas and liquid effluents from any process (e.g., a coal power plant) to incredibly low levels of pollutants. Chemical engineers can be involved in immunology since they are trained in membrane separations, and are experts at both

CHEMICAL ENGINEERS

Chemical engineers use their knowledge of scientific principles (physical and organic chemistry integrated with physics, mathematics, and biology), engineering principles (heat transfer, mass transfer, and fluid flow), and design constraints to develop processes to manufacture raw materials that meet the demands of nearly every industry in our modern society.

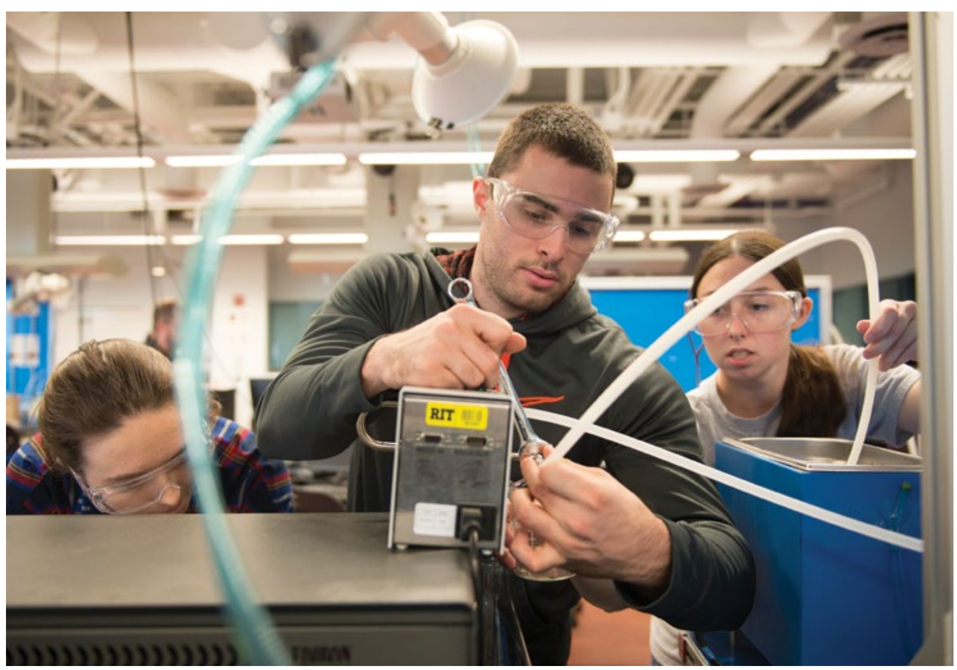
What you'll study

First and Second Years
- First Year Writing
- Year One: College Experience
- Chemical Engineering Insights I, II
- General and Analytical Chemistry I & II with Labs
- Project-Based Calculus I & II
- Differential Equations
- Multivariable & Vector Calculus
- Applied Statistics
- University Physics I
- Chemical Process Analysis
- Organic Chemistry I with Lab
- Applied Thermodynamics
- Chemical Engineering Principles Lab
- Inorganic Chemistry
- Continuum Mechanics I
- General Education—Liberal Arts and Sciences
- Wellness Education (2 courses)
- Co-op Prep Seminar

Third through Fifth Years
- University Physics II
- Mass Transfer Operations
- Continuum Mechanics II
- Analytical Techniques for Chemical Engineers I, II
- Instrumental Analysis with Lab
- Multiple-Scale Materials Science
- Reaction Engineering
- Chemical Engineering Processes Lab
- Analysis of Multi-Scale Processes
- Design with Constraint
- System Dynamics & Control
- Professional Electives (3 courses)
- Advanced Design Capstone
- Free Electives (2 courses)
- General Education—Liberal Arts and Sciences
- Cooperative Education* (2 semesters plus 2 summers)

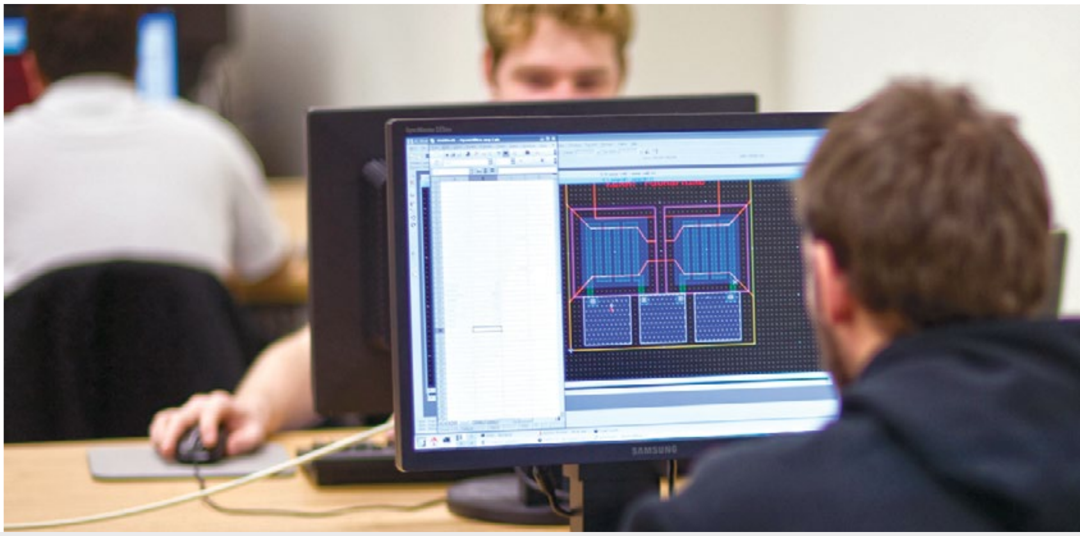
* RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

making and delivering custom chemicals across cellular membranes and into debilitating cells. Chemical engineers are also involved in environmental applications, such as the development of cleaner fuels. They design novel materials that involve photovoltaics for solar cells, but also are involved with the development of electrochemical cells (batteries) in which to store alternative energy. These are just a few of the huge number of areas that chemical engineers can impact with their training, apart from their traditional role in making chemicals.



Computer Engineering

www.rit.edu/computerengineering



NICHOLAS BARLOW

Hometown: Buffalo, NY
Major: Computer Engineering
Minors: Computer Science and Chinese Language and Culture
Activities: National Society for Black Engineers
Co-op Placements: Information Security Intern, Rockwell Collins; Phillips Medical Devices; Enterprise Router Testing Intern, Cisco Systems; User Interface Co-op, Microsoft

"Since I was a kid, I've always loved tinkering around with electronics," says Nicholas Barlow, who used to disassemble old VCRs just to see how they worked. What drew him to computer engineering was the notion of being able to make an impact on the world. "Computers are one of the most important inventions in the last 100 years. The fact that we can accomplish so much more with the use of computers is what really got me interested. I want to help further that."

In the computer industry, rapid innovation is the name of the game, and there is a great demand for computer engineers who can do it all—from designing high-performance computer hardware components and software, to developing next-generation intelligent, resilient, and sustainable products and applications that contain embedded systems.

As computer technology becomes more essential to commerce and daily life, companies will need computer engineers who possess a well-developed set of skills and who can quickly adapt to changes. To meet the challenges of the future, these companies will turn to computer engineers for innovative solutions and technological leadership.

An emphasis on skill development

Studying computer engineering begins with the fundamental math, science, and technology courses that are essential to computer engineering. You'll study computer science, software engineering, and electrical engineering, including data structures, object-oriented programming languages, circuits, electronics, and principles of software engineering. Professional and ethical responsibility is gained through seminars and co-op experience. Upper-level computer engineering courses prepare you to integrate hardware and software by formulating complete system solutions. Since computer engineering is closely related to both electrical engineering and computer science, you'll study computer architecture, digital systems, IC (integrated circuit) design, embedded system design, computer networks, and digital signal processing. In your fifth year, you will work on a senior design project with a multidisciplinary design team to develop a project from concept to working prototype that integrates hardware and software sub-systems.

Faculty active in research

Computer engineering faculty members are engaged in diverse research and use their expertise to enrich our students' classroom and laboratory experiences. Students interested in research may be able to work alongside faculty on a number of initiatives, including autonomous robots, computer vision, machine learning, GPU acceleration, heterogeneous computing, interface electronics, robust control, thermal management in many-core architectures, neuromorphic

Having completed four co-ops, all at mid- to large-size companies, Barlow understands the power of teamwork. "What's really struck me is how large companies and large teams of people, 20 to 100 people, can collaborate and work to make something that would take several lifetimes for one person to do."

What you'll study

First Year and Second Years

- First Year Writing
- Year One: College Experience
- Introduction to Computer Engineering
- Project-Based Calculus I, II
- Multivariable Calculus
- Discrete Mathematics for Computing
- Differential Equations
- Linear Algebra I
- Computer Science I, II
- University Physics I, II
- Digital System Design I, II
- Introduction to Embedded Systems
- Circuits I
- Introduction to Software Engineering
- General Education—
  Liberal Arts and Sciences
- Wellness Education (2 courses)
- Co-op Prep Seminar

Third through Fifth Years

- Computer Organization
- Circuits II
- Electronics I
- Applied Programming
- Interface and Digital Electronics
- Digital Signal Processing
- Computer Architecture
- Probability and Statistics I
- Data & Communication Networks
- Digital IC Design
- Professional Electives (2 courses)
- Senior Design Project I, II
- Free Electives (2 courses)
- General Education—
  Liberal Arts and Sciences
- Cooperative Education*
  (2 semesters plus 2 summers)

The BS program in computer engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

*RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

Accelerated BS/MS option

A master of science degree is a highly valued asset. After three semesters, you may qualify for the accelerated BS/MS option, which allows you to earn a bachelor's degree and a master's degree in computer engineering in five years. You'll complete approximately one semester and two summers of co-op, along with either a master's thesis or a graduate project in your final year.

computing, novel flexible and reconfigurable computing fabrics, cryptographic engineering, wireless communication and networking, network security, and sustainable networks.

Computer engineering facilities

The department of computer engineering has several specialized labs, including the Digital Computer Organization Lab, Digital IC Design Lab, NXP Embedded Systems Lab, Harris Design Center, IoT Design Collaboratory, Networks & Information Processing Lab, NanoComputing Research Lab, Multi-core Systems Lab, CUDA High Performance Computing Lab, Machine Intelligence Lab, Applied Cryptography Lab, and Real Time Vision & Image Processing Lab.

Electrical Engineering

www.rit.edu/electrical

BENJAMIN PARNAS

Hometown: Natick, MA
Major: Electrical Engineering with Robotics Option
Activities: RIT FIRST Mentors
Co-op Placement: 21st Century Group

Benjamin Parnas participated on his high school's FIRST Robotics team, where he learned a lot about mechanical engineering. He had a strong understanding of mechanics, but when it came time to choose a major, Parnas wanted to study a subject he knew less about. So he chose electrical engineering. "Once I started taking classes I realized this was the best fit for me," he says of choosing electrical engineering with a robotics option.

To further his knowledge of robotics, Parnas is working in The Construct to craft an autonomous boat. The Construct is a student-run makerspace open to all RIT students. It's a large lab full of tools and equipment where students with an idea can work to make it a reality. He is interested in applying the principles of autonomous robotics to a sailboat, which, he says, hasn't really been done before. "While there are autonomous submersibles, there isn't an autonomous sailboat. The big advantage is that a sailboat can travel large distances really quickly since it's powered by the wind," he says of his project, which he hopes to submit to a national engineering competition next year.

Electrical engineers synthesize science, math, technology, and applications-oriented design into consumer products and devices, microprocessors, computers, electronic components, signal processing, microwaves, telecommunications, robotics, power systems, transportation systems, and more.

From technology development to technology application, the innovations of electrical engineers are shaping the future. With a shortage of electrical engineering talent in the job market, demand for RIT alumni remains strong each year.

A comprehensive curriculum

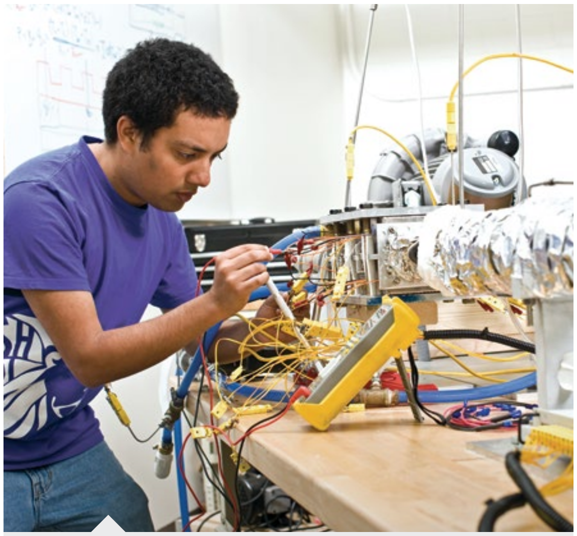
Our highly regarded electrical engineering major combines the rigor of theory with the flexibility of engineering practice. The first two years of the curriculum are devoted to the mastery of mathematics and principles of science essential to the study of electrical engineering. Design practice is introduced early on through our Freshman Practicum, so you develop a learn-by-doing attitude and become familiar with tools that will be used throughout your academic experience. Later you will focus on the core of electrical engineering: circuits, electronics, linear systems, electromagnetic fields, physics of semiconductor devices, communication systems, control systems, and mechatronics. The fifth year allows you to specialize in an area of professional interest.

Electrical engineering labs

The electrical engineering laboratories feature state-of-the-art equipment for teaching and research. Labs available for student use include the Computer Lab, Communication Systems Lab, Center for Electronic Design Automation Lab, Integrated Microsystems Lab, Digital Signal Processing Lab, RF/Analog/Mixed-Signal Lab, Computer Architecture Lab, MEMS Lab, Electromagnetic Theory/Applications Lab, Robotics Lab, Electromagnetic Energy Conversion Lab, and Electronics Studio Labs.

Undergraduate research

The diverse research interests of our electrical engineering faculty serve to enrich the classroom and laboratory experiences of our students. Those interested in research are encouraged to contact faculty members in



HANDS-ON EXPERIENCE

Courses in circuits, electronics, linear systems, electromagnetic fields, physics of semiconductor devices, communication systems, control systems, and energy conversion emphasize hands-on experience.

What you'll study

First and Second Years
- First Year Writing
- Year One: College Experience
- EE Practicum
- General Chemistry for Engineers
- Project-Based Calculus I, II
- Multivariable and Vector Calculus
- Differential Equations
- University Physics I, II
- Circuits I, II
- Digital Systems I, II
- Semiconductor Devices
- Computational Problem Solving for Engineers
- Science Elective (1 course)
- General Education—Liberal Arts and Sciences
- Wellness Education (2 courses)
- Co-op Prep Seminar

Third through Fifth Years
- Complex Variables
- EM Fields and Transmission Lines
- Linear Systems
- Digital Electronics
- Analog Electronics
- Probability and Statistics I
- Embedded Systems Design
- Classical Control
- Communication Systems
- Mechatronics
- Professional Electives (3 courses)
- Senior Design I, II
- Free Electives (2 courses)
- General Education—Liberal Arts and Sciences
- Cooperative Education* (2 semesters plus 2 summers)

The BS program in electrical engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

* RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

Special program options

Computer option
This option is ideal for those wanting to add skills required in designing modern computing systems. Students receive instruction in areas ranging from C programming, object-oriented programming, assembly language, microprocessor interfacing, and logic design to data structures and computer operating systems.

Clean and renewable energy option
It is both necessary and important that we develop nonpolluting electrical energy, preferably from renewable energy sources like wind and solar. It is almost certain that in the future, research and development in this area is going to grow at a rate much faster than other areas. Students will learn about generation, transmission, and distribution of electrical energy as well as their social and environmental effects.

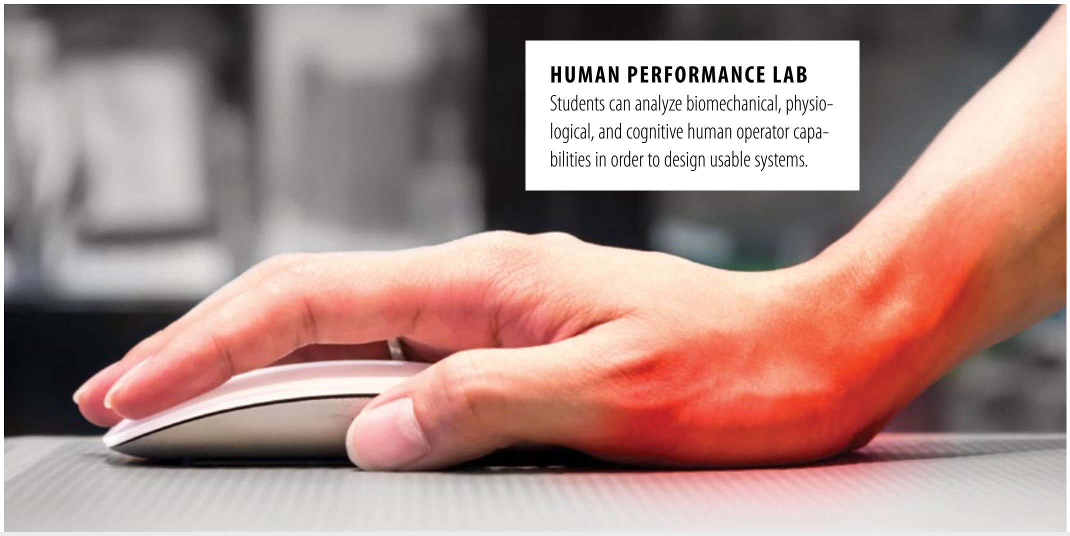
Robotics option
The robotics option is ideal for those who want the theoretical and practical skills required in designing robots and robotics devices. Students complete curricula in advanced programming, robotics systems, principles of robotics, and advanced robotics. They study principles of robotics covering kinematics and dynamics of robotics manipulators, mobile robots, locomotion types, and complete experiments using various arm and mobile robots. An advanced robotics course studies the dynamics of manipulators, dynamics of mobile robots with advance locomotion techniques, and path planning.

their area of interest. Just a few examples of our faculty's recent research include optimization techniques for reduced-size microstrip antennas; tissue characterization using implantable LC sensors; impact of tissue inhomogeneity on implantable antennas and sensors; synthesis, design, analysis, and optimization of novel NEMS, MEMS, nano- and microsystems; motion micro- and nanodevices; smart micro- and nanostructures; and biomimetics and bionanoarchetectronics with application to nano- and microsystems.

Five years, two degrees
An accelerated BS/MS option in electrical engineering is available for students who demonstrate outstanding academic performance. Qualified students take both undergraduate and graduate courses in their fifth year, earning both degrees after completing a master's thesis or research paper.

Industrial Engineering

www.rit.edu/ise



HUMAN PERFORMANCE LAB
Students can analyze biomechanical, physiological, and cognitive human operator capabilities in order to design usable systems.

VALERIA VILLA

Hometown: Cali, Colombia
Major: Industrial Engineering
Minor: Psychology
Activities: WE@RIT; Society of Women Engineers; Women in STEM; Institute of Industrial Engineers; Habitat for Humanity; UNICEF; International Student Services; peer adviser leader
Co-op Placement: Toyota

When Valeria Villa first visited RIT, she fell in love with the campus and the environment. "I also really liked the co-op program. The idea of getting work experience while still going to school was very interesting to me," she says. She chose industrial engineering because of the career opportunities it offers. "It is a very broad major; you can work in banks, industry, small companies, hospitals—pretty much anywhere." Villa has found RIT to be a very supportive place. "The college and my department have always been there to help with classes, schedules, providing resources, and just to talk." Villa has volunteered for Habitat for Humanity since her freshman year, and finds being involved in the club helped improve her confidence and leadership skills. "RIT is a great school! There are thousands of things to do and get involved with. You could try anything and most likely find your passion."

Industrial engineers take a systems approach to people, materials, and technology in the work place.

Industrial engineers deal with the creation of products, procedures, and processes that are compatible with both the people who use them and the environment. They help companies compete globally. They answer "big-picture" design and engineering questions: Can we remanufacture last year's hard drives and monitors rather than junk them? Can we develop an optimum routing structure for our shipments? What can we do to simultaneously increase efficiency and quality? How can we reduce waiting time on amusement park rides? As new technologies are implemented in industrial and commercial environments, the role of the industrial engineer is becoming more pivotal than ever.

Balance is the key

Future industrial engineers will need to be proficient in problem solving and communication, possessing a blend of skills in engineering and management. After your first-year foundation in mathematics and science, the curriculum covers concepts of human performance, mathematical modeling, statistical analysis, quality management, and contemporary manufacturing processes. Many courses teach you how to apply computers to the solution of engineering problems. In our Computer Tools Lab, you will use state-of-the-art software to design the layout of manufacturing plants and develop animated simulations. Traditional and advanced equipment is used by students in our Brinkman Manufacturing Lab. In the Human Performance Lab, you'll learn how to analyze performance factors

TOYOTA PRODUCTION SYSTEMS LAB

Toyota Motor Engineering & Manufacturing North America provides funding for the 1,600-square-foot Toyota Production Systems Lab. This facility provides hands-on education in state-of-the-art production systems with emphasis on the concepts of teamwork, problem solving, and process improvement by studying the fundamental behavior of production lines.

What you'll study

First and Second Years
- First Year Writing
- Year One: College Experience
- Fundamentals of Industrial Engineering
- General Chemistry for Engineers
- Project-Based Calculus I, II
- Multivariable & Vector Calculus
- Probability and Statistics for Engineers I
- Engineering Statistics
- Design of Experiments
- Linear Systems and Differential Equations
- University Physics I, II
- Materials Processing
- Fundamentals of Mechanics
- Engineering Economy
- Computing for Engineers
- General Education—Liberal Arts and Sciences
- Wellness Education (2 courses)
- Co-op Prep Seminar

Third through Fifth Years
- Operations Research
- Engineering Management
- Ergonomics & Human Factors
- Facilities Planning
- Fundamentals of Materials Science
- Materials Science with Applications Lab
- Production Planning and Scheduling
- Applied Statistical Quality Control
- Systems Simulation
- Linear Regression Analysis
- Professional Electives (4 courses)
- Senior Design I, II
- Free Electives (2 courses)
- General Education—Liberal Arts and Sciences
- Cooperative Education* (2 semesters plus 2 summers)

The BS program in industrial engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

* RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

relating to human-machine interaction. In our Toyota Production Systems Lab, you'll design processes in our flexible assembly cell.

Sustainable design

The environmental impact of products and processes is taken into consideration in sustainable designs. Remanufacturing is the process of giving a second life to a manufactured product after its primary functions have been served. Some examples include remanufacturing the components of anti-lock brakes, cameras, or computers. Many companies are now integrating these concepts into their original product and process designs to reduce product costs and environmental problems, and that's where you can make a contribution.

Outstanding faculty

Our faculty members combine significant industrial experience with applied research to enrich students' course work, projects, and assignments. Research is conducted in a broad array of industrial engineering areas, including operations, manufacturing systems, sustainable product design, product development and design robustness, supply chain management, ergonomics, and advanced systems integration.

Accelerated dual-degree programs

The department offers accelerated BS/MS and BS/ME degree programs, which give you the opportunity to complete both a bachelor's and a master's degree in approximately five years. An arrangement with RIT's Saunders College of Business also allows for an accelerated BS/MBA degree option.

We also offer an option for a dual degree in industrial engineering (BS) and science, technology, and public policy (MS, offered through RIT's College of Liberal Arts).

Special program options

This program offers four degree options that deepen your expertise through specialized courses, co-op assignments, and senior projects.

- Ergonomics Option
- Lean Six Sigma Option
- Manufacturing Option
- Supply Chain Management Option

Mechanical Engineering

www.rit.edu/mechanical

MAURA CHMIELOWIEC

Hometown: Batavia, NY
Major: Mechanical Engineering with Automotive Engineering Option
Minor: Environmental Studies
Activities: Technical Team Lead, Hot Wheelz Formula SAE Electric team; member, WE@RIT
Co-op Placements: Manufacturing Co-op, GE Aviation; Intern, WE@RIT

When Maura Chmielowiec was 12 years old, she won a trip to Watkins Glen International for an all-access NASCAR experience. She rode in a pace car, met drivers, and hung out in the pits. When she returned home, she wanted a car. Not to race, but to rebuild. She got her wish two years later when she saved enough money to buy a 1986 Nissan 300ZX, which she rebuilt by hand using instruction manuals and hands-on labor. By the time she had her driver's license, Chmielowiec had a functional, drivable car.

Her passion for cars and mechanical know-how drew the attention of faculty in the College of Engineering. Chmielowiec was one of several students approached to develop an e-dragster for a competition for Imagine RIT, the university's imagination and creativity festival. The team scraped together materials and sought out donations, put together an electric dragster car, and won.

Motivated by this, she spearheaded the development of the Hot Wheelz Formula SAE Electric Team, an all-female team on which Chmielowiec is the technical team lead, meaning she leads all design work on the mechanical and electrical side of producing the car. The team designed and built a hybrid formula race car, which placed third in the electric category in the 2016 Formula Hybrid Electric Vehicle Competition.

From rockets to robots, power plants to biomechanical parts, mechanical engineers put both energy and machines to work. Wherever there is motion, you will find their innovations making an impact on modern life.

A hands-on curriculum

Mechanical engineering is perhaps the most comprehensive of all the engineering disciplines. Like all RIT engineering programs, it is built on a foundation of math and science. Beginning freshman year, you will be exposed to the essentials of mechanical engineering, from advanced computer-aided engineering tools to manufacturing parts. Computer-aided design (CAD) is taught in the first year, giving you the skills you need to convey design ideas in a 3D solid model. Modern design tools and software are used throughout our curriculum, which builds toward advanced mechanical engineering subjects and study in later years. Engineering design is an important topic, and you will be introduced to a variety of manufacturing and control systems.

Industry-sponsored projects

In your final year, you'll take a senior design sequence and work on a multidisciplinary team to tackle a real-world project. You'll analyze a problem, develop a plan, produce a prototype, and ultimately complete the project on time and within budget. This project is an important capstone to your program and gives you hands-on experience in the execution of a complete project, from design through testing. Past projects have included the design of production automation equipment, aerospace systems, clean energy products, and bioengineering products that assist the disabled and elderly.

Well-equipped laboratories

Because many courses require you to build a model or working prototype to demonstrate a particular concept, you will make extensive use of our well-equipped facilities. Our labs contain dynamic system simulators, spectrum analyzers, high-tech equipment for measuring fluid velocities, materials testing, friction wear, and computerized data acquisition. You'll be encouraged to experiment in many areas, including thermal systems, applied mechanics, computer-aided manufacturing, systems analysis, biometrics, robotics, vibration, and automotive and aerospace engineering.

Special program options

Aerospace engineering option

This option focuses on engineering aspects of airborne and space vehicles. You'll take an introductory course on contemporary issues in aerospace engineering followed by courses such as composites, fatigue, aerodynamics, aerospace structures, propulsion, and flight dynamics. For your senior design project, you are expected to work on an aerospace engineering project. Your co-op experiences will take place in the aerospace industry.

Automotive engineering option

Modern automotive engineering entails the design of engines and components such as braking and lighting systems, transmission, and fuel economy. This option includes an introduction to automotive design and manufacturing as well as courses in vehicle dynamics, internal combustion engines, controls, fuel cell technology, and tribology. Your senior design project will relate to automotive engineering as will your co-op experiences.

Bioengineering option

This option consists of a Contemporary Issues in Bioengineering course, biological science electives, and courses in areas such as artificial organs, biomechanics, biomaterials, biosensors, and biomicrofluidics. You will work on a bioengineering senior design project and pursue co-op employment in a related field.

Energy and the environment option

This option allows you to focus on contemporary issues in the fields of energy and the environment and modern technologies such as wind turbines, solar energy, geothermal systems, fuel cell technology, and alternative energy systems. You will work on an energy systems senior design project, pursue co-op employment in a related field, and have the opportunity to participate in our Human-Powered Vehicle competition team.

Research that impacts society

Our faculty and students engage in research to enhance the quality of life through socially responsible engineering. Our primary areas of focus are vehicle systems, bioengineering systems, and sustainable energy systems. Research has influenced a number of exciting outcomes, including advances in assistive device technologies, synthetic muscles, point-of-care medical diagnostics and nano-probes for improved health care, control of unmanned air vehicles, and wearable sensor technology. Your participation in research at RIT will develop your leadership skills while you help to shape tomorrow's economy through the application of advanced technologies and innovative product development.

What you'll study

First and Second Years

- Engineering Mechanics Lab
- Engineering Design Tools
- Statics
- Strength of Materials I and Lab
- Dynamics
- Thermodynamics I
- Fluid Mechanics I
- Engineering Measurements Lab
- Cooperative Education Preparation
- Project-Based Calculus I, II
- Multivariable Calculus
- Differential Equations
- Computer Programming
- Year One: College Experience
- First Year Writing
- General Education—
  Liberal Arts and Sciences
- Wellness Education (2 courses)

Third through Fifth Years

- Contemporary Issues in Mechanical Engineering
- Materials Science with Applications and Lab
- Circuits I
- Numerical Methods
- System Dynamics
- Heat Transfer I
- Engineering Applications Lab
- ME Extended Core Elective
- ME Applied Elective
- Multidisciplinary Senior Design I, II
- Boundary Value Problems
- Linear Algebra
- Applied Statistics
- University Physics II
- Physical Science Elective II
- Cooperative Education (summer)
- Immersion Courses
- Free Electives (2 courses)
- General Education—
  Liberal Arts and Sciences
- Cooperative Education*
  (2 semesters plus 2 summers)

The BS program in mechanical engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

* RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

Microelectronic Engineering

www.rit.edu/eme

MATTHEW HARTENSVELD

Hometown: Wyckoff, NJ
Major: Microelectronic Engineering
Activities: President, Microelectronic Engineering Student Association
Research Placement: Research Experience for Undergraduates at University of California at Santa Barbara, funded by the National Nanotechnology Infrastructure Network
Co-op Placement: Northrop Grumman

Matthew Hartensveld started doing experiments in microelectronics when he was about 14 years old. "I got interested in the area by repairing and modifying my Xbox 360 consoles in my garage. That started my pursuit into learning more about electronics," he says. His interest led him to build a clean room in his parents' house. "In my mini clean room, I am able to perform photolithography, diffusion, oxide growth, and etching. These are all integral parts to making modern computer chips." Though rudimentary, his clean room has many similarities to the larger scale clean rooms at RIT, including the HEPA filters for minimal particles, an industrial UV laser for photolithography, similar chemicals for different processes, a kiln/furnace, a motor to spin different samples, special lighting that does not emit UV, and similar safety precautions. Hartensveld loves the microelectronics field. "I'm blown away by the complexity of it and I love how the whole major really pushes boundaries. There is so much innovation in MicroE. I'm really fascinated by the small-scale developments people are able to do."

Astounding innovations in semiconductor microelectronics will continue to drive our economy by increasing productivity and supporting a wide range of technologies: information, computing, communication, nanotechnology, defense, transportation, medical, and energy.

Advanced semiconductor products and systems are bringing new opportunities, growth, and development to countries around the globe, enabling the internet of things. Integrated circuits are found everywhere from computers, communication devices, satellites, automobiles, appliances, electronic entertainment, and medical devices. Semiconductor devices form the basis of solar cells. Microelectronic engineers continue to compress more circuit elements into smaller chip space, making computers faster, smaller, and less expensive. The quest for speed and density is driving innovation toward nanotechnology. Micro and nanofabrication techniques are largely employed in a range of applications: microelectro-mechanical systems, flat panel displays, energy conversion, and medical devices. RIT's microelectronic engineering program offers an unparalleled opportunity to prepare for professional challenges and success in one of the leading engineering areas of our time.

Absolutely the finest

RIT's microelectronic engineering is the only program of its type in the United States that leads to the bachelor of science degree in microelectronics. The program was recently ranked No. 1 in the world in educating semiconductor process engineers. The program is supported with a state-of-the-art facility, the Semiconductor and Microsystems Fabrication Laboratory (SMFL), for conducting educational and research programs associated with the design and manufacture of today's most complicated integrated circuits. It is among the finest educational facilities in the world.

Shape the next technology

This program builds upon a general engineering foundation of mathematics and science. Upper-level course work emphasizes all aspects of microelectronic engineering and provides you with a broad interdisciplinary background in device physics, electrical engineering, optics, materials science, chemical engineering, statistics, and

MICRO-E FACILITY

RIT's Semiconductor and Microsystems Fabrication Laboratory (SMFL) is among the finest educational facilities in the world. It is equipped with state-of-the-art tools to design, fabricate, and test integrated circuits, and features an electron beam mask making facility; ion implanter; UV exposure systems; plasma processes; diffusion furnaces; electron microscopes; and simulation, modeling, and computer-integrated manufacturing tools.

What you'll study

First and Second Years
- First Year Writing
- Year One: College Experience
- Introduction to Nanoelectronics
- General Chemistry for Engineers
- Project-Based Calculus I, II
- Multivariable & Vector Calculus
- Differential Equations
- Statistics and Design of Experiments
- University Physics I, II
- Modern Physics
- Circuits I, II
- Digital Systems I
- IC Technology
- Computational Problem Solving for Engineers
- General Education—Liberal Arts and Sciences
- Wellness Education (2 courses)
- Co-op Prep Seminar

Third through Fifth Years
- E & M Fields for Microelectronics
- Linear Systems
- Semiconductor Devices for Microelectronic Engineers
- Digital Electronics
- Analog Electronics
- Thin Films
- Lithographic Materials & Processes
- Semiconductor Process Integration
- Nanolithography Systems
- CMOS Processing
- Professional Electives (2 courses)
- Senior Design I, II
- Free Electives (2 courses)
- General Education—Liberal Arts and Sciences
- Cooperative Education* (2 semesters plus 2 summers)

The BS program in microelectronic engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

*RIT's co-op program, a feature in all our engineering majors, is detailed on page 24.

semiconductor manufacturing. You'll receive hands-on experience in the design, fabrication, and testing of integrated circuits in our student-operated IC fabrication facility. Your professors have a wide range of experience in research, industry, and academia, and many are internationally recognized for their contributions to the semiconductor industry. Upon completion of the program, you'll be well prepared to enter industry or go on to advanced study in programs such as RIT's doctoral program in microsystems engineering.

Special program concentrations

Microelectronic engineering students may develop concentrations in nanotechnology and photovoltaics. The program offers elective courses in nanotechnology, nanofabrication, nanocharacterization, and photovoltaics science and engineering.

BS/MS option

An accelerated cross-disciplinary BS/MS degree option offers students the opportunity to complete a BS in microelectronic engineering and an MS in materials science and engineering (offered by RIT's College of Science) in only five years. As we begin to harness the power of nanotechnology, there will be incredible career opportunities for graduates with skills in these areas.

We also offer an option for a dual degree in microelectronic engineering (BS) and science, technology, and public policy (MS, offered through RIT's College of Liberal Arts).

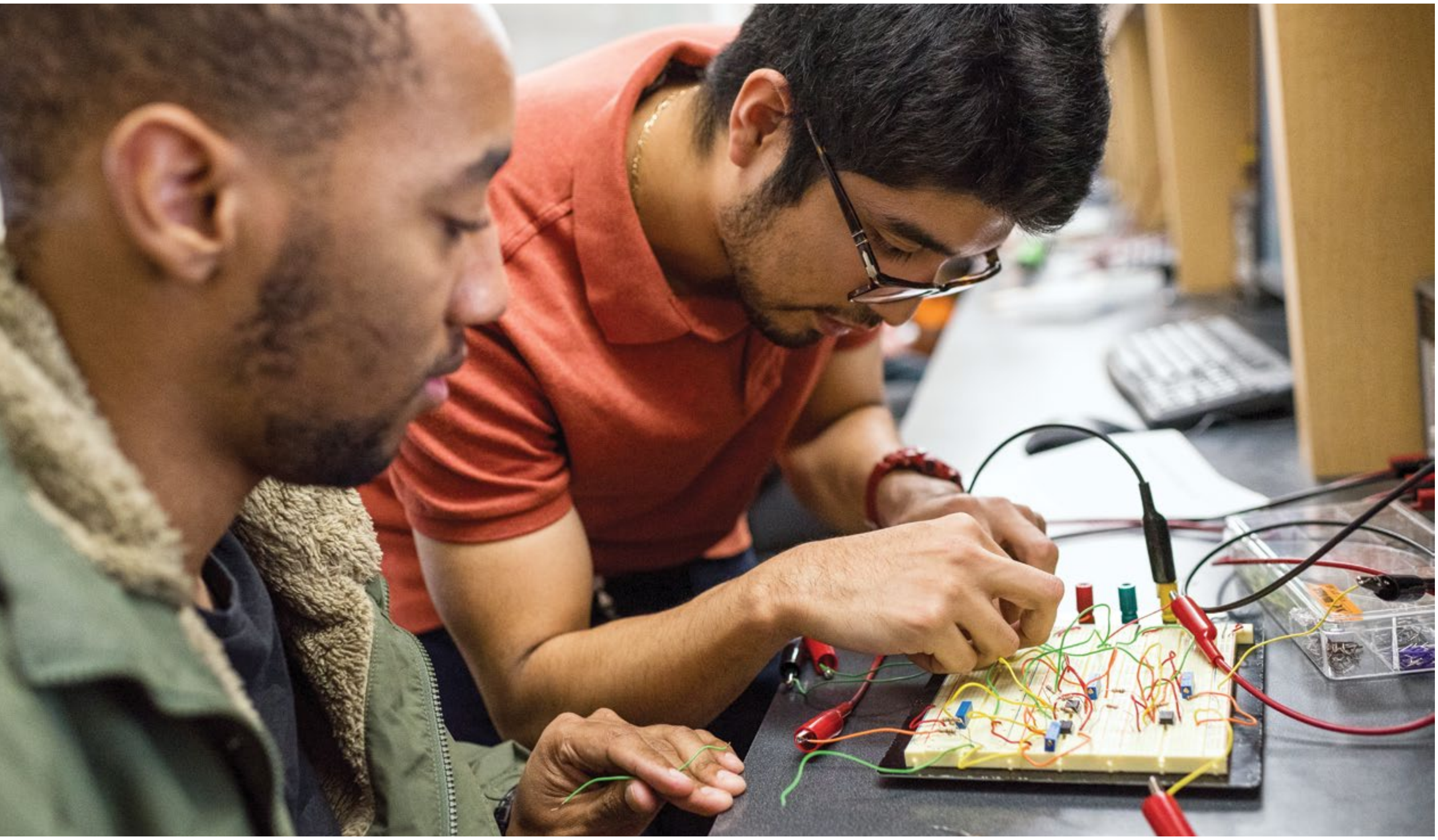
Outstanding career prospects

The electronics industry exceeds $1 trillion in sales per year, and semiconductors make up between $200 and $300 billion of that number, with continued growth forecasted for the foreseeable future. In a survey by the Semiconductor Research Corporation, RIT was ranked by engineering and operations managers in major semiconductor companies as the top source of new engineers. RIT's microelectronic engineering program ranked above such universities as MIT, RPI, Purdue, Stanford, Cornell, and the University of Texas at Austin for this particular measure.

Your communication skills, technical expertise, general engineering knowledge, and relevant work experience gained through cooperative education give you the professional credentials employers are seeking. The proof is reflected in both the number of job offers our graduates receive and their starting salaries, which average among the highest of any program at RIT.

Engineering Exploration

www.rit.edu/kgcoe/student-resource/engineering-exploration



Can't decide which engineering major is the best fit? Let us help you.

The engineering exploration option is designed for students who prefer additional time before deciding on an engineering major. During the first year, students take foundation courses required by all the engineering disciplines as well as a one-credit course, Engineering Exploration Seminar, which provides an overview of all seven majors. Students learn about each major and the career opportunities in each discipline, and meet faculty and students from each program. Small group discussions, observing classroom presentations of senior engineering design projects, exploring facilities, and consulting one on one with an academic adviser guide students in deciding on a major. Since each engineering program shares similar first-year course offerings, the course work you take as an engineering exploration student will transfer into all engineering programs without any loss of time toward graduation.

What you'll study

- Project-Based Calculus I, II
- General Chemistry for Engineers
- Engineering Exploration Seminar
- Engineering Discipline Courses
- University Physics I
- Wellness Education
- General Education—
  Liberal Arts and Sciences
- Year One: College Experience
- First Year Writing

Engaging, Experienced Faculty

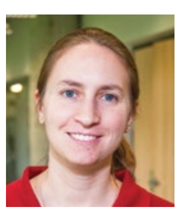
www.rit.edu/kgcoe/facultystaff

In the Kate Gleason College of Engineering, there are more than 100 full-time faculty members. Collectively they are an incredible resource for students.

Our faculty members include both scholars and practitioners who share their experiences with students as mentors, teachers, and academic advisers. Many are at the forefront of research and practice in their disciplines. They challenge, support, and stimulate students to identify and reach their potential. Our faculty place emphasis on using their real-life experiences to give you perspectives on what it takes to be successful in the real world. Their teaching is grounded in reality, and their research and involvement in engineering fields means courses, assignments, and projects are timely and relevant. Our faculty are interested in guiding you as one of tomorrow's engineering leaders.

Margaret Bailey, senior faculty associate to the provost and professor in mechanical engineering, is directly engaged in research related to gender within engineering and science. She is investigating the hypothesis that women's participation in undergraduate engineering programs that provide work experiences (e.g., cooperative education) leads to enhanced self-efficacy and an increased likelihood of retention through graduation. Bailey is also the principal investigator for a large multiyear university-level organizational transformational effort with a goal of increasing the representation and advancement of women STEM faculty. Bailey teaches energy-related courses and serves as a mentor and adviser to undergraduate and graduate mechanical engineering students involved in her research. She is actively involved in curricular development and assessment activities ranging from individual courses to college and university-wide programs.

David Borkholder, Bausch & Lomb professor of microsystems engineering, leads a research team that developed a blast gauge device to monitor a soldier's exposure to blasts in warfare. The resulting data from the device will eventually assist in improving care for soldiers injured in the field. A senior member of the Institute of Electrical and Electronics Engineers, Borkholder holds a number of patents. He also is a DARPA Defense Sciences Research Council Fellow. Borkholder's current research projects include implantable microsystems for intra-cochlear drug delivery, a user-guided assistive listening system, and several other physiological sensors with industrial support.



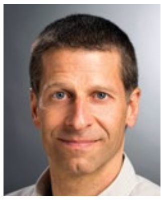
Elizabeth DeBartolo, director of multidisciplinary design and associate professor, helps to attract young women into engineering fields. She is part of a team of professors who developed a traveling activity kit to educate middle and high school students about energy-related careers in engineering. The kits show students how engineering can be exciting and fun—and more than just functional. "The experience allows students to see another side of engineering that does not relate to maximizing output or profit: the value of their work beyond a financial bottom line." She organized an event—"Park & Ride: Amusement Park Ride Design"—that illustrates how exciting engineering can be. DeBartolo teaches statics, materials science, design of machine elements, and advanced mechanics of solids. She also teaches Senior Design, a capstone multidisciplinary course.

Thomas Gaborski, associate professor in biomedical engineering, does research focused on the interface of nanomaterials, biology, and imaging with the goal of developing novel nanomaterials that lead to improved biomedical research and the treatment of human diseases. He co-founded SiMPore—a nanomaterials company that develops and commercializes ultrathin membranes—and was the principal investigator on several NIH innovative research grants for the company, where his research concepts have been commercialized into biomedical and materials science laboratory products. Gaborski continues his bionanotechnology research by creating physiologically relevant microenvironments using nanomembranes in order to differentiate adult stem cells. These substrates could be used in the future to not only differentiate but also proliferate stem cells for diagnostic and therapeutic uses.

"There is great value and tremendous satisfaction in the process of learning. I try to convey the value of hard-won information and the personal, intellectual satisfaction that comes from struggling and finally understanding. This appreciation for learning is something that students will carry with them for the rest of their lives."

—James Moon, associate professor of electrical engineering and recipient of the Richard and Virginia Eisenhart Award for Excellence in Teaching

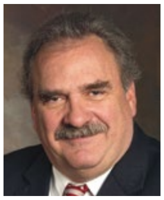
Edward Hensel, professor, associate dean for research and graduate studies, serves as a mentor to a local high school robotics team that competes annually in the FIRST Robotics Competition, which challenges participants to solve engineering design problems in fun contests involving remote-controlled robots designed, built, and programmed by students and their mentors. "When the light bulb goes on, and students connect their classroom education with the excitement of FIRST, that's what it's all about," says Hensel, adding that "100 percent of the students graduating from [that] FIRST team went on to become freshmen in college engineering and science programs."



Karl Hirschman is a professor of microelectronic engineering and director of the Semiconductor and Microsystems Fabrication Laboratory, RIT's 13,000-square-foot clean room. He epitomizes RIT's commitment to student-centered research. Hirschman and a team of students have been conducting a sponsored research project with Corning Inc. to advance the development of silicon-on-glass technology for use in flat-panel displays. "We recognize this as a unique opportunity to have a major impact on the development of advanced display products," he says.

Mark Kempski, a professor of mechanical engineering, teaches system modeling and system control, and is responsible for the direction of the Systems Studio Laboratory. Kempski participates in research activities focused on cardiovascular biomechanics, such as modeled vascular blood flow in cardiac muscle, heart rate variability after acute head trauma in pediatric patients, blood velocity variability and cardiovascular system modeling during early fetal development, the processing of biomedical ultrasound signals, and recently, sport motion analysis.

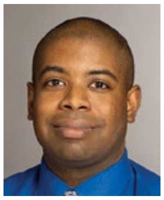
Santosh Kurinec is a professor in RIT's electrical and microelectronic engineering department, the first in the nation devoted to the discipline. Research by Kurinec and her team in integrated circuits and semiconductor devices has revolutionized communication, information storage, transportation, and media. "Throughout my time at RIT, I have focused on the dual goals of advancing technology in the microelectronics field, while also promoting the skills and capabilities of our students," says Kurinec. Nearly every major semiconductor company in the field—including Intel, IBM, and Micron—employs RIT graduates. Her current research activities include nonvolatile memory, photovoltaics, and advanced integrated circuit materials and processes.



Alan Nye, professor of mechanical engineering, is the faculty adviser to the RIT Formula SAE team, which beat 81 teams to take home first-place honors at the 2009 and 2010 Collegiate Design Series California. It (2009) was the first time the RIT team placed first overall on American soil. "This was our 17th year doing this," says Nye. "We've gone to multiple events most years and have won in Australia and England, but this was the first time we had won in the United States." The team also swept the individual categories in the competition.

Risa Robinson, professor and mechanical engineering department head, is conducting research on the impact of smoking. She guided students in the construction of a smoking machine that simulates how particles build up over time and the damage the process can have on the body's particle-clearance mechanisms. Robinson established and directs the college's Respiratory Technologies Laboratory (RTL), which develops systems to evaluate new tobacco products against manufacturers' claims for reduced emissions and addictive potential. Her work currently involves the evaluation of electronic cigarettes, a product whose market is rapidly expanding to now include teenagers.

Her work will aid the FDA in regulating these new and widely untested products.



Reginald Rogers, assistant professor of chemical engineering, conducts research in the areas of absorption and next-generation battery technology. His focus is on the use of carbon nanotubes for environmental applications and chemical/biological sensors. Rogers also teaches undergraduate students and received the Partner of the Year award from RIT's Multicultural Center for Academic Success, a student nominated award.

Sean Rommel is a professor in the department of microelectronic engineering. His research interests focus on three areas: nanoelectronic devices and circuits, photonic/optoelectronic devices/circuits, and advanced semiconductor fabrication techniques, all of which have been viewed as key areas within the growing semiconductor industry. Rommel leads the Emerging Devices Research Group, which recently demonstrated a breakthrough in tunneling field effect transistor, showing that use of new methods and materials for building integrated circuits can reduce power—extending battery life to 10 times longer for mobile applications compared to conventional transistors.

Bruce Smith, professor, is director of both the microsystems doctoral program and the Center for Nanolithography Research. After working for Gould AMI Semiconductor and Digital Equipment Corp., he returned to RIT to share his experience in the classroom. Smith, who holds 18 patents, developed a method—known as evanescent wave lithography—capable of optically imaging the smallest-ever semiconductor device geometry. The breakthrough has allowed resolution to smaller than one-twentieth the wavelength of visible light. Internationally known for his work in microlithography, Smith is founder and president of Amphibian Systems, a producer of R&D lithography systems for semiconductor companies.

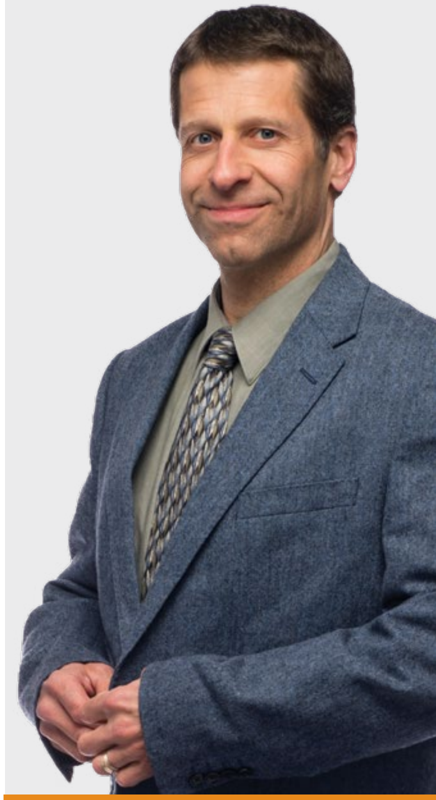
Brian Thorn, professor of industrial and systems engineering, was presented the 2015 Sustainable Development Excellence in Teaching Sustainability Award by the Institute of Industrial Engineers. "Organizations are starting to understand that they need technically oriented people who are prepared to deal with sustainability-themed problems. That's where we come in," says Thorn. Using beet juice as an alternative in products to de-ice roads, exploring the environmental impact of food packaging materials, or building an Arborloo are only a few of the ways he encourages his students to think about how sustainability can be applied to solving engineering challenges.

Jing Zhang is a Kate Gleason assistant professor in the electrical and microelectronic engineering department. Zhang's research works cover various aspects of computational, material growth, and device fabrication of III-Nitride semiconductors for light emitters and thermoelectric devices. Her research interests include the pursuit of novel materials for large thermoelectric figure of merit, semiconductor Ultraviolet Light Emitting Diodes (LEDs) and lasers, as well as III-Nitride solid state lighting devices. Zhang has published more than 22 refereed journal papers and 30 conference publications, including invited talks.

Steven Weinstein is the head of the chemical engineering department. He worked for 18 years at Eastman Kodak Co. as a research scientist before joining RIT to develop the chemical engineering program, one of the newest degree programs in the college and a career field where demand for graduates is strong. "High-performance materials are needed across all industry sectors including aerospace, automotive, biomedical, electronic, environmental, space, and military applications," says Weinstein.

"RIT's focus on 'education by doing' is a major asset not only for students but also for professors and researchers. Students bring new ideas and a fresh perspective to problems that assist in making our research better."

—Karl Hirschman, associate professor of microelectronic engineering and director of the Semiconductor and Microsystems Fabrication Laboratory



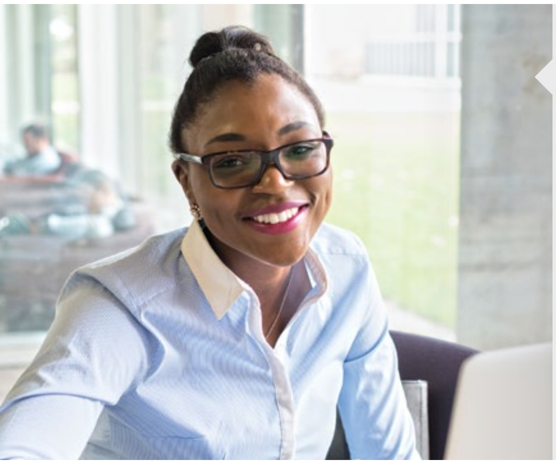
Co-op and Experiential Learning

www.rit.edu/kgcoe/co-op

MELISSA MENDOZA

Hometown: Hollis (Queens), NY
Major: Biomedical Engineering
Activities: Engineering House, Women in Engineering, Biomedical Engineering Society, Newman Parish
Co-op Placements: Research Department Intern, New Hope Fertility Center; Student Research Coordinator, FUNDANIER-Roosevelt Hospital; Research Intern, Renal Research Institute

Growing up, Melissa Mendoza knew about family friend Dr. Randall Lou-Meda and his work with Fundanier, the Guatemalan Foundation for Children with Kidney Diseases. Mendoza wanted to contribute to his work, so she and two RIT classmates traveled to Guatemala to work with Lou-Meda at Roosevelt Hospital in Guatemala City. There, she helped to troubleshoot technical problems with medical equipment. "If there is any indication of air in the tubing that is streaming the blood and connected to the child, it can cause an embolism, which would be a very serious problem," Mendoza explains. She and her classmates contacted NIPRO, an international biomedical device company, which donated some new equipment to the clinic. "Guatemala is a country dear to my heart and it means a lot to me that we traveled there to make a difference."



LEZEH FOY

Hometown: Cameroon, West Africa
Major: Electrical Engineering with Computer Engineering Option
Activities: Society of Women Engineers, National Society of Black Engineers, Organization of African Students
Co-op Placement: GE Aviation; Toyota

The only colleges Lezeh Foy was interested in attending were ones with a co-op program. When she visited RIT for the first time, at the Accepted Student Open House, she was impressed with the range of options and opportunities the university offered. "I want to be challenged," Foy says about her choice of major. That feeling carried over to her co-op. On her first day at GE Aviation her mentor asked her to write down five goals she wanted to accomplish. A week later, he assigned her projects that would enable her to meet her goals. "I was really challenged by problems that he gave me to solve. I realized I liked design engineering more than manufacturing engineering. I want to be the one who decides what gets made, instead of making someone else's idea."

RIT's cooperative education (co-op) program is one of the oldest and largest in the world and is an integral part of all engineering programs.

Co-op offers you distinct and diverse opportunities to apply classroom education to "real-world" problems and projects through full-time, paid work experiences in companies and organizations from small startup firms to Fortune 500 corporations. You'll earn a competitive salary—income that you can apply toward tuition, books, and living expenses—while developing skills that cannot be mastered in the classroom or laboratory, including hands-on leadership, decision making, professionalism, and independence.

Engineering co-op positions are among the most exciting, diverse, and high-paying opportunities available, and many students receive full-time job offers from their co-op employers upon graduation.

How it works

All of RIT's engineering programs require approximately one year of co-op work experience. Co-op typically takes place in your third, fourth, and fifth years, and you'll alternate blocks of work and on-campus study. RIT's Office of Career Services and Cooperative Education will assist you in identifying appropriate co-op employment. Career service coordinators with the office are assigned to each academic major and work with you individually from the beginning of co-op through career entry upon graduation and beyond. These services remain available to you whenever you need them as an alumnus of RIT. The office provides state-of-the-art resources and a specially designed series of educational seminars to cover every aspect of the job search process, including identifying and contacting co-op employers, resume preparation, interviewing techniques, and salary negotiation. You'll have opportunities to interact with employer representatives throughout the year at university-wide career fairs, individual company on-campus recruiting activities, special topic workshops, and networking events.

A full-service website provides you with everything you need to be successful in your job search—on-campus interview schedules and electronic resume referrals—making the application process for co-op or full-time positions as easy as clicking a

Co-op and permanent employers

RIT's employer network includes more than 2,200 organizations. Here is a sample of those that have hired students for co-op and permanent placement.

Analog Devices
Anaren Microwave Inc.
Anheuser-Busch Inc.
Apple Inc.
Ariel Corporation
BAE Systems
Bausch & Lomb Inc.
BorgWarner Morse TEC Inc.
Bose
Carestream Health
Cisco Systems
Corning Inc.
Cummins
Delphi Corporation
Freescale Semiconductor
Genencor
General Dynamics
General Electric
General Motors
Gleason Works
Google
Harris Corporation
Honda of America Manufacturing
Iberdrola
IBM Corp.
Intel Corp.
iRobot
ITT Corporation
Lord Corp.
Micron Technology
Microsoft Corporation
MKS ENI Technologies
MOOG Inc.
NASA
National Security Agency
Parsons
Phillips Electronics
Praxair Inc.
The Raymond Corporation
Sikorsky
SpaceX
SRC Inc.
Synaptics Inc.
Tesla Motors
Toyota
Vicor Corp.
Wegmans Food Markets
Welch Allyn Inc.

RIT DUBAI

Engineering students have the opportunity to study abroad at RIT Dubai, strategically located in the heart of Dubai Silicon Oasis, one of the world's leading centers of advanced electronic innovation and design. Dubai is home to numerous groundbreaking engineering feats, including the Burj Al-Arab hotel, the fourth tallest building in the world, and Ski Dubai, the world's largest indoor snow park. Students live in this exciting, modern city as they complete engineering courses (taught in English) and study amid some of the world's most amazing structures created by top international architectural and engineering design firms.

mouse. You have the option of working with one of RIT's current co-op employers or developing your own opportunity, whether you are seeking a one-of-a-kind position in Silicon Valley or a job at a company in your hometown.

Building your resume

By the time you finish your program of study at RIT, your resume will reflect not only your academic record but a significant amount of related work experience in your engineering discipline. During your co-op work experience, you'll have the chance to sample many areas of your career field and apply your skills in a variety of situations. Maybe you'll work for the same company for more than one co-op assignment, or perhaps you'll work for companies in different geographic locations each time you leave campus. No matter which way you go, co-op is an essential part of your career exploration and provides critical connections between your on-campus education and the real world. RIT gives you unbeatable experience in your field, confidence in your abilities and technical skills, and the support of a professional network—features that will prove invaluable as you advance through your career.

Study Abroad

RIT's Study Abroad program enhances the understanding of other cultures. You may study full time in RIT-affiliated programs in more than 20 countries around the world. Program locations include the United Kingdom, Ireland, Dubai, Italy, France, Denmark, Germany, Ghana, Costa Rica, Hong Kong, Singapore, Australia, China, Croatia, Dominican Republic, Japan, Russia, and Thailand, to name a few.

You can select to enroll in courses in your degree area or you may elect to complete liberal studies classes—all while gaining the experience of living and learning in a culture different from your own. College of Engineering students may want to consider a semester of study abroad in Dubai. All courses are taught in English and the curriculum is essentially the same as on the RIT campus for electrical, microelectronic, or mechanical engineering bachelor's degree programs. Students stay on course with their curriculum while experiencing all that the Study Abroad program has to offer, and living and learning in another country and culture.

Finest Facilities

www.rit.edu/kgcoe/facilities

At RIT, technology enhances creativity and innovation. The Kate Gleason College has the latest equipment, software, laboratories, and classrooms to help you explore and excel.

Biomedical Device Engineering Lab

This lab is dedicated to the design, measurement, and benchtop testing of electromechanical medical devices such as magnetically levitated implantable blood pumps known as ventricular assist devices. The lab includes dedicated workstations for soldering, metrology of mechanical parts, several workstations with personal computers, and multiple tabletops used for prototype assembly and testing. Software includesSolidWorks, MATLAB, Canvas, CorelDraw, COSMOL, Multiphysics, as well as Adobe products and Microsoft Office.

Brinkman Machine Tools and Manufacturing Lab

The Brinkman Machine Tools and Manufacturing Lab is a state-of-the-art facility devoted to research and teaching of manufacturing. It features a wide variety of cutting-edge advanced manufacturing processes such as waterjet machining, computer-controlled milling, 3D printing, and printed electronics. The lab is also home to a number of other tools, including metrology tools and CNC. Faculty conduct cutting-edge research in this lab and the lab provides valuable support to students on the SAE Formula Team and Mini Baja Team, as well as those working on senior design projects.

Fuel Cell Lab

Students who work in the lab are exposed to a research-intensive environment. They work with sophisticated technical equipment on projects that are directly related to current environmental and societal issues such as climate change and pollution from fossil fuel use in automobiles.

Micro-E Facility

RIT's Semiconductor and Microsystems Fabrication Laboratory (SMFL) is among the world's finest educational facilities. It has state-of-the-art tools to design, fabricate, and test integrated circuits, and features an electron beam mask making facility; ion implanter; UV and deep UV exposure systems; plasma processes; diffusion furnaces; electron microscopes; and simulation, modeling, and computer-integrated manufacturing tools.

Institute Hall

Institute Hall is home to the biomedical and chemical engineering programs, is approximately 86,000 square feet, and includes:

- twelve dedicated 750-square-foot faculty research labs
- a 2,500-square-foot chemical engineering unit operations teaching lab that will provide the students with the opportunity to get hands-on experience in the main chemical engineering processes like distillation, absorption, adsorption, filtration, and reaction engineering. The distillation, absorption, and adsorption columns, the ultrafiltration system, and the chemical reactors include automated control systems that introduce the students to topics in chemical process control.
- a 2,500-square-foot wet/dry biomedical engineering teaching lab with an advanced instructional system that includes the hardware and software to perform different assessments of human physiology: breathing, respiratory, and blood pressure measurements as well as electrocardiography and electromyography. There are also biomechanical structures to build and test structural models of the human body.
- a chemical stock room
- computer laboratories
- a green data center
- several new classrooms.

Toyota Production Systems Lab

Founded in 2006 with support from Toyota Motor Engineering & Manufacturing North America, the Toyota Production Systems Lab educates students in state-of-the-art production systems. The facility features a reconfigurable production line with storage and kitting areas, conveyors, and conveyance operations. The lab addresses issues such as supplier/customer supply chain interactions, production control, storage, conveyance, and assembly, among others.

Research Highlights

www.rit.edu/kgcoe/research

ALEXANDRA LALONDE

Hometown: Manlius, NY
Major: Biomedical Engineering

It's uncommon for undergraduate students to be the first authors of a research paper accepted and published in a recognized, peer-reviewed journal. Alexandra LaLonde has had two—just this past year. And the biomedical engineering major co-authored two other articles since she started working in professor Blanca Lapizco-Encinas' Microscale Bio-Separations Laboratory.

LaLonde is part of a team developing techniques in microfluidics to separate live cells from dead cells so that scientists and clinicians can better analyze diseases. And once analyzed, intervention and cures are not too far behind. Today, work in the Bio-Separations Lab is about developing techniques to build lab-on-a-chip devices, highly sophisticated laboratories on microchips. These miniaturized devices have multiple channels where fluid samples containing mixtures with E.coli (bacterium) or S.cerevisiae (yeast), for example, are assessed. Once exposed to electrical currents, the bio-particles separate, making them easier to analyze.

"For lab-on-a-chip devices to work, a separation technique of a physical or chemical nature has to occur, and that is where we come into play," says Lapizco-Encinas, associate professor of biomedical engineering and recipient of a National Science Foundation grant. "We are developing the techniques that can make those devices possible." Some of those techniques were developed and tested by LaLonde, who was able to determine significant levels where the cells remain viable despite manipulation with high electric potentials.

"When she started working in my lab more than a year ago, Alexandra was interested in doing research," says Lapizco-Encinas. "She has grown so much since then, in her confidence and her skills. When she has to present her results in front of people, you have to see her…it's amazing to see such a brilliant young scientist." Lapizco-Encinas adds: "Students have all these wonderful skills and capabilities, but they need to have the right environment to be successful. Our undergraduates have what they need to shine. I treat them like I treat any graduate or doctoral student because they are working to that level. They are all colleagues, with the same level of responsibility. I have had very rewarding experiences working and publishing several journal articles with undergraduate students as first authors."

RIT engineering faculty are active in many research areas. Research takes place across engineering disciplines and often involves other colleges at RIT, local health care institutions, and major industry partners.

Externally sponsored projects are a vital and integral component of RIT's educational and research activity. Faculty and students undertake sponsored projects for a variety of important reasons: to add to the body of knowledge, for professional development, and to strengthen academic programs. Sponsored projects enhance the university's academic programs, broaden its research resources, provide opportunities for student participation in research, strengthen university-industrial partnerships, and serve the wider community.

RIT's major public sponsors include the National Science Foundation (NSF), the National Institutes of Health (NIH), the Department of Education (USDE), the Department of Defense (DOD), the National Aeronautics and Science Administration (NASA), and New York state.

KGCOE engineering research falls under five broad focus areas:

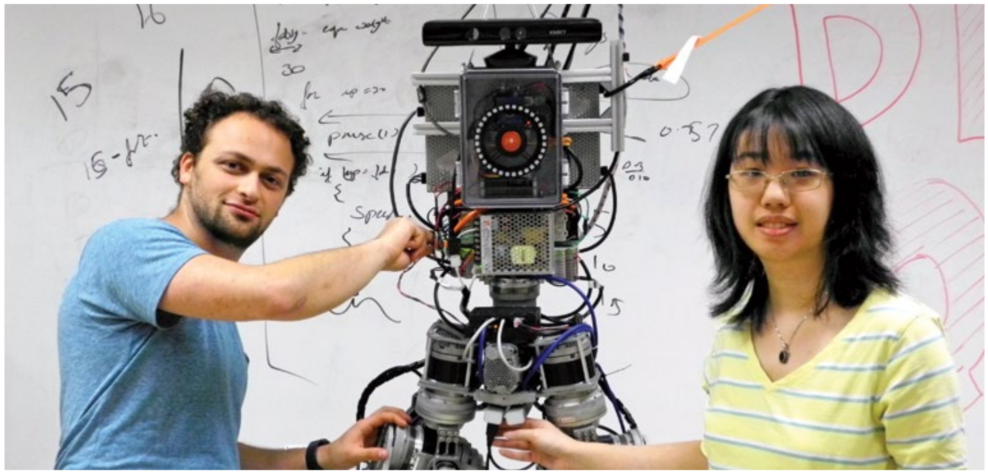
- Transportation
- Energy
- Communications
- Health care
- Nano-science and Microsystems Engineering

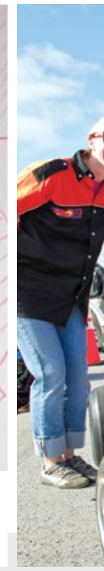
Within these broad areas, faculty and students are conducting research in a variety of focus areas and industries such as:

- advanced materials
- computer vision
- embedded systems and control
- high-performance computing
- operations
- photonics
- semiconductor processing
- supply chain and logistics
- sustainability as it applies to all of the broad areas mentioned above

Academic Enrichment

www.rit.edu/kgcoe





TIGERBOT A team of students from the electrical, computer, and mechanical engineering majors designed and built a 31-inch autonomous humanoid robot platform nicknamed "TigerBot" for their senior design project.

SENIOR DESIGN

Senior Design is a two-term sequence course that all Gleason College students complete in their fifth year. The course sequence prepares students for modern engineering practices. Working in multidisciplinary teams with students from other majors, students collaborate with corporate sponsors on real-world engineering problems. They define and analyze the problem, then design solutions within customer requirements and constraints. Students have worked on a wide variety of projects over the years. Here are just a few titles that provide a sense of the depth and breadth of senior design:

- Navigation Aid for the Blind
- Wireless Power Transmission Through the Skin
- Moog Flight Simulator
- Wind Energy Collection to Energy Bank

RIT has many opportunities for students to enrich their education beyond the curriculum.

The RIT Honors Program

The RIT Honors Program is for students who have demonstrated outstanding academic performance. Students admitted to the RIT Honors Program have access to special courses, seminars, projects, and advising. They also have the opportunity to work directly with faculty on applied and interdisciplinary research projects.

Accelerated dual-degree programs

Accelerated dual degrees allow you to earn both a bachelor's and a master's degree in just five years. You will still participate in the cooperative education program (completing 40 weeks of co-op instead of approximately one year) as you take undergraduate and graduate courses simultaneously in your fifth year. Upon completion of a master's thesis or a project, you'll earn both degrees. Students interested in pursuing an accelerated dual-degree program typically apply for admission during their second year. The following accelerated dual-degree options are available:

- BS in any of our engineering disciplines/ MS in Science, Technology and Public Policy*
- BS in Chemical Engineering/ MS in Materials Science and Engineering
- BS/MS in Computer Engineering
- BS/MS in Electrical Engineering
- BS in Industrial Engineering/ ME in Engineering Management
- BS in Industrial Engineering/ME or MS in Industrial and Systems Engineering
- BS in Industrial Engineering/ ME or MS in Sustainable Engineering
- BS in Mechanical Engineering/ ME or MS in Mechanical Engineering
- BS in Microelectronic Engineering/ MS in Materials Science and Engineering

* All qualified students in any of our undergraduate disciplines (biomedical, chemical, computer, electrical, industrial, mechanical, and microelectronic) may apply for the dual-degree program with the master's degree in science, technology and public policy from the College of Liberal Arts. This dual-degree program provides students with the technical skills they need in engineering and a solid understanding of how technology impacts public policy.

- Photovoltaic Energy Housing
- Near Space Solar Power Conditioning
- Next Generation Charcoal Stove for Haiti
- Green Sauna
- Wegman's Freezer Inventory Management
- Intra-building Navigation Device
- Dresser Rand Wellsville Ventilator Factory
- Cheesecake Water Dosing
- Monitoring Device for Human Smoking Behavior

Software engineering

A five-year BS degree in software engineering is offered in RIT's B. Thomas Golisano College of Computing and Information Sciences (GCCIS). There is a strong partnership between the computer engineering and software engineering departments, and the first two years of both programs have similar requirements. The program provides 12 months of paid, professional work experience through cooperative education. The software engineering major was the nation's first BS degree program of its kind. Visit www.rit.edu/gccis for more information.

Minors and Immersions at RIT

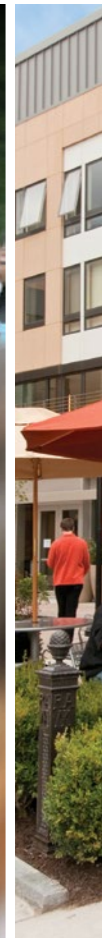
For the most recent list of immersions, please visit rit.edu/programs/immersions. For the most recent list of minors, please visit rit.edu/minors.

- Accounting ●
- Advertising and Public Relations ●▲
- African Studies ▲
- American Art ●▲
- American Politics ●▲
- American Sign Language and Deaf Cultural Studies ●▲
- Anthropology and Sociology ●
- Applied Statistics ●▲
- Archaeological Science ●
- Archaeology ▲
- Art History ●▲
- Astronomy ●▲
- Bioinformatics Analysis ●
- Biology ▲
- Biology: Cellular and Molecular ●
- Biology: Ecology and Evolution ●
- Black Studies ●
- Business Administration ●
- Chemical Engineering Systems Analysis ●
- Chemistry ●▲
- Communication ●▲
- Computer Engineering ●
- Computer Science ●
- Computing Security ●
- Construction Management ●
- Creative Writing ●▲
- Criminal Justice ●▲
- Cultural Anthropology ▲
- Database Design and Development ●
- Digital Business ●
- Digital Literatures and Comparative Media ●▲
- Diversity in the U.S. ▲
- Economics ●▲
- Electrical Engineering ●
- Engineering Management ●
- English ●▲
- Entrepreneurship ●
- Environmental Modeling ●
- Environmental Science ●
- Environmental Studies ●▲
- Ethics ●▲
- Exercise Science ●
- Film Studies ●▲
- Finance ●
- Flexible Packaging ●
- Free and Open Source Software and Free Culture ●
- Game Design ●
- Game Design and Development ●
- Geographic Information Systems ●▲
- Global Justice ▲
- Global Literatures and Cultures ●
- Globalization ●
- Globalization Theory ▲
- Health Communication ●
- Health and Culture ●▲
- Health IT ●
- History ●▲
- Hospitality Management ●
- Human Language Technology and Computational Linguistics ▲
- Imaging Science ●
- Imaging Systems ●
- Industrial Engineering ●
- Innovation ●
- International Business ●
- International Relations ●▲
- Journalism ●▲
- Language Science ●▲
- Latino/Latina/Latin American Studies ●▲
- Legal Studies ●▲
- Linguistic Anthropology ▲
- Management ●
- Management Information Systems ●
- Marketing ●
- Mathematics ●▲
- Mechanical Engineering ●
- Media Arts and Technology ●
- Microelectronic Engineering ●
- Military Studies and Leadership ●
- Mobile Design and Development ●
- Mobile Development ●
- Modern Language (Arabic, Chinese, French, German, Italian, Japanese, Portuguese, Russian, Spanish) ●
- Modern Languages and Cultures (Arabic, Chinese, French, German, Italian, Japanese, Portuguese, Russian, Spanish) ▲
- Museum Studies ●▲
- Music ▲
- Music Performance ●
- Music and Technology ●
- Native American and Indigenous Studies ▲
- Networking and Systems Administration ●
- Nutritional Sciences ●
- Optical Science ●
- Packaging Science ●
- Philosophy ●▲
- Physics ●▲
- Political Science ●
- Psychology ●▲
- Public Policy ●▲
- Religious Studies ▲
- Renaissance Studies ▲
- Science of Film, Photography, and Imaging ▲
- Science, Technology, and Society ●
- Science and Technology Studies ▲
- Social Inequalities ▲
- Software Engineering ●
- Structural Design ●
- Supply Chain Management ●
- Sustainable Product Development ●
- Theater Arts ●▲
- Urban Studies ▲
- Visual Culture ●▲
- Water Resources ●
- Web Design and Development ●
- Web Development ●
- Women's and Gender Studies ●▲

● Minor ▲ Immersion

Student Life

MUD TUG
The Mud Tug, an annual fundraising event, is just one example of the philanthropy of RIT's students. Each year, student clubs, fraternities, and sororities hold events for a number of charities, including Habitat for Humanity, Tree of Angels, and the Multiple Sclerosis Society.



RIT engineering students take their academics seriously—but they'll be the first to tell you that they're just as serious about student life—especially when a victory is on the line.

Join the action

We offer you plenty of ways to keep your mind sharp by having fun and getting involved. Some of the options you'll find on campus include a radio station, a campus magazine, a jazz ensemble, student government, and community service opportunities. An active events calendar also features nationally known bands, plays, movies, comedians, and speakers.

Our campus is alive with sports and recreation activities as well. Men's and women's intercollegiate athletic teams have captured a number of championships, and our intramural program offers independent and coed leagues in basketball, volleyball, softball, flag football, ice hockey, soccer, tennis, golf, and more. The athletic facilities include a state-of-the-art fitness center, weight room, ice arena, swimming pool, field house, racquetball courts, outdoor tennis courts, playing fields, and a wilderness fitness trail.

Ahead of the competition

Whether designing, building, and racing cars, robots, or products, our students rank at the top of every competition they enter. Our record says it all. Our Formula SAE race car team routinely places among the top 20 overall finishers in the U.S., and our Mini Baja team travels from California to Brazil to squash the competition. Success in a competitive team environment looks great on a résumé, too.

Rochester and beyond

Rochester is a true college town. Home to 11 colleges and universities, four of which are within five miles of the RIT campus, Rochester provides unsurpassed educational and cultural opportunities. The greater Rochester metropolitan area is ranked as one of America's top places to live, work, and play. The four-season climate, home to almost 1.5 million people, is perfect for seasonal activities like snow skiing, sailing, hiking, cycling, and kayaking. Rochester provides an incredible backdrop for higher education, career growth, high-tech startups, and arts and culture.

High-tech, communications, optics, research, and manufacturing companies, including many Fortune 500 companies, choose Rochester as their base of operations. The city has more than 4,000 exporting companies. Xerox Corporation, Eastman Kodak Company, Bausch & Lomb, Inc., Paychex, Inc., Frontier Corporation, and other national and international firms make Rochester a great place to learn about the world of business. In addition, these firms and other Rochester companies offer excellent co-op and permanent employment opportunities.

The region has plenty of dining and entertainment options. A significant range of art galleries, cinemas, theaters, comedy clubs, restaurants, concert halls, and nightclubs featuring live music and dancing are just minutes from campus. For nature lovers, parks, beaches, golf courses, mountains, gorges, lakes, and streams provide opportunities for outdoor recreation and sightseeing. The city is home to professional sports teams in baseball (Red Wings), ice hockey (Americans), soccer (Raging Rhinos), lacrosse (Knighthawks and Rattlers), indoor football (Rochester Raiders), and basketball (Razorsharks). Rochester's cultural assets include the Memorial Art Gallery, Rochester Philharmonic Orchestra, Rochester Museum and Science Center, Strasenburgh Planetarium, Geva Theatre, and the world-renowned photographic and motion picture collections at the George Eastman House.

Engineering clubs and organizations

- AeroDesign Club
- American Indian Science & Engineering Society
- American Institute of Chemical Engineers
- American Society of Civil Engineers
- American Society of Mechanical Engineers
- Biomedical Engineering Society
- Computer Science House
- Engineering House
- Engineers for a Sustainable World
- E-Vehicle Team
- Institute of Electrical and Electronic Engineers
- Institute of Industrial Engineers
- Micro Air Vehicle Club
- Microelectronic Engineering Student Association
- Mini Baja Team
- National Society of Black Engineers
- Pi Tau Sigma (National Mechanical Engineering Honor Society)
- RIT Collegiate FIRST
- RIT Formula SAE Team
- Robotics Club
- SAE Clean Snowmobile Team
- Society of Asian Scientists & Engineers
- Society of Hispanic Professional Engineers
- Society of Manufacturing Engineers
- Society of Women Engineers
- Software Engineering Club
- Tau Beta Pi (National Engineering Honor Society)

Admissions and Financial Aid

www.rit.edu/admissions

Aerial image courtesy of Stratus Imaging

Selective, personalized admission process

Admission to RIT is competitive, but our admission process is a personal one. Each application is reviewed holistically for strength of academic preparation, performance on standardized tests, counselor recommendations, and your personal career interests. We seek applicants from a variety of geographical, social, cultural, economic, and ethnic backgrounds.

Application timelines

Students applying for freshman admission for September may apply through an Early Decision Plan or Regular Decision Plan. The Early Decision Plan is for students who consider RIT their first-choice college and wish to make an early commitment regarding admission. Early Decision requires candidates to file their applications and supporting documents by November 15 in order to receive admission notification beginning mid-December.

Freshmen who choose not to apply for Early Decision are considered under our Regular Decision Plan. Regular Decision applicants who have provided all required application materials by January 15 will receive admission notification beginning mid-February. Applications received after January 15 will be reviewed on a space-available basis, with notification letters mailed four to six weeks after the application is complete. Students interested in being considered for merit-based (academic and extracurricular) scholarships or the RIT Honors Program must apply by January 15.

A smart investment

All students deserve an educational opportunity, regardless of their families' economic circumstances. We invest in our students by offering a comprehensive financial aid program that includes merit-based scholarships, and a full range of need-based grants, loans, and campus employment options. Our merit-based scholarships include Presidential Scholarships ranging from $14,000 to $20,000 per year, Founders Scholarships valued up to $12,000 per year, and more. RIT need-based grants are valued up to $20,000 per year.

During the past school year, more than 77 percent of RIT full-time undergraduate students received more than $300 million in financial aid. We also offer monthly payment and tuition prepayment plans. Cooperative education opportunities also can generate significant earnings to help offset your college expenses.

RIT in Brief

COLLEGES AND DEGREE-GRANTING UNITS:

College of Art and Design
- School for American Crafts
- School of Art
- School of Design
- School of Film and Animation
- School of Photographic Arts and Sciences

Saunders College of Business

B. Thomas Golisano College of Computing and Information Sciences

Kate Gleason College of Engineering

College of Engineering Technology
- School of Media Sciences

College of Health Sciences and Technology
- Wegmans School of Health and Nutrition

College of Liberal Arts

National Technical Institute for the Deaf

College of Science
- Chester F. Carlson Center for Imaging Science
- Thomas H. Gosnell School of Life Sciences
- School of Mathematical Sciences
- School of Chemistry and Materials Science
- School of Physics and Astronomy

Golisano Institute for Sustainability

School of Individualized Study

FOUNDED IN 1829, Rochester Institute of Technology is a privately endowed, coeducational university with nine colleges and two degree-granting units emphasizing career-focused education and experiential learning.

THE CAMPUS occupies 1,300 acres in suburban Rochester, the third-largest city in New York state. RIT also has international campuses in China, Croatia, Dubai, and Kosovo.

DEGREES: RIT offers the following degrees: doctoral (Ph.D.) programs in astrophysical sciences and technology, color science, computing and information sciences, engineering, imaging science, mathematical modeling, microsystems engineering, and sustainability; master's degree programs: master of architecture (M.Arch.), master of business administration (MBA), master of engineering (ME), master of fine arts (MFA), master of science (MS), and master of science for teachers (MST); bachelor's degree programs: bachelor of fine arts (BFA) and bachelor of science (BS); and associate degree programs: AS, AOS, AAS.

THE RIT STUDENT BODY consists of approximately 15,700 undergraduate and 3,250 graduate students. Enrolled students represent all 50 states and more than 100 countries. More than 3,400 students from diverse racial and ethnic backgrounds are enrolled on the main campus along with nearly 2,700 international students. An additional 2,188 students are enrolled at RIT's international campuses.

RIT is an internationally recognized leader in preparing deaf and hard-of-hearing students for successful careers in professional and technical fields. The university provides unparalleled access and support services for the more than 1,100 deaf and hard-of-hearing students who live, study, and work with hearing students on the RIT campus.

RIT ALUMNI number nearly 125,000 worldwide.

COOPERATIVE EDUCATION provides paid career-related work experience in many degree programs. RIT has the fourth-oldest and one of the largest cooperative education programs in the world, annually placing more than 4,400 students in nearly 6,300 co-op assignments with nearly 2,300 employers across the United States and overseas.

The RIT LIBRARIES consist of Wallace Library, the RIT Archive Collections, and the Cary Graphic Arts Collection. Wallace Library provides a vast array of resource materials, both print and online, and is open 24/5 during the academic year. Librarians associated with each college are ready to assist with research and class assignments. The RIT Archive Collections serves as the official repository for RIT's historically valuable records and artifacts. The Cary Collection is one of the country's premier libraries on graphic communication history and practices, and has a policy of liberal access for all students. For more information: http://library.rit.edu/.

HOUSING: Many of RIT's full-time students live in RIT residence halls, apartments, or townhouses on campus. On-campus fraternities, sororities, and special-interest houses are also available. Freshmen are guaranteed housing.

STUDENT ACTIVITIES: Major social events and activities are sponsored by the College Activities Board, Residence Halls Association, sororities, fraternities, and special-interest clubs of many kinds. There are more than 300 clubs and student organizations on campus.

ATHLETICS: Men's Teams—baseball, basketball, crew, cross country, ice hockey (Division I), lacrosse, soccer, swimming, tennis, track, and wrestling

Women's Teams—basketball, crew, cross country, ice hockey (Division I), lacrosse, soccer, softball, swimming, tennis, track, and volleyball

RIT offers a wide variety of activities for students at all levels of ability. More than 50 percent of our undergraduate students participate in intramural sports ranging from flag football to golf to indoor soccer. Facilities include the Gene Polisseni Center, which houses RIT's hockey arena and accommodates 4,300; the Gordon Field House, featuring two swimming pools, a fitness center, indoor track, and an event venue with seating for 8,500; the Hale-Andrews Student Life Center, with five multipurpose courts, eight racquetball courts, and a dance/aerobics studio; the Ritter Ice Arena; and outdoor facilities including an all-weather track, tennis courts, and several athletic fields.

EXPENSES: Full-time students enrolling for the first time and living in an RIT residence hall have the following 2018-19 academic year expenses. We estimate that the typical student also spends an average of $2,054 per year for books, transportation, and personal expenses.

Charges	2018-2019 Academic Year (two semesters)	NTID*
Tuition	$43,546	$16,518
Room (double)	7,598	7,598
Board (standard plan)	5,448	5,448
Fees	584	584
Total	$57,176	$30,148

** Deaf and hard-of-hearing students who are U.S. citizens enrolled in any undergraduate program and students enrolled in the ASL-English Interpretation major will pay these charges instead of the regular academic year charges.*

VISITS TO CAMPUS are encouraged and may be arranged in advance by calling 585-475-6631. Deaf and hard-of-hearing students may arrange campus visits by calling 585-475-6700, toll free in the U.S. and Canada at 866-644-6843, or by videophone at 585-743-1366.

HOME PAGE: www.rit.edu
EMAIL: admissions@rit.edu
UNIVERSITY COLORS: Orange and brown
UNIVERSITY MASCOT: Bengal tiger "Ritchie"
UNIVERSITY ATHLETIC TEAMS: Tigers

RIT does not discriminate. RIT promotes and values diversity within its workforce and provides equal opportunity to all qualified individuals regardless of race, color, creed, age, marital status, sex, gender, religion, sexual orientation, gender identity, gender expression, national origin, veteran status, or disability.

The Advisory Committee on Campus Safety will provide, upon request, all campus crime statistics as reported to the United States Department of Education. RIT crime statistics can be found at the Department of Education website, http://ope.ed.gov/security, and by contacting RIT's Public Safety Department at 585- 475-6620 (v/tty).

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Rochester Institute of Technology

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