



# Electrical and Computer Engineering

MASTER OF SCIENCE DEGREE PROGRAM

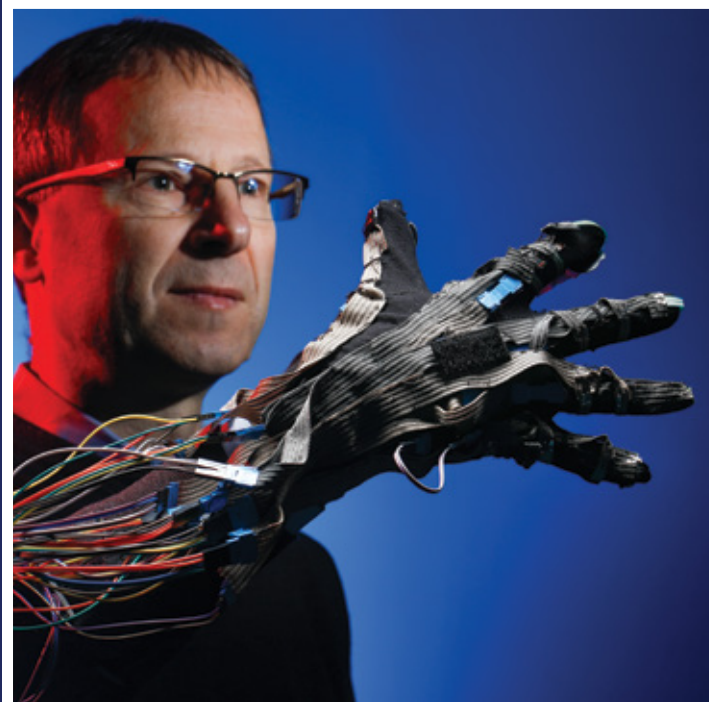
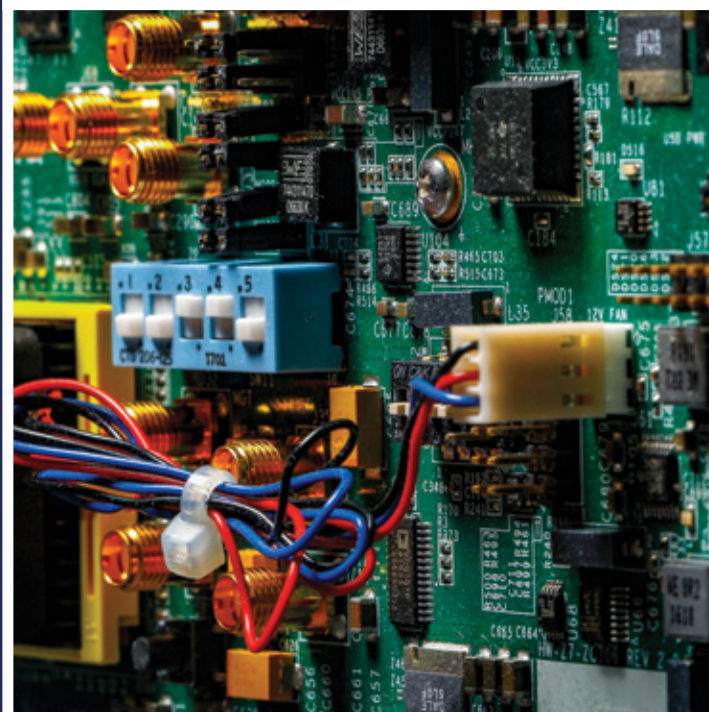
## A degree in electrical and computer engineering, or ECE, will prepare you for careers in creating innovative hardware and software components and systems.

Drawing on your advanced knowledge of mathematics and physics, you will be able to contribute to the next generation of smartphones, Internet-connected appliances, smart grids, autonomous cars, surgical robots, and more—putting the “smart” in virtually every device you use.

Electrical, electronics, and computer engineering are growing fields that offer rewarding work and rising pay: their median annual salaries range from \$99,000 to \$114,000, according to the U.S. Bureau of Labor Statistics.

### A UIC MASTER OF SCIENCE DEGREE WILL PREPARE YOU TO ENTER YOUR AREA OF CHOICE:

- |                         |                    |
|-------------------------|--------------------|
| Artificial Intelligence | Healthcare         |
| Automotive              | Manufacturing      |
| Avionics                | Multimedia Systems |
| Big Data                | Nanotechnology     |
| Communication Networks  | Robotics           |
| Electromagnetics        | Semiconductors     |
|                         | Supercomputing     |



## There are two ways to complete your MS in Electrical and Computer Engineering at UIC:

### THESIS OPTION

In conjunction with your coursework, the **thesis option** pairs you with a faculty mentor and gives you the opportunity to write an original research-based thesis on an ECE topic that interests you. Students have found that the specialization of a thesis makes them more marketable to employers. Thesis experience also is ideal for students who might want to continue on for doctoral study after the MS.

### COURSEWORK OPTION

The **coursework-only option** allows you to complete all the credits toward your MS degree through our comprehensive selection of electrical and computer engineering courses.

### International Programs

UIC's international partnership programs allow students from specific universities around the world to complete part of their higher education in our department, potentially culminating in an MS in Electrical and Computer Engineering from UIC.

Learn more at [go.uic.edu/COEinternational](http://go.uic.edu/COEinternational), contact Derong Liu at [derong@uic.edu](mailto:derong@uic.edu), or find us on WeChat at UIC-Engineering-32.

### UIC's Academic Strengths

- |                   |                                    |
|-------------------|------------------------------------|
| Electromagnetics  | Robotics                           |
| Hardware Security | Signal Processing and Data Science |
| Microrobotics     | Wireless Communications            |

### Featured Courses

What will you take as an MS student at UIC? Explore your choices at [ece.uic.edu](http://ece.uic.edu) (see the Courses page under the Graduate menu). Here are a few that have captured our current students' attention—and that have proved especially valuable in their careers after UIC.

#### ECE 442 POWER SEMICONDUCTOR DEVICES AND INTEGRATED CIRCUITS

This class encompasses the fundamentals of primarily silicon-based power semiconductors. It covers their basic physical principles, breakdown mechanisms, high-voltage bipolar and insulated gate devices, and basic packaging issues.

#### ECE 452 ROBOTICS: ALGORITHMS AND CONTROL

Learn about the kinematic and dynamic modeling of robots, configuration space, motion-planning algorithms, the control of robots, sensors and perception, and mobile robots. This course also explores robotic reasoning.

#### ECE 559 NEURAL NETWORKS

This course covers mathematical neuron models, learning methods, the perceptron, basic nonlinear optimization, the backpropagation algorithm, associative memory, hopfield networks, SVM, vector quantization, SOM, PCA, convolutional networks, and deep learning.

#### ECE 594 HARDWARE SECURITY AND TRUST

Students review and discuss state-of-the-art research on how to design trusted and assured microelectronics and to avoid invasive and non-invasive attacks. Among the many topics are crypto-engineering, side-channel attacks, and counterfeit electronics detection and prevention.

### A Step Ahead

Thanks to the strength of our curriculum and UIC's global connections, many MS students are able to get **internships** that help them level up their career planning.

#### Iswaryalashmi Narayanan

**Internship:** The Chamberlain Group

**Location:** Oak Brook, IL

**Assignment:** Working with the global innovation group on a new product for the company's line of modular door-openers, integrating features such as cameras, voice control, and smart locks

**Enrichment:** Embedding a small microchip into a pet collar that can automatically allow a pet access to the outdoors through an electronically enabled door

**Her perspective:** "R&D exposure is a huge eye-opener. I have a new passion to create things. Imagine you walk into a store five years from now and see a product that you helped develop."



#### Niranjani Venkatesan

**Internship:** LitePoint

**Location:** Arlington Heights, IL

**Assignment:** Testing Bluetooth and Wi-Fi devices such as modems, phones, and smart home devices, adhering to IEEE standards and making sure the products were configurable with legacy standards such as 2G, 3G, and 4G

**Enrichment:** Discovering the value of UIC Engineering's on-campus career fair, which Venkatesan said was key to finding her internship and then a full-time job

**Her perspective:** "It was a great experience. LitePoint was very flexible and wanted us to learn and explore as much as possible in that three-month period."





# After UIC, where to?

Companies that have hired graduates of the UIC MS in Electrical and Computer Engineering program include:

- |                               |                            |
|-------------------------------|----------------------------|
| Amazon                        | Motorola                   |
| Broadcom                      | <b>Northrop Grumman</b>    |
| Caterpillar                   | Nvidia                     |
| Cisco Systems                 | Philips                    |
| Citigroup                     | Qualcomm                   |
| Delta Mobile Software         | Samsung                    |
| Enphase Energy                | Sandia National Laboratory |
| Freescale Semiconductor       | <b>Shure</b>               |
| Fujitsu R&D                   | Schlumberger               |
| GE Research                   | Siemens                    |
| General Dynamics              | Space Systems / LORAL      |
| Google                        | Stanley / Black & Decker   |
| Huawei                        | Teradyne                   |
| Intel                         | Trident Microsystems       |
| LHV Power Corp.               | Varian Medical Systems     |
| LitePoint                     | Videojet Technologies      |
| Mayo Clinic                   | Western Digital            |
| Microsoft                     | WITech Instruments         |
| MIT Lincoln Laboratory        | Xerox                      |
| National Institutes of Health |                            |



**Patrick Martin**  
Physicist, Northrop Grumman

Most people expect a full-time job to come at the end of their master's program. For Patrick Martin, the offer came right in the middle.

Martin held an internship with Northrop Grumman while he was working on his degrees in both physics and ECE at UIC. When he completed the physics program, the global security and aviation company offered him a full-time role, which he accepted. He then continued to work on his master's in ECE while conducting data analysis for Northrop Grumman.

Martin was drawn to UIC for its national reputation, institutional resources, and faculty, whom he called "fantastic." He advises: "You should be challenged—that's the way the real world works. As engineers, we progress when we take leaps, and that's easier when you're in school. It's the perfect place to learn, make mistakes, and grow."



**Manas Nyati**  
RF Engineer, Shure

Manas Nyati has what he describes as his dream job. A self-trained piano player, he loves music, and now his career involves helping musicians to hear, record, and communicate better.

Nyati works in the wireless communication division at Shure, where he conducts research and development toward new headphones, microphones, antennas, and other communication technologies, trying to reduce or eliminate interference. That might mean eliminating feedback from other instruments or cellphones, or improving the threshold that the sound can travel without losing connectivity.

The key to landing this role? Nyati's UIC master's thesis. "The thesis let me get my hands on instruments in the lab, which are important to industry. After the thesis, I had an internship at Nokia, and then I was able to get the job with Shure."

## Admissions

Full details on how to apply—including requirements and deadlines—are at [ece.uic.edu](http://ece.uic.edu) under the Graduate menu.

Interested in graduate study at UIC? Talk to us. Contact our ECE graduate team with questions or for an informal conversation.

**Danilo Erricolo, PhD**  
Professor and Director of Graduate Studies  
[ecedgs@uic.edu](mailto:ecedgs@uic.edu)

**Zhichun Zhu, PhD**  
Associate Professor and Director of Graduate Admission and Recruitment  
[grad-ece@uic.edu](mailto:grad-ece@uic.edu)

**Tina Alvarado**  
ECE Student Affairs  
[ecestudentaffairs@uic.edu](mailto:ecestudentaffairs@uic.edu)