

# Electrical + Computer Engineering

CORNELL ENGINEERING

## Education/Degree Programs

We offer the BS in Electrical and Computer Engineering and the MEng and MS/PhD in Electrical Engineering.

- Computer systems: computer architecture for high performance and low power consumption, novel architectures, and hardware security.
- Communication and signal processing: sensor, wireless and ad hoc networks and the Internet, information theory, and image processing and compression.
- Electromagnetic phenomena: plasma and ionospheric physics, GPS, high energy density plasmas, and space weather.
- Solid state electronics and photonics: novel mixed-signal and ultra-high frequency RF systems, photonic and electronics devices, microwave materials and systems, laser development, and MEMS.
- Bio-electrical engineering: computer-aided imaging, neural circuits, and programmable protein synthesis.

## Trends

The field of Electrical and Computer engineering is arguably more pervasive than ever before, with powerful microchips enabling unprecedented performance in complex systems such as communication networks, transportation, and medicine. Undergraduate enrollment in all Top 10 ECE programs, including ours, has declined for the last 7 years. We have experienced a significant increase in the size of our PhD enrollment and PhD production, working toward graduating approximately 1 PhD/year/faculty.

Bio-electrical engineering is growing as a new sub-discipline in the field, and we have made good hires in this area.

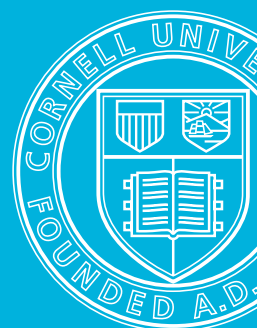
## Faculty Achievements

We “raised the bar” on hiring and promotion, becoming much more selective in making offers and promotions with tenure. Our recent hires are truly outstanding, having been strongly recruited by other leading schools, and are establishing innovative research programs that will form a strong foundation for our future. We were able to locate five of our faculty into labs in Duffield, and each of their programs has since benefited.

Irwin and Joan Jacobs have endowed a \$15M gift to support graduate student fellowships in ECE.



Professor Paul Kintner, shown positioning the antenna on the roof of Phillips Hall, discovered that strong solar flares cause Global Positioning System receivers to fail.



## Goals for the Next Five Years

The top priority is to retain and nurture our star faculty members, and increase their number with future selective hiring. 40% of our faculty have been hired in the last 8 years; we have made a huge investment in outstanding new talent. A second priority is the curriculum. We have accepted the challenge of delivering a curriculum that provides the foundation for creative adaptation to rapid changes in technology and that teaches critical thinking responsive to the problems society will face. Our third priority is to address our space and infrastructure challenges. We will add a floor to one wing of Phillips to provide some immediate high-quality space.

## Challenges

Retention of outstanding faculty at all ranks is critical. We will focus on hiring women and underrepresented minorities. We will increase our efforts at curriculum enhancement, and increase marketing of the MEng program. Lack of space is a potential show-stopper.

## Opportunities

We see opportunities in energy and health care that address global problems. We expect to grow research into energy conservation (low power electronics and lighting), smart grids, and efficient control of consumption.



Associate Professor Alyssa Apsel holds a test board for a radio frequency receiver timing circuit, designed in her lab at Cornell.



This prototype device uses a copper cantilever 2 centimeters long. Future nanofabricated versions could be smaller than one cubic millimeter; created in Assistant Professor Amit Lal's lab.