

Department of Electrical and Computer Engineering

Our department serves as a statewide focal point for innovation, entrepreneurship, and economic development. ECE is nationally recognized for attracting many of the best and brightest students from around the world and our graduates are aggressively recruited by leading engineering firms, startups, corporations, government agencies, and research universities.

What's Electrical Engineering?

Electrical engineers design many of the systems that we use every day, including the nation's electrical power grid, computer systems, cell phones, communications satellites, biomedical devices, automatic control systems, robotics, nanotechnology, renewable energy, and much more. Our students use scientific and engineering principles to design new and better electronics, solve real-world challenges, and improve our quality of life.

What's Computer Engineering?

Computer engineers design computers and computer-based systems, and their work impacts nearly every aspect of modern technology: the Internet, smartphones, video games, 3DTV, biomedical equipment, autonomous vehicles, WiFi and cellular networks, and much more. Computer engineers are, first and foremost problem solvers – they make computers work better, faster and more efficiently. Computer engineering is among the most lucrative fields in engineering, according to Forbes magazine.

Unlike electrical engineering or computer science, computer engineering primarily deals with how to build computer systems, hence there is more emphasis on hardware and low-level software that make up the systems. In contrast, computer science explores how to process information using computer systems, thus leading to a focus in software.

Global Reputation. Individual Attention.

Electrical and computer engineers enjoy flexibility in career options and many engineering careers turn toward management as they mature. NC State University is known worldwide for providing students with the knowledge and skills necessary in all aspects of Electrical and Computer Engineering.

NC State is consistently ranked in the top ECE programs in the United States. We not only teach students the fundamentals of engineering, we give students the ability to expand and develop their own creative capabilities. Our program also strives to develop each student's skills in all aspects of the field. This enables students to broaden their realm of knowledge to include a variety of issues that they will face in their future careers.

Scholarship Opportunities

A wide variety of scholarship opportunities exist for students in the ECE department (<https://ece.ncsu.edu/ugrad/scholarships/>), in addition to those offered by the University and the College of Engineering (<https://www.engr.ncsu.edu/academics/undergrad/scholarships/>)—these

opportunities span a range of criteria, from academic performance, to need, to area of study.

Facilities

With state-of-the-art teaching and research facilities on Centennial Campus, ECE promotes ongoing research and collaboration between industry located on campus and other departments.

ECE's administration and main teaching labs are located in Engineering Building II (<https://ece.ncsu.edu/tour/>), with additional research labs spanning the Monteith Research Center and Keystone Science Center.

MakerSpaces

The Kolbas MakerSpace provides all the tools required for students to work on electrical projects with state-of-the-art testing and soldering stations, Pick-and-Place component placement machine, in addition to a dozen 3-D printers to aid in prototyping.

The Troxler MakerSpace allows for fully-fledged fabrication with a complete wood and metal workshop, including a ShopBot CNC router and a WAZER waterjet cutter.

The MakerSpace (<https://my.ece.ncsu.edu/makerspace/>) enables and encourages students to be involved in hands-on engineering projects in their coursework and of personal interest.

Teaching Labs

The Electrical and Computer Engineering curriculum is designed to allow each student the opportunity to gain knowledge and complete comprehension of all concepts in this field. The department is able to see that these demands are met by maintaining teaching labs, technical support staff, modern computing equipment, and industry-standard software.

The labs include spaces devoted to embedded systems, integrated circuit design, microelectronics, power electronics, wireless networking, and mechanics.

Troxler Design Center

The Troxler Design Center is named in recognition of William F. Troxler, and is dedicated to the Department's Senior Design (<https://seniordesign.ece.ncsu.edu>) courses. Originally located in 111 Lampe Dr., the center moved in the Fall of 2005 to a larger facility in Engineering Building II.

At over-2,000 sq. ft., the Troxler Design Center is the ECE Department's largest lab, and contains workspace and storage space as well as multiple meeting areas for group meetings or presentations. Large, high-quality workbenches make up the 20 stations for project teams, which also include a dedicated computer for each team. Cutting-edge test equipment and instruments are provided throughout the lab, thanks in large part to the generous donations of William F. Troxler and the Troxler family.

Nanofabrication Facility

The Nanofabrication facility (<https://nnf.ncsu.edu>) is located in the Larry K. Monteith Engineering Research Center and occupies a 7400 sq. ft. cleanroom. The facility has a full range of micro- and nano-fabrication capabilities including photolithography, reactive ion etching (RIE), deep RIE, low-pressure chemical vapor deposition (LPCVD), plasma enhanced CVD, rapid thermal anneal, thermal oxidation, solid source diffusion,

thermal and e-beam evaporation, sputtering, chemical mechanical polishing, various wet etching and cleaning processes, along with various characterization tools.

Many of the tools are capable of processing on a broad range of substrates such as semiconductor glass, ceramics, and plastics with sizes from small pieces to 6# wafers.

Faculty

Department Head

Veena Misra, *MC Dean Distinguished University Professor*

Senior Associate Department Head

James Tuck, *Professor and Senior Associate Department Head for Undergraduate Affairs*

Associate Department Heads

Aranya Chakraborty, *Associate Department Head for Research and Professor*

Paul Franzone, *Associate Department Head for Graduate Affairs and Cirrus Logic Distinguished Professor*

Professors

Jacob Adams

Jayant Baliga, *Progress Energy Distinguished University Professor*

Mesut Baran

Salah Bedair, *Distinguished Professor*

Subhashish Bhattacharya, *Duke Energy Distinguished Professor*

Alper Bozkurt

Greg Byrd

Huaiyu Dai

Michael Daniele

Rhett Davis

Alexandra Duel-Hallen

Do Young Eun

Brian Floyd, *Alton and Mildred Lancaster Professor*

Ismail Guvenc

Brian Hughes

Iqbal Husain, *Director, FREEDM Center; ABB Distinguished Professor*

Ki Wook Kim

Fred Kish, *NNF Director; MC Dean Distinguished Professor*

Hamid Krim

Michael Kudenov

Edgar Lobaton

Ning Lu

Srdjan Lukic, *Deputy Director, FREEDM; Distinguished Professor*

John Muth, *Progress Energy Distinguished Professor; Director of CLAWS Microelectronics Commons Hub*

H Troy Nagle, *Distinguished Professor*

Ömer Oralkan, *McPherson Family Distinguished Professor in Engineering Entrepreneurship*

Mehmet Öztürk

David Ricketts

Eric Rotenberg

Mihail Sichitiu

Daryoosh Vashaee

Victor Veliadis, *Executive Director & CTO, PowerAmerica*

Yannis Viniotis

Wenye Wang

Jonathan Wierer

Cranos Williams, *Goodnight Distinguished Professor of Agricultural Analytics; Platform Director, NC Plant Sciences Initiative*

Huiyang Zhou

Associate Professors

Amro Awad

Aydin Aysu

Dror Baron

Michela Becchi

Stanley Cheung

Hantao Cui

Alexander Dean

Paschalis Gkoupidenis

Qing Gu

Ali Gurbuz

Sevgi Zubeyde Gurbuz

Shih-Chun Lin

Zeljko Pantic

Spyridon Pavlidis

Wenyuan Tang

Tianfu Wu

Assistant Professors

Amay J. Bhandodkar

Demetry Farfurnik

Yuan Liu

Samira Mirbagher Ajorpaz

Aritra Mitra

Vijay K Shah

Abraham Vázquez-Guardado

Suresh Venkatesh

Chau-Wai Wong

Kaixiong Zhou

Teaching Professors

Rachana Gupta, *Director, ECE Senior Design*

Ginger Yu, *Associate Director of Graduate Programs*

Teaching Associate Professors

Misha Cutitaru

Jennifer Marley

Ozgur Ozdemir

Teaching Assistant Professor

Elena Veety

Professor of the Practice

Jeremy Edmondson, *Associate Director of Senior Design*

John Gajda

Leonard White

Associate Professor of the Practice

Priya Gill

Research Associate Professor

Wensong Yu

Research Assistant Professor

Fu-Chen Hsiao

James Reynolds

Senior Lecturer

Jim Carlson

Directors

Candice Byrd, *Research and Center Administration*

Sara Concini, *Corporate Relations and Career Services*

Dan Green, *Information Technology & Operations*

Paul Merry, *Finance*

Suzette Walker, *Human Resources*

Plans

- Computer Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/computer-engineering-bs/>)
- Computer Engineering (BS): Artificial Intelligence and Machine Learning Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/computer-engineering-ai-machine-learning-concentration-bs/>)
- Computer Engineering (BS): Computer Architecture and Emerging Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/computer-engineering-computer-architecture-emerging-systems-concentration-bs/>)
- Computer Engineering (BS): Computer Systems Software Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/computer-engineering-computer-systems-software-concentration-bs/>)
- Computer Engineering (BS): Embedded Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/computer-engineering-embedded-systems-concentration-bs/>)
- Computer Engineering (BS): Networking Hardware Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/networking-hardware-concentration-bs/>)
- Computer Engineering (BS): Networking Software Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/networking-software-concentration-bs/>)

- Electrical Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs/>)
- Electrical Engineering (BS): Analog Circuits Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-analog-circuits-concentration/>)
- Electrical Engineering (BS): Artificial Intelligence and Machine Learning Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-ai-machine-learning-concentration/>)
- Electrical Engineering (BS): Biomedical Instrumentation Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-biomedical-instrumentation-concentration/>)
- Electrical Engineering (BS): Communications and Signal Processing Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-communications-signal-processing-concentration/>)
- Electrical Engineering (BS): Controls and Robotics Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-controls-robotics-concentration/>)
- Electrical Engineering (BS): Digital Circuits Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-digital-circuits-concentration/>)
- Electrical Engineering (BS): Electronic Devices Concentrations (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-electronic-devices-concentration/>)
- Electrical Engineering (BS): Music Technology Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-music-technology-concentration/>)
- Electrical Engineering (BS): Optics and Photonics Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-optics-photonics-concentration/>)
- Electrical Engineering (BS): Power Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-power-systems-concentration/>)
- Electrical Engineering (BS): Radio Frequency Circuits Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-radio-frequency-circuits-concentration/>)
- Electrical Engineering (BS): Renewable Electric Energy Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-renewable-electric-energy-systems-concentration/>)