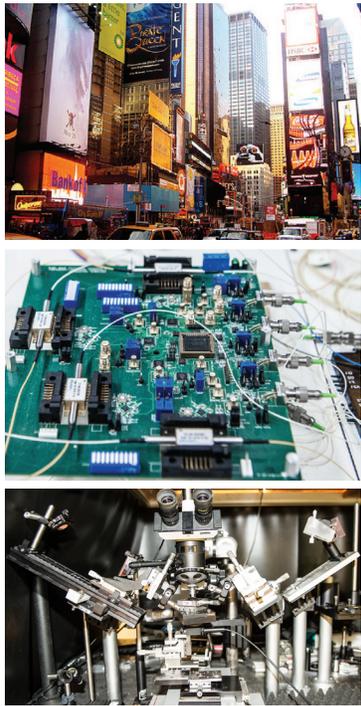




# COLUMBIA | ENGINEERING

The Fu Foundation School of  
Engineering and Applied Science



## MASTER'S PROGRAM

Our MS program is flexible and customizable to the student's individual goals. It allows students to pursue electrical engineering disciplines in depth, as well as to take a selection of courses from other Columbia engineering majors. Students can study topics from physical devices, to circuits and systems, to communications and networking, to signal, information and data processing, to computer engineering as well as systems biology or neuroengineering.

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**Apply by Feb. 15th**

## DOCTORAL PROGRAM

Our PhD program offers the opportunity to work closely with our world-renowned faculty on pushing forward the frontiers of knowledge in EE. It introduces students to a career of advanced research in either an academic or industrial setting. Our PhD students are a small and carefully selected group who will go on to be the leaders and innovators in tomorrow's Electrical Engineering field.

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"THE COLUMBIA ELECTRICAL ENGINEERING DEPARTMENT COMBINES TOP-TIER RESEARCH WITH A RIGOROUS AND VIBRANT LEARNING ENVIRONMENT. WE ARE PROUD OF OUR BALANCE BETWEEN THEORETICAL AND PRACTICAL ASPECTS OF EE, AND BETWEEN TRADITIONAL AND EMERGING FIELDS. WE AIM TO PROVIDE OUR GRADUATES WITH A FIRST-RATE, WELL-ROUNDED EDUCATION FOR CAREERS IN INDUSTRY AND ACADEMIA, EITHER WITHIN OR BEYOND EE."

Peter Kinget, Bernard J. Lechner Professor and Department Chair

# FIELDS OF RESEARCH AND EDUCATION

## SIGNALS, INFORMATION AND DATA

The Signals, Information and Data area concerns the representation, processing, analysis, and communication of information embedded in signals and datasets arising in a wide range of application areas, including audio, video, communications, and biology. Research interests include the development of models, algorithms and analyses for sensing, detection and estimation, statistical learning, and the recognition, organization and understanding of the information content of signals and data.

## NETWORKING AND COMMUNICATIONS

The Networking and Communications area focuses on the design and performance evaluation of communication systems and data networks of all kinds, including wireless/cellular, optical, ultra-low power, vehicular, mobile, wearable, data center networks, cyber physical systems, and the Internet. Methods range from analyzing and refining existing approaches to the development of new and evolving networking techniques and systems.

## INTEGRATED CIRCUITS AND SYSTEMS

The Integrated Circuits and Systems area focuses on the integration of circuits and systems on semiconductor platforms. Research spans the analysis, design, simulation and validation of analog, mixed-mode, (sub) mm-wave, RF, power, and digital circuits, and their applications from computation and sensing to cyber-physical and implantable biomedical systems.

## NANOSCALE STRUCTURES AND INTEGRATED DEVICES

The area of Nanoscale Structures and Integrated Devices applies fundamental physical principles to develop revolutionary new electronic, photonic, and optical devices made from conventional and emerging materials, including graphene, 2D semiconductors, and organic semiconductors. Research includes nanofabrication, characterization, and electromagnetic design of quantum device structures and complex silicon photonic circuits that impact numerous fields from Lidar and optogenetics to low-energy computation and flexible electronics.

## SYSTEMS BIOLOGY AND NEUROENGINEERING

The Systems Biology and Neuroengineering area aims to understand and analyze biological systems within the living cell and in the brain. Examples of related tasks are biomolecular data analysis for medical applications, synthetic biology, establishing the principles of neuroinformation processing in the brain for developing robust sensory processing and motor control algorithms, accelerating the clinical translation of devices that make contact with neurons, and building massively parallel brain-computer interfaces.

## SMART ELECTRIC ENERGY

The smart electric energy area focuses on the optimization of the generation, conversion, distribution, and consumption of electric energy as well as the electrification of energy systems. Research spans the analysis, design, and control of power electronics, motor drive, and energy storage systems, grid resilience and security, and Internet-of- Things. Applications include transportation electrification, smart grid, renewable energy, and smart building systems.

# COMPUTER ENGINEERING MS PROGRAM

Offered jointly by the electrical engineering and computer science departments and combines key aspects of both. Students learn the fundamentals of circuits, systems, and software associated with the design of programmable systems used in general purpose computing, communications, control, and signal processing.

For more information: [Compeng.columbia.edu](http://Compeng.columbia.edu), [ceadmissions@ee.columbia.edu](mailto:ceadmissions@ee.columbia.edu)

