Aerial view of Columbia campus with Columbia Engineering affiliated buildings highlighted in blue

Columbia Engineering Plus

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Go to one of the oldest and most distinguished engineering programs in the country, where leadership, entrepreneurship, groundbreaking innovation, and social responsibility are part of the air you breathe.

Don’t just be an “engineer.” **Be a Columbia engineer.** It will make all the difference.

1. College entrepreneurs attend PitchFest, where students take 90 seconds to “pitch” their ideas for new ventures and products to industry leaders.

2. With a nearly $1 million federal grant, Columbia Engineers are studying cracking and collapsing polar ice sheets to better understand their link to global warming.

3. A photo of the Columbia Non-neutral Torus, a small stellarator at the Columbia Plasma Physics Laboratory designed to conduct the first investigation of non-neutral plasmas confined on magnetic surfaces.

4. The Combustion & Catalysis Laboratory focuses on converting carbon-based material into something useful (such as greenhouse gases into fuel).

Columbia Engineering’s Better World Blueprint

**It means working on socially responsible, culturally appropriate and environmentally sustainable solutions from day one.**

**Our way of engineering means joining some of today’s smartest, most versatile young people to collaborate on high-impact research with professors whose patented ideas and inventions generate more income than almost any other university.**

**It means gaining the tangible skills companies look for so that you are technically astute — able to design, build, and test your ideas — while also able to think about problems in a broader context so you can bring creative ideas to the table.**

**It’s a blueprint that calls for living in a global capital of innovation, entrepreneurship, opportunity, and inspiration, otherwise known as New York City.**

**Our blueprint for a better world is a formula for leaders who are ready to solve society’s most pressing needs. We invite you to make it your formula too.**

Going to Columbia Engineering means becoming one of the most sought after young leaders of your generation no matter what field(s) you choose, from biomedical, chemical, mechanical, and financial engineering to environmental law, nanotechnology, computer science, or medicine.

**It means immersing yourself in a university known around the world for its field-shaping thinkers in every discipline — not only in science and engineering but also in business, economics, law, design, media, and philosophy.**

1. PitchFest

2. Climate Change

3. Non-neutral Torus

4. Combustion & Catalysis Laboratory
1 Engineering Revolution
Engineering Revolution

What do curing disease, cyber security, investment banking, renewable energy, and digital media all have in common? Engineering. No silo-confined discipline but a transferable, transformational knowledge base, engineering has become a key to solving many of the world’s most pressing problems. Columbia Engineers are leading this revolution. Here’s where we’ve been and where we’re going.

1754 Founded as King’s College, Columbia University has always been an institution of and for engineers. Among other disciplines, the University’s original charter laid out a plan to teach “the arts of Number and Measuring, of Surveying and Navigation … the knowledge of … various kinds of Metals, Stones, Mines and Minerals, Plants and Animals and everything useful for the Comfort, the Convenience and Elegance of Life.”

1910 In 1910, Professor and future Nobelist Thomas Hunt Morgan’s research on fruit flies led him to develop the chromosome theory of heredity—the cornerstone of modern genetics.

1940 Edmund DiGiulio, Class of 1950, received both an Oscar and an Emmy for his development of the Steadicam and other specialty cameras designed especially for Stanley Kubrick and now used extensively by movie directors.

1954 Admiral Hyman George Rickover, Class of 1929, served during the Second World War as head of the electrical section of the Navy’s Bureau of Ships. He directed the planning and construction of the world’s first nuclear submarine, launched in 1954.

1956 Joseph Engelberger, Class of 1946, was the father of modern robotics, founding the world’s first robotics company.

1815 John Stevens, Class of 1768, procured patents in early steamboat technology; received the first railroad charter in United States.

1899 Michael Ilovsky Popin, Class of 1883, invented the “Popin coil,” extending the range of long-distance telephones.

1913 Edwin Howard Armstrong, Class of 1913, invented the superheterodyne circuit and developed the method of frequency modulation (FM) for radio broadcasting.

1964 Dr. Charles Hard Townes shares the Nobel Prize in Physics for his work at Columbia in quantum electronics that helped develop laser technology.

1982 Emerita Electrical Engineering Professor Gertrude Neumark Rothschild was inducted as a fellow of the American Physical Society in 1982 for her research improving light emitting and laser diodes now used in many cellphones, flat-screen televisions, and Blu-ray disc players.

1978 Edmund DiGiulio. Class of 1950; received both an Oscar and an Emmy for his development of the Steadicam and other specialty cameras designed especially for Stanley Kubrick and now used extensively by movie directors.

Columbia Engineering’s uniquely broad and rigorous education is a student’s best preparation for a leadership role in engineering or in any of the diverse career paths our graduates follow. Proof of the effectiveness of our approach is the fact that the world has long embraced the work of Columbia Engineers, who continue to distinguish themselves in almost every field of human endeavor.

8 7

1754 1850

1864 Founded the School of Mines, the first in the U.S. and the foundation for today’s Columbia Engineering.

1904 William Barclay Parsons, Class of 1882, was the chief engineer of New York City’s first subway system.

1922 Irving Langmuir. Class of 1903, invented the gas-filled tungsten lamp; research in monolayering and surface chemistry led to a Nobel Prize in chemistry in 1932.

1956 Joseph Engelberger. Class of 1946, was the father of modern robotics, founding the world’s first robotics company.

1754

1882

1910

1940

1960

1980

1956

1982
Professor Horst Stormer of Applied Physics won the Nobel Prize for Physics for his discovery of a new form of quantum fluid with fractionally charged excitations.

Computer Science Professor Shree Nayar invented the first 360-degree camera in 1996, he also created the BigShot, low-cost cameras used to teach engineering concepts to children in high-need populations.

Robert C. Merton, Class of 1966, won the Nobel Prize in Economics for his role in developing a formula for the valuation of stock options.

Columbia Engineering is officially named The Fu Foundation School of Engineering and Applied Science in honor of the late Chinese philanthropist Z.Y. Fu, who gave the school $26 million to bring the best and brightest faculty and students to Columbia Engineering.

Michael J. Massimino, Class of 1984, was one of two NASA astronauts aboard the Columbia shuttle mission which successfully upgraded the Hubble Space Telescope (he was also the first person to Tweet from space).

Computer Science Professor Tony Jebara is a coinventor and holds multiple patents in vision, learning, and spatio-temporal modeling that have social media and face recognition applications. He joined SEAS in 2002.

工业和环境工程教授Klaus Lackner, who joined SEAS in 2004, is developing “artificial trees” that will scrub carbon dioxide out of the atmosphere in much the same way that real trees do.

Industrial Engineering and Operations Research Professor Emanuel Derman developed one of the first interest rate models and his memoir, My Life as a Quant: Reflections on Physics and Finance, was selected as one of Business Week’s top ten books of 2005.
10 11

2008 Mechanical Engineering Professors Jeffrey Kysar and James Now were the first to determine the actual strength of graphene, the strongest material ever measured.

2008 Biomedical Engineering Professor Gordana Vunjak-Novakovic created the first viable, anatomically shaped human bone and was inducted into the Women in Technology International Hall of Fame.

2010 Civil Engineering and Engineering Mechanics Professor Huiming Yin is developing roofing materials that double as solar panels.

2010 Mechanical Engineering Professor Kristin Myers is helping to pioneer a new interdisciplinary field CyberBioPhysical™ Systems at Columbia by studying the engineering behind pregnancy. Her ultimate goal is to prevent miscarriages and preterm labor.

2010 Civil Engineering and Engineering Mechanics Professor Huiming Yin is developing roofing materials that double as solar panels.

2010 Mechanical Engineering Professor Eitan Grinspun is helping to pioneer a new interdisciplinary field, Grinspun studies the basic rules of motion and turns them into computer programs that are animating Hollywood movies and creating new tools for graphic designers.

2011 Kartik Chandran, associate professor of Earth & Environmental Engineering, is awarded $1.5 million from the Bill & Melinda Gates Foundation to develop technology that will convert waste treatment facilities into biorefineries, a practical boon for poor and resource-starved regions.

2011 Popular Science magazine named Computer Science Professor Eitan Grinspun among its "Brilliant 10," the magazine’s annual list of the top 10 researchers in the United States. Grinspun studies the basic rules of motion and turns them into computer programs that are animating Hollywood movies and creating new tools for graphic designers.

2011 Columbia Engineering became home to the City of New York’s Urban Technology Innovation Center. The Center connects the latest scientific developments, green building technology companies, and building owners in New York to build a greater, greener New York.

2010 Civil Engineering and Engineering Mechanics Professor Patricia Culligan is working to overhaul the massive, centralized infrastructure projects that are hallmarks of modern civil engineering, replacing them with smaller, more decentralized systems. She was the principal investigator for the Columbia Green Roof Consortium, which runs New York City’s first-ever network of green roof research stations. In 2010, she helped launch Columbia’s new major in sustainable development.

2009 Funding by a multi-million dollar grant from the National Institutes of Health, Mechanical Engineering and Biomedical Engineering Professor Gerard Ateshian is working to grow artificial cartilage in his lab that’s as strong and resilient as the native tissue.

2009 Professor Ah-Hyung (Alissa) Park is developing an efficient, cost-effective energy conversion system that turns non-recyclable plastics into jet fuel.

2009 Helen Lu, associate professor of biomedical engineering, received the Presidential Early Career Award for Scientists and Engineers (PECASE)—the nation’s highest honor for young scientists. Lu focuses on biological interfaces between different types of connective tissues and how to re-establish distinct tissue-to-tissue boundaries post-injury.

2007 Professor Ah-Hyung (Alissa) Park is developing an efficient, cost-effective energy conversion system that turns non-recyclable plastics into jet fuel.

2007 A co-founder of the Columbia Water Center, Earth and Environmental Engineering Professor Upmanu Lall is working to solve the global consumption crisis. His work focuses on tripling water efficiency by changing the way farmers water crops.

2008 Biomedical Engineering Professor Gordana Vunjak-Novakovic created the first viable, anatomically shaped human bone and was inducted into the Women in Technology International Hall of Fame.

In our classrooms and laboratories, the scientific breakthroughs of the past imbue the ideas and innovation of the present to incubate novel solutions to meet the challenges of today and of the future.”

FENIOSKY PEÑA-MORA
Dean, Columbia Engineering
Columbia Engineering Convocation, August 30, 2010
An Education for Engineers Who Lead
A Combination You Can’t Find Anywhere Else

Columbia Engineering’s unique program includes an unparalleled breadth and depth of majors and minors, a first-year design course, professional-level courses, hands-on design projects, research in New York City and around the world, and Columbia’s legendary Core Curriculum. It’s a combination you can’t find anywhere else.

The Columbia Engineering Core

The Art of Engineering: First-Year Design Course
Calculus
Physics
Chemistry
Computer Science
Economics
Physical Education

Professional-Level Course
Firsthand experience with the most current skills, practices and ideas in the field. A sampling of courses includes:
● Molecular Engineering and Product Design
● A Better Planet by Design
● Physics of the Human Body
● Introduction to Electrical Engineering, with Laboratory in Circuit Design
● Engineering Graphics
● Mechanical Engineering: Micro-Machines to Jumbo Jets

16 Areas of Study

Majors
Applied Mathematics
Applied Physics
Biomedical Engineering
Chemical Engineering
Civil Engineering
Computer Science
Earth and Environmental Engineering
Electrical Engineering
Financial Engineering
Engineering Mechanics
Engineering Management Systems
Industrial Engineering
Materials Science and Engineering
Mechanical Engineering
Operations Research

Engineering Minors
Applied Mathematics
Applied Physics
Biomedical Engineering
Chemical Engineering
Civil Engineering
Computer Science
Earth and Environmental Engineering
Electrical Engineering
Engineering Mechanics
Entrepreneurship and Innovation
Industrial Engineering
Materials Science and Engineering
Mechanical Engineering
Operations Research
Sustainable Engineering

Liberal Arts Minors
Architecture
Art History
Dance
East Asian Studies
Economics
English and Comparative Literature
French
French and Francophone Studies
German
Greek
Hispanic Studies
History
Latin
Middle Eastern, South Asian, and African Studies
Music
Philosophy
Political Science
Psychology
Religion
Sociology
Statistics

Columbia’s School of Mines was founded in 1864 and was the first mining school in the United States. The School awarded the first Columbia Ph.D. in 1875 and was the key feature of today’s School of Engineering and Applied Science. Le Maeljeur (The Metallurist), created by the Belgian sculptor Constantin Meunier, was a class gift from one of the early School of Mines classes (1889) and stands in the Columbia Engineering courtyard.

Research, Internship, and Entrepreneurship Opportunities in New York City and the World

Undergraduate Research Involvement Program
400+ research positions working with prizewinning faculty reserved for engineering undergraduates.

Engaged Entrepreneurship Program
Promotes innovation and entrepreneurship through interdisciplinary minors, student challenges such as the Columbia Venture Competition that offer project opportunities and prize money support from national and international experts through the Entrepreneurship Advisory Board; outreach in New York via the Columbia-Harlem Small Business Development.

Science Technology Engineering Program (STEP)
Offers Columbia students high-quality internship opportunities in a comprehensive array of engineering fields through alumni and employer partnerships. Recent opportunities include design engineering, cancer research, software development, and nanotechnology.

Global Internships
Every summer Columbia Engineering students intern in companies, NGOs, and labs around the world through several established global internship programs in Germany, Scandinavia, Brazil, France, and multiple cities in Asia and Africa.

Columbia Affiliate Research
Not only does Columbia have faculty and labs doing pioneering research in nearly every sub-field of every discipline, affiliated institutions like NASA Goddard Institute for Space Studies and Nevis Physics Laboratories make the research possibilities virtually limitless.

(More on research, New York City, and the world in the next chapters.)
Because in order to find solutions to the world’s most pressing problems, you have to fully understand the world around you.

“I knew that I had to find a university that touched not only on the technical dimension but also on the human dimension - Columbia’s Core Curriculum did just that. As I refined my understanding of humanitarian relief efforts in my Supply Chain Management course, in my Contemporary Civilization class I learned about philosophy and world religions, which strengthened my understanding of others and honed my sense of ethical duty. It is more important than ever that engineers find solutions with consideration not only to the latest engineering knowledge but also to the impacts on those on the receiving end of those solutions.”

Carmen Zapata
SEAS ’07
Associate, Advanced Analytics
Booz Allen Hamilton
Supports Department of Homeland Security and Immigration and Customs Enforcement

Why do we give you over 20 minors in the liberal arts, plus innovative interdisciplinary minors in emerging fields from which to choose?

“Because great engineers see problems from multiple perspectives.

“In managing hardware and software engineering teams I’ve found that the most difficult challenges in engineering are often not engineering problems. These challenges involve understanding cultural boundaries, organizational behavior, and making a decision on what to do (versus how to do it). Columbia prepared me to navigate not only the technical challenges, but also those that require you to reach beyond your knowledge base and comfort zone and be a leader.”

Stephen Wang
SEAS ’06
Project manager for top Silicon Valley company
(household name that likes to remain nameless in publications such as this)
Why do we do what other engineering schools don’t? Because we don’t just educate great engineers. **We educate great engineers, global citizens, and entrepreneurial thinkers. We educate leaders.** We are a different kind of engineering school.

“Senior year I got to help Professor Shree Nayar develop an online curriculum for BigShot, a build-it-yourself digital camera designed to expose kids to science, engineering, and photography. My favorite moment was field testing the camera with real kids in Japan. It was the first time a project of mine made such a big impact.”

**Brian Smith**
SEAS ‘09
Ph.D. student in the Computer Vision Laboratory at Columbia
Real Research, Real Impact
As a Columbia engineer you will be part of fascinating research endeavors on the cusp of breakthroughs that have a major impact on the way we live our lives today and tomorrow. You will be mentored by superstars in their fields. You will be the first author on research papers and go on to present your work at national conferences. You will be part of a great tradition of socially responsible engineering and a close community of scientists, engineers, and innovators. The work you do here will make you one of the next generation of leaders.

Senior Design Projects

Epilepsy Brain Sensor for In Vivo Reflectance Observation
Windmill-Driven Water Pump
Rapid Prototyper 3D Printer
Novel Ventriculoperitoneal Shunt

Some recent senior design projects range from a rapid prototyper 3D printer to a nationally award-winning neonatal vital signs monitor to a windmill-driven water pump; senior engineering capstone projects allow students to integrate all that they’ve learned to design, test, and build the novel, the viable, and the useful. The projects often lead to new companies and patents and even future careers.

Earth and Environmental Engineering major Henry Jones has gained hands-on experience working in Columbia’s Department of Mechanical Engineering. He not only plans to use that experience working in industry, but he also uses his knowledge of the engineering problem-solving process now as a mentor for a high school robotics team that competes around the country.
“From my very first year at Columbia, I worked on a project that had a direct impact on a church in East Harlem. The next year when I found out one of my courses was being taught by a leader in climate change studies, Professor Faye McNeill, I jumped at the opportunity to work in her lab.” Ultimately, Joe was able to develop his own study on ultrafine particle emissions and learn how to model chemical reactions in the atmosphere via computational chemistry methods.

Professor of Chemical Engineering Faye McNeill received a prestigious CAREER Award from the National Science Foundation to fund her research into one of the biggest problems facing climate scientists: how aerosol particles and ice in the environment profoundly influence Earth’s climate and atmosphere.

“From a rising sophomore I worked in Professor Ah-Hyung (Alissa) Park’s lab. Working in the lab gave me the chance to delve into areas of environmental engineering I was not aware of that ended up being my real passion — environmental bioremediation techniques; more specifically, within brownfields and water contamination.” Now Judy is working with the Mayor’s Office of Environmental Remediation, focusing on risk assessment of contaminants in brownfield sites in the New York City area.

Professor in Applied Climate Science Ah-Hyung (Alissa) Park has been called the “Carbon Lady.” She is one of the leading experts on the many forms carbon takes as humans transform and move it through the environment. Her path-breaking work may help pave the way to a future in which society obtains energy from a wide range of sustainable sources and deals with its excess carbon in surprising ways.

From Lab to Mayor’s Office Judy Kim
Hometown: Clarksville, TN
Major: Earth and Environmental Engineering
“All I’ve known is living the refugee life. But I’ve always had arms stretching out to help me.” Morris is a former Sudanese refugee. He is also a key member of Professor Sam Sia’s research team and plans to become a doctor. “I feel like I owe it to the world to help people around me.” His senior design project is a vital signs monitor for developing countries. Such devices usually start at $1,000 but his would cost between $50 and $200. Plans are already underway to test it in Uganda.

If you’re a Columbia Engineer, you’re doing research using state-of-the-art labs and equipment and an almost overwhelming array of basic and advanced research installations. Centers include:

- Botwinick Multimedia Learning Lab
- Brookhaven National Laboratory
- Carleton Strength of Materials Laboratory
- Center for Electron Transport in Molecular Nanostructures
- Columbia High-beta Tokamak
- Geotechnical Centrifuge
- Laser Diagnostics and Solid-State Physics Lab
- Materials Research Science and Engineering Center
- Microelectronics Sciences Laboratories

You’re working with professors at the cutting edge of their fields

In one of Columbia’s 200 research centers and institutes. Research centers like the Lamont-Doherty Earth Observatory, where the concept of plate tectonics was formulated, currently home to hundreds of researchers studying the origin, evolution, and future of the natural world, but also:

- Center for Computational Learning Systems
- Center for Integrated Science and Engineering
- Center for Electron Transport in Molecular Nanostructures
- Center for Integrated Science and Engineering
- Columbia Water Center
- Earth Institute at Columbia
- Goddard Institute for Space Studies
- Lenfest Center for Sustainable Energy
- Botwinick Multimedia Learning Lab
- Brookhaven National Laboratory
- Carleton Strength of Materials Laboratory
- Center for Electron Transport in Molecular Nanostructures
- Columbia High-beta Tokamak
- Geotechnical Centrifuge
- Laser Diagnostics and Solid-State Physics Lab
- Materials Research Science and Engineering Center
- Microelectronics Sciences Laboratories

And you’re part of Columbia Engineering’s Undergraduate Research Involvement Program, which gets you involved in projects like:

- Brain imaging of psychological disorders
- DNA cloning
- Electrophysiological measurements and signal processing
- Laser probe of thin films and thin film processing
- Modelling and simulation of genetic networks
- Nanotechnology for solar energy and fuel cells
- Recovery of heavy metals by recycling of industrial wastes
- Reliability of fatigue-sensitive structures, including aircraft and ships
- Response of materials to ultrasonic excitation
- Seismic behavior of reinforced soil structures
- Space physics, microwave heating, and plasma sources
- Tissue engineering of cartilage-bone interface
- Virtual worlds and augmented reality

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- Seismic behavior of reinforced soil structures
- Space physics, microwave heating, and plasma sources
- Tissue engineering of cartilage-bone interface
- Virtual worlds and augmented reality
New York and the Next Big Thing
Routes to Inspiration

Pioneering work in the built environment from skyscrapers to long-span bridges, from subways to water supply systems. Continuous innovation in efficiency and sustainability, resulting in one of the smallest carbon footprints of any major city on Earth. Global leaders in research. Silicon Alley – it’s all here. New York City puts our students and faculty at the nexus of every next big thing on campus and off. While you may find the spark of a new idea along any New York avenue, here are a few spots guaranteed to inspire whether you’re researching, interning, or just visiting.

New Jersey’s Pharmacological Corridor

What makes Columbia a great place for research? In part, it’s location, location, location. New Jersey’s big pharma corridor is a perfect example. No other area has a greater concentration of pharmaceutical research and development.

World Science Festival

Co-founded by renowned Columbia Professor of Mathematics and Physics Brian Greene, the World Science Festival takes over New York City each June. The world’s leading scientific minds are joined by renowned artists and influential thinkers for a five-day celebration of science.

Brooklyn Bridge

In 1927, the Holland Tunnel in the United States opened. Suspension bridges are one of the oldest feats. The Brooklyn Bridge (shown here) is a classic example. The New York City neighborhood to offer free wireless on its streets and in parks and plazas.

World Health Organization

WHO is part of the United Nations — responsible for leadership on global health matters, shaping the health research agenda, providing technical support to countries, and assessing health trends.

Columbia University Medical Center

On 20 acres in the Washington Heights community of northern Manhattan, our Medical Center provides world-class leadership in scientific research, health and medical education, and patient care with faculty from four schools (College of Physicians and Surgeons, College of Dental Medicine, School of Nursing, and Mailman School of Public Health) teaching and conducting research there.

Museum Mile


Columbia has close research ties with this major museum and research center, which is just blocks from campus.

Bronx Zoo

The largest metropolitan zoo in the United States. B centered by the Bronx River with indoor and outdoor exhibits on 265 acres of park lands and naturalistic habitats.

Silicon Alley

Many of Manhattan’s tech and new media innovators like Google and DoubleClick make their home along a corridor from the Flatiron District down to Soho and TriBeCa along Broadway.

Rose Center for Earth and Space Featuring the New Hayden Planetarium

Columbia University’s Hayden Planetarium is now New York City’s hands-on science and technology center.

Silicon Alley was the world’s first vehicular tunnel. And two bridges set records as the world’s longest suspension bridges when they opened: the George Washington Bridge in 1931 and the Verrazano Narrows Bridge in 1964.

Over 2,000 bridges and tunnels make New York a city of civil engineering feats. The Brooklyn Bridge (shown here) is one of the smallest suspension bridges in the United States, opening in 1883. The Holland Tunnel (1927) is one of the world’s longest suspension bridges.

The Intrepid Sea, Air & Space Museum

The Museum is centered on the aircraft carrier Intrepid (CV-11), one of the most successful ships in US history.

The Intrepid Sea, Air & Space Museum

Improved technology continues to inspire today.

The Museum of Arts and Design

The Museum of Arts and Design explores the intersection of art, design, and craft today.

Columbia University

Columbia Hall of Science

More of Manhattan’s tech and new media innovators are moving to a place for research in part, it’s location, location, location. New Jersey’s big pharma corridor is an enduring symbol of that fact.

One of the city’s most famous landmarks and listed on the National Register of Historic Places, the station was an innovation in transit-hub design that continues to inspire today.

Manhattan Bridge

Built initially as a pavilion for the 1964 World’s Fair, the New York Hall of Science is now New York City’s hands-on science and technology center.

The Museum of Arts and Design

Columbia Hall of Science

At the Manhattan Bridge Overpass (DUMBO) section of Brooklyn is one of the newest hubs for start-up companies. DUMBO includes “Silicon Beach,” which had 65 digital companies in a five-block radius at last count — the largest being Etsy, the online site for vintage and handmade clothing and other items. DUMBO is also the first New York City neighborhood to offer free wireless on its streets and in parks and plazas.
Real-World Symbiosis: Your Professional Network

Our city is the front door to innovation, and opportunity is always knocking.

In this world capital of culture, media, science, education, health, politics, finance, and technology, Columbia Engineering’s network can connect you to thousands of internships, job opportunities, and mentors in coveted firms and organizations. Access is key for an engineer and that’s what you have when you live in a city that is home to an amazing percentage of the world’s visionaries, experts, iconic and next-generation institutions, and global leaders. Active, global, fresh, and exciting, every opportunity that’s now and next is here.

Columbia’s STEP (Science, Technology, Engineering Program) Internships

Our STEP summer program places engineering students with firms across the city and around the country. Here are some of the companies, start-ups, and organizations Columbia Engineers are interning and working with:

- AOL
- Alcatel-Lucent
- American Express
- Arup
- BASF
- Bloomberg L.P.
- Broadcom
- Brookhaven National Laboratory
- Brooklyn Motorized Corporation
- Bug Labs
- Buro Happold
- CIA
- Citigroup
- CodeGreen Solutions
- Columbia Water Center
- Con Edison
- Credit Suisse
- E*TRADE
- EGI Technology
- Ernst & Young
- FactSet Research Corporation
- GZA GeoEnvironmental, Inc.
- General Dynamics Electric Boat
- Goldman Sachs
- Google
- Greensulate
- HSBC Bank USA
- Hazen and Sawyer
- HEICO Aerospace Institute of Bioengineering and Nanotechnology
- Institute for Myeloma & Bone Cancer Research
- Integral Derivatives LLC
- Jaros, Baum & Bolles Consulting Engineers
- Jefferson Laboratory
- Langan Engineering & Environmental Services, Inc.
- LimeWire LLC
- Lucasfilm
- Major League Baseball
- MediaM棒
- Merck
- Merrill Lynch
- Micro Empowering
- Microsoft
- Morgan Stanley
- NASA
- New York City Mayor’s Office of Operations
- New York State Department of Transportation
- Northrop Grumman
- Parsons Brinckerhoff
- Pfizer
- Rockstar Games
- R3 Energy
- Sony Music Entertainment
- Sunoco
- Time Warner
- Tissue Engineering Group — University of Melbourne
- Van Dam Engineering
- VMware
- U.S. Patent and Trademark Office
- U.S. Department of State
- U.S. Department of Transportation
- U.S. Foreign Service
- Van Dam Engineering
- VMware
- Big name companies like AOL, Citigroup, Google, and Goldman Sachs are a subway ride away from campus.

“The internships and job opportunities available to you while in New York make it all the more worthwhile to gain a rigorous and holistic engineering education.”

JOHN CHAVEZ

Fulshear, TX; Biomedical Engineering and Applied Math
Global Engineering Experience

Engineering is synonymous with a global perspective. At least it should be. Urbanization, public health, poverty, sustainability — these are global challenges that engineers are uniquely positioned to tackle. Global engineering for the good of the world is at the heart of Columbia Engineering. The international flow of ideas through the work of students and faculty here leads to cooperation and partnerships with other universities, communities, companies, NGOs and governmental bodies around the world. Owning an obligation to help advance society is the history of Columbia Engineering. It also happens to be the future of engineering. We’ve just been doing it all along.

Global Centers

We have Global Centers in Mumbai, India; Paris, France; Beijing, China; and Amman, Jordan, with new centers opening or recently opened in Nairobi, Kenya; Santiago, Chile; and Istanbul, Turkey. Columbia Engineering also partners with Tsinghua University in Beijing to collaborate in cutting-edge genomics and with Jordan University for Science and Technology in biomedical engineering and nanotechnology.

Global Internships

Columbia Engineering has several established internship programs in Brazil, France, Germany, and Scandinavia. Intern with the Pasteur Institute in Paris, gaining hands-on laboratory experience in biomedical engineering. Work in forestry and life sciences in Finland or sustainable engineering in Brazil. The Columbia Experience Overseas (CEO) program also offers students dozens of internship experiences.

Global Social Responsibility Projects

Students here have abundant opportunities to work with groundbreaking faculty like Professor of Earth and Environmental Engineering Kartik Chandran, who has developed a revolutionary new model in water, sanitation, and energy. Or Professor of Mechanical Engineering Vijay Modi, who leads the U.N. Millennium Project’s efforts on energy services and rural infrastructure. Given our mission of global social impact, it’s no coincidence that Columbia’s chapter of Engineers Without Borders (EWB) was one of the first in the country. Our EWB chapter works to improve the lives of others locally and around the world through creative, sustainable engineering solutions.

Study Abroad

In addition to the almost 200 global study options available to both Columbia Engineering and Columbia College students, engineering students can study abroad through programs designed specifically for them with Columbia partner universities, including École Polytechnique or École Centrale de Paris in France and University College London or Imperial College in the United Kingdom.

Global Alumni

From pioneering advances in international shipping and open management styles to leading universities and aerospace companies, Columbia Engineering graduates are using their expertise in finance and banking, music and media, biotech and education to make positive and significant impact in the international arena.

“Our role as engineers isn’t to go into a community and say, ‘This is wrong. We’ll fix it.’ Our role is to listen to the people in a community and understand their goals and work with them to achieve them.”

PATRICIA CULLIGAN
Professor of Civil Engineering and Engineering Mechanics

The Columbia University network is 250,000 strong with long-standing alumni chapters in cities around the world, including three in China.
Our Students Define Engineering Plus
Columbia Engineering does not live by data sets, systems, chemicals, and circuits alone. An engineering education at Columbia University is engineering plus a generous helping of a student’s other talents and passions. You get a phenomenal engineering curriculum, faculty, and research program. Beyond that you have all of Columbia as well as New York City and the world to expand on your education in almost limitless ways. On the next few pages, read five students’ personal versions of engineering plus.

Going to college in New York City means living in one of the largest and most diverse cities in the world, where you are at the center of every industry - research, business, technology, arts, media, publishing, and more. Going to Columbia means free and discounted tickets to theatre, concerts, and museums, ensuring you’ll have access to all that New York City offers.

Not only do you get all of the advantages of New York City but also a traditional college campus with guaranteed campus housing for all four years.

Columbia Engineering students are not only part of a world-class engineering school, they are also part of a top-ranked college of arts and sciences, and one of the premier research universities in the world.

Columbia University

- 4,400 Columbia College undergraduates to call your friends, classmates, teammates, and fellow Columbians
- 80+ areas of study from creative writing to sustainable development
- 80% of undergraduate classes have fewer than 20 students
- Almost 200 study abroad programs
- 143 Faculty in the American Academy of Arts and Sciences
- 79 Nobel Prize winners are Columbia alumni, faculty, or former faculty. More Nobel Laureates have graduated from or taught at Columbia than any other university in the Ivy League.
- 400+ research positions reserved for undergraduates
- 40,000+ Columbia Engineering Alumni Network
- 1,400 undergraduates
- 9 academic departments
- 16 majors
- 40 members of the National Academy of Sciences
- In the last two years alone, faculty have won the MacArthur Foundation Award (the “Genius” Award) 3 PECASE (Presidential Early Career Award for Scientists and Engineers) Awards, 4 Sloan Fellowships, and 10 NSF CAREER Awards.
- 20 members of the National Academy of Engineering among current faculty. That number represents 13% of the total Engineering faculty, one of the highest percentages of any school in the country.
- 4,400 Columbia Engineering Alumni Network
- 22 Libraries
- 20+ Residence Halls
- 500+ student clubs and organizations
- 250,000 university alumni
Engineering Plus
Theater
Lisa Mack
Hometown: Philadelphia, PA

“In high school I was always branded as a “science kid,” but I’ve always had a passion for theatre. Being a Chemical Engineering major, I was worried I would have to leave theatre behind, but since coming to Columbia I’ve been able to act in, play music for, direct, and produce countless plays. How many engineers can say that they performed in a play on Broadway? Only Columbia could create an opportunity like that. While what I learn in the classroom will help me throughout the rest of my life as an engineer, some of my favorite moments at college have been performing a Shakespearean play outside on Low Steps at midnight or seeing the cast of a play that I directed nail a performance.”

* Our blackbox theatre is on Broadway, so every show I’ve done is technically on Broadway.

Major
Chemical Engineering, Psychology minor

Activities
Theatre, Engineering Student Council, Residential Programs (I was a Resident Adviser last year and I’m a Community Adviser this year), Volunteer at St. Luke’s Hospital.

Internships and Research
I’ve interned with Advanced Lubrication Specialties calibrating pressure sensors of oil holding tanks. Last year I conducted atmospheric chemistry research with Chemical Engineering Professor Faye McNeil and now I am working in Chemical Engineering Professor Sanat K Kumar’s lab. His lab focuses on several areas including biochemical engineering, composite materials, interfacial phenomena, nanotechnology, and polymers. I’m working on nano-composite polymer research with him.

Post-Columbia Plans
Work in the engineering industry and then go to graduate school.

60+
a capella, comedy, dance, film, music, and theatre clubs and organizations

More than a
dozen
conservatory-caliber arts majors and programs

The Varsity Show, an entirely student-run performance now in its 118th year

The CU Arts Initiative offering free and discounted tickets to New York City cultural events, including Broadway shows, Lincoln Center concerts, and blockbuster films.

Arts Link
A Columbia program allowing professors to seamlessly include arts and cultural events around the city in their syllabi. Professors can also take their classes on self-guided museum tours with all costs covered by ArtsLink.
“I chose Columbia because of the ‘pluses’ and I have intended to have as many as possible. One of my big pluses is being a Kenneth Cole Community Engagement and Civic Action Fellow. As a Fellow I have the opportunity to work and learn about community engagement and civic action through courses and through hands-on experience in the community during a summer internship. I’ve also been able to travel to Norway, England, and Italy as a student there. Another big plus for me is minor ing in Entrepreneurship and Innovation so that I can start my own business one day.”

**Activities**

I’m very involved with the Multicultural Recruitment Committee — we host events, speak to students, and help throughout the year to bring talented students of underrepresented backgrounds to Columbia.

**Internships**

As a Kenneth Cole Fellow, I met Mr. Cole while spending the summer working with the Community League of the Heights. My internship focused on helping to develop a new community center in the neighborhood. I’ve also been invited to go to Haiti to continue community work there with the Kenneth Cole Fellows.

**Post-Columbia Plans**

I hope to own my own business focused on green technology and innovative ways to develop a more self-sustaining society.
“Athletics brings together students from Columbia Engineering, Columbia College, and Barnard. The athletic and academic vision here are in sync — focused on scholar-athletes at the highest level — and that creates great, well-rounded people. Being a member of Columbia’s Men’s Division I Varsity Soccer Team introduces a component of college life that I love. I feel honored knowing I have developed a wonderful family away from home.”

Megan Armstrong
Hometown: Ann Arbor, MI
Major
Biomedical Engineering
Civic Engagement

“One of the projects I’m involved in is the Columbia University Peer Health Exchange, which gives teenagers the knowledge and skills they need to make healthy decisions. Through the program, I’ve been trained as a public speaker, gained expertise in health topics, learned how to manage a classroom, and discovered I love teaching. When I became a leader in the program, I also learned to manage groups, which has been really useful in other organizations and on engineering projects. None of these things would have happened if I had not come to Columbia.”

Activities
- Columbia University Peer Health Exchange; Intervarsity Christian Fellowship of the Social Justice team leader; Columbia Outdoor Orientation Program (COOP) leader; Columbia Undergraduate Scholars Program; High School Tutor; Veritas Forum inter-faith discussion group leader

Post-Columbia Plans
I see three possible paths I may take. One is working in the biomedical engineering field, taking new technologies to parts of the world that need them. Another path would be social justice work, leading the training of social activists and their efforts at activism. The third option is med school to become a doctor of osteopathy, taking everything I’ve learned to parts of the world that lack adequate health care.

Jesse Vella
Hometown: New York, NY
Major
Earth and Environmental Engineering

Internships and Research
Biomedical internship at Columbia Presbyterian under Dr. Levine; Landmark Advisors Fund of Funds Research and Marketing Intern

Post-Columbia Plans
Environmental consulting, preferably for large-scale city infrastructure.

“Community Impact is one of the largest community service organizations in the Ivy League, in which 950 students participate in 25 community service programs, serving more than 8,000 people each year.

CU EMS
is a student-operated, New York State-certified, Basic Life Support (BLS) volunteer ambulance corps that provides prehospital emergency medical care, free of charge, to Columbia University’s Morningside Heights neighborhood — just one way to gain hands-on healthcare experience.

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Varsity Soccer

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“There are so many non-engineering interests that I’ve been able to pursue here at Columbia. I’m very interested in learning new languages and experiencing new cultures, and I’ve been able to take multiple semesters of Chinese, Spanish, and Japanese classes. While I love being in a city like New York, I also have a strong interest in nature and the outdoors. As a COÖP leader (Columbia Outdoor Orientation Program), I’ve had the opportunity to test hiking trails in the Catskills over the summer, and share my passion for nature with a group of incoming first-years on a canoeing trip down the Delaware River in the fall semester. This year, I lived on and volunteered at an organic farm in upstate New York during spring break. I’ve also been volunteering at a nonprofit farm and education center in the Hudson Valley aiming to increase awareness of healthy and sustainable food systems.”

Instruction in nearly 50 foreign languages

—

5 pre-orientation programs:

● CUE (Columbia Urban Experience) — Community service around New York City
● International Student Pre-Orientation Program (ISOP)
● 3 COÖPs (Columbia University Outdoor Orientation Programs) — HOP for hiking, BOP for biking, ROP for river (canoeing)

13 Environmental and outdoor clubs

● Columbia Barnard Earth Coalition
● Consilience: The Journal of Sustainable Development
● CoreFoods Food Cooperative
● Cycling
● Equestrian
● Hiking
● Kayak
● Road Runners
● Rock Climbing
● Sailing
● Ski Racing
● Students for Economic and Environmental Justice
● Triathlon

Major
Industrial Engineering and Operations Research

Activities
Undergraduate Recruitment Committee. COÖP leader.
Class Council.

Internships
During the summers I’ve had internships at an investment firm in Chicago and a management consulting firm in New York. One semester during the school year, I interned in the sales department of the major American fashion label Marc Jacobs.

Post-Columbia Plans
I’ll be staying in New York and working at a management consulting firm with a focus on the financial services industry. I’m excited to stay in the city, and to be directly applying my academic background in optimization and analysis. One day, I’d really like to start my own business — something that my parents have done and that I respect and admire greatly.

Engineering Plus Languages, Culture, and the Great Outdoors
Mike Linshi
Hometown: Naperville, IL
More than ever before leadership in every field requires a deep understanding of science and technology. That’s “future smart.” Columbia Engineering is the perfect education for such leadership because we integrate top engineering majors and research, technological innovation, and a stellar humanities education like no other engineering school can or does. Graduates define “future smart” — becoming trailblazers in every field from biomedicine and banking to education, environmentalism, and entrepreneurship to security, shipping, and social media to corporate leadership and city planning.

88% admit rate to medical school, almost twice the national average, and equally high acceptance rates into the most selective graduate and professional schools.

Sampling of employers hiring new SEAS graduates:

- Accenture
- AllianceBernstein
- At&T
- BlackRock
- Citigroup
- Deutsche Bank
- Goldman Sachs
- Google
- IBM
- JPMorgan Chase
- Teach For America

No. 1
Columbia Engineering and Columbia College are the #1 feeder schools to Columbia University Law, Medical, and Business Schools.

Clues to the Universe
Just a few months after NASA astronaut Mike Massimino and his team successfully updated the Hubble Space telescope, 21 new galaxies were identified. Massimino finds himself regularly falling back on what he learned as a Columbia Engineering student. In particular, he says, it’s the engineering mindset—a way of looking at a problem—that helps him the most. “Engineering teaches you how to solve problems. It teaches you to look at a problem, decide what’s important, and break it down into something you can engage.”

Michael J. Massimino ’84
NASA Astronaut

Innovating to Educate
“From my science and engineering background, I learned discipline, problem solving, turning complexity into simplicity, managing by fact—all of these are fundamental attributes of successful engineers and, I believe, of successful leaders,” says Xerox CEO Ursula Burns. In addition to leading Xerox, she was appointed by President Obama to help lead Educate to Innovate, an initiative intended to improve performance of U.S. high school students in STEM (science, technology, engineering, and math) subjects. “We need more people to pursue engineering careers, especially women and minorities, because our companies are better when we build engineering communities that are diverse... I want to help them get there.”

Ursula Burns ’82
CEO, Xerox Corporation
Whether you continue in engineering, or later tackle finance, business, politics, or research, the discipline you develop as an engineering student will ground you, providing you the instincts to continually ask questions, to seek explanations beyond first impressions.”

JEANE CHEN ’90
VP of Software Development, Blackbaud
### Departments and Majors

<table>
<thead>
<tr>
<th>Departments and Majors</th>
<th>Majors</th>
<th>Student-faculty Research Portfolio</th>
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<tbody>
<tr>
<td><strong>Applied Physics and Applied Mathematics</strong></td>
<td>Applied Physics, Applied Mathematics, Materials Science and Engineering</td>
<td>Nanoscale science; advanced scientific computing; earth science; plasma physics; materials for information technologies</td>
</tr>
<tr>
<td><strong>Biomedical Engineering</strong></td>
<td>Biomedical Engineering</td>
<td>The intersection of engineering, physical science and biological science, biology and medicine, living systems and their behavior; biomedical systems and devices; Concentrations: biomechanics; cell and tissue engineering; biomedical imaging</td>
</tr>
<tr>
<td><strong>Chemical Engineering</strong></td>
<td>Chemical Engineering</td>
<td>Science and engineering of polymers and soft materials; genomics engineering; biophysics and soft matter physics; biodegradable and biomimetic materials; interfacial engineering and electrochemistry</td>
</tr>
<tr>
<td><strong>Civil Engineering and Engineering Mechanics</strong></td>
<td>Civil Engineering, Engineering Mechanics</td>
<td>Environmental, earthquake, and geotechnical engineering; structural control and health monitoring; flight structures and construction materials; infrastructure delivery and management; solid, fluid, and probabilistic mechanics</td>
</tr>
<tr>
<td><strong>Computer Science</strong></td>
<td>Computer Science; Computer Engineering</td>
<td>Computer graphics; computer-aided digital design; computer vision; databases and digital libraries; data mining and knowledge discovery; distributed systems; mobile computing; natural-language processing; networking; operating systems; programming systems; robotics; user interfaces; real-time multimedia</td>
</tr>
<tr>
<td><strong>Earth and Environmental Engineering</strong></td>
<td>Earth and Environmental Engineering</td>
<td>Environmentally sound extraction and processing of primary materials (minerals, fuels, water); management and development of land and water resources; recycling or disposal of used materials</td>
</tr>
<tr>
<td><strong>Electrical Engineering</strong></td>
<td>Electrical Engineering; Computer Engineering</td>
<td>Multimedia networking; lightwave communications; image and advanced television; laser processing; microelectronics fabrication</td>
</tr>
<tr>
<td><strong>Industrial Engineering and Operations Research</strong></td>
<td>Financial Engineering, Engineering Management Systems, Industrial Engineering, Operations Research</td>
<td>Financial engineering; engineering management systems; logistics; production and supply chain management; revenue management; quality control; mathematical programming; queueing theory; reliability; portfolio management; option pricing; data mining; risk management</td>
</tr>
<tr>
<td><strong>Mechanical Engineering</strong></td>
<td>Mechanical Engineering</td>
<td>Controls and robotics; energy and micropower generation; fluid mechanics; mechanics of materials; manufacturing; material processing; nanotechnology; orthopaedic biomechanics</td>
</tr>
</tbody>
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Low Library, seen here in the foreground facing Butler Library and the city beyond, features the largest freestanding granite dome in the United States. The Rotunda created by the dome is the site of major prize ceremonies such as the University’s presentation of the Pulitzer and Bancroft Prizes.
What makes Columbia Engineers so special?

They have knowledge and experience that are crucial for our times. They see the component parts of problems as well as the interconnections that lead to solutions. In other words, Columbia Engineers see the forest through the trees.

When you’re a Columbia Engineer you have the vision and the leadership not only to see the future but to create a better one.
Office of Undergraduate Admissions
Columbia University
212 Hamilton Hall, MC 2807
1130 Amsterdam Avenue
New York, NY 10027

For more information about Columbia University,
please call our office or visit our website:

212-854-2522
www.studentaffairs.columbia.edu/admissions