

THE COOPER UNION
FOR THE ADVANCEMENT
OF SCIENCE AND ART



ALBERT NERKEN

School of Engineering

Introduction

Home to approximately 475 exceptionally talented undergraduate students, the Albert Nerken School of Engineering is a learning community of innovative builders, makers, and creative problem solvers in New York City.

Cooper students closely engage with their fellow classmates and Cooper's distinguished faculty—with classes of 25 students in core courses and 10 students in elective courses. That tight-knit educational experience is defined by experimentation, collaboration, and innovation. Students delve into project-based learning and encounter rich opportunities for research and advanced coursework alongside professors and peers who care deeply about making an impact on the world.

Faculty in the school of engineering are committed to preparing students to succeed in an increasingly complex world shaped by emerging technologies and global challenges. Students are encouraged to think broadly across disciplines and to work collaboratively.

The Cooper Union's engineering graduates are known for revolutionizing their disciplines and transforming society, with accomplishments ranging from the Nobel Prize-winning discovery of a binary pulsar, to developing the first Global Positioning System, to engineering the infrastructures that support everyday life. Our graduates are recruited by leading national and international corporations, cutting-edge consulting companies, new and disruptive startups, and top graduate schools.

Cooper by the Numbers

- #1 Best Value Schools, #2 Regional Colleges North, #8 Top Performers on Social Mobility, #9 Best Undergraduate Engineering Programs, #9 Undergraduate Electrical/Electronic/Communications, #11 Undergraduate Mechanical Engineering, *U.S. News and World Report Best Colleges, 2024*
- Top 20 Best Buy Colleges and Universities, *Fiske Guide to Colleges 2024*
- Best Northeastern Colleges and Best Value Colleges (private schools), *The Princeton Review Best Colleges, 2024*
- Ranked in the top 50 among the country's most selective schools for economic diversity, *The New York Times, 2024*
- #1 Bachelor's College and #22 Best Bang for the Buck in the Northeast, *Washington Monthly, 2023*
- Selected by the American Society for Engineering Education (ASEE) for its Bronze-level recognition, the highest level issued in this application cycle, as part of the ASEE Diversity Recognition Program (ADRP)
- 9 to 1 student-to-faculty ratio



Majors

CHEMICAL ENGINEERING

From energy and environmental protection to nanotechnology and medicine, many important industries and professions require experts who can apply their understanding of the physical and natural sciences, mathematics, and engineering systems to develop new materials and reimagine how they are produced. At Cooper, chemical engineering majors acquire a foundational knowledge in these fields through hands-on training in the classroom, laboratory work, and professional internships, learning to solve complex problems from the molecular level to an industrial scale. Recent graduates are working on groundbreaking research and technologies, including renewable energy, pollution prevention and carbon capture, 3D printing and manufacturing of biomedical devices, and the latest advances in materials science.

CIVIL ENGINEERING

Whether analyzing climate change resilience in New York City neighborhoods or competing nationally for the best steel bridge design, Cooper's civil engineering students are at the forefront of addressing important societal issues and finding solutions to infrastructural challenges. The civil engineering department embraces a breadth of specialties—structural, geotechnical, environmental, and water resources engineering—exposing students to the hands-on application of cutting-edge technologies such as augmented and virtual reality and 3D-printed structures. With more than 90% of civil engineering seniors passing the Fundamentals of Engineering (FE) exam—the first step toward obtaining a Professional Engineering (PE) license—over 90% of our civil engineering graduates secure jobs at top engineering firms in NYC and worldwide or enroll in top graduate schools within six months of graduation. Cooper students are committed to building a smarter and more equitable world.



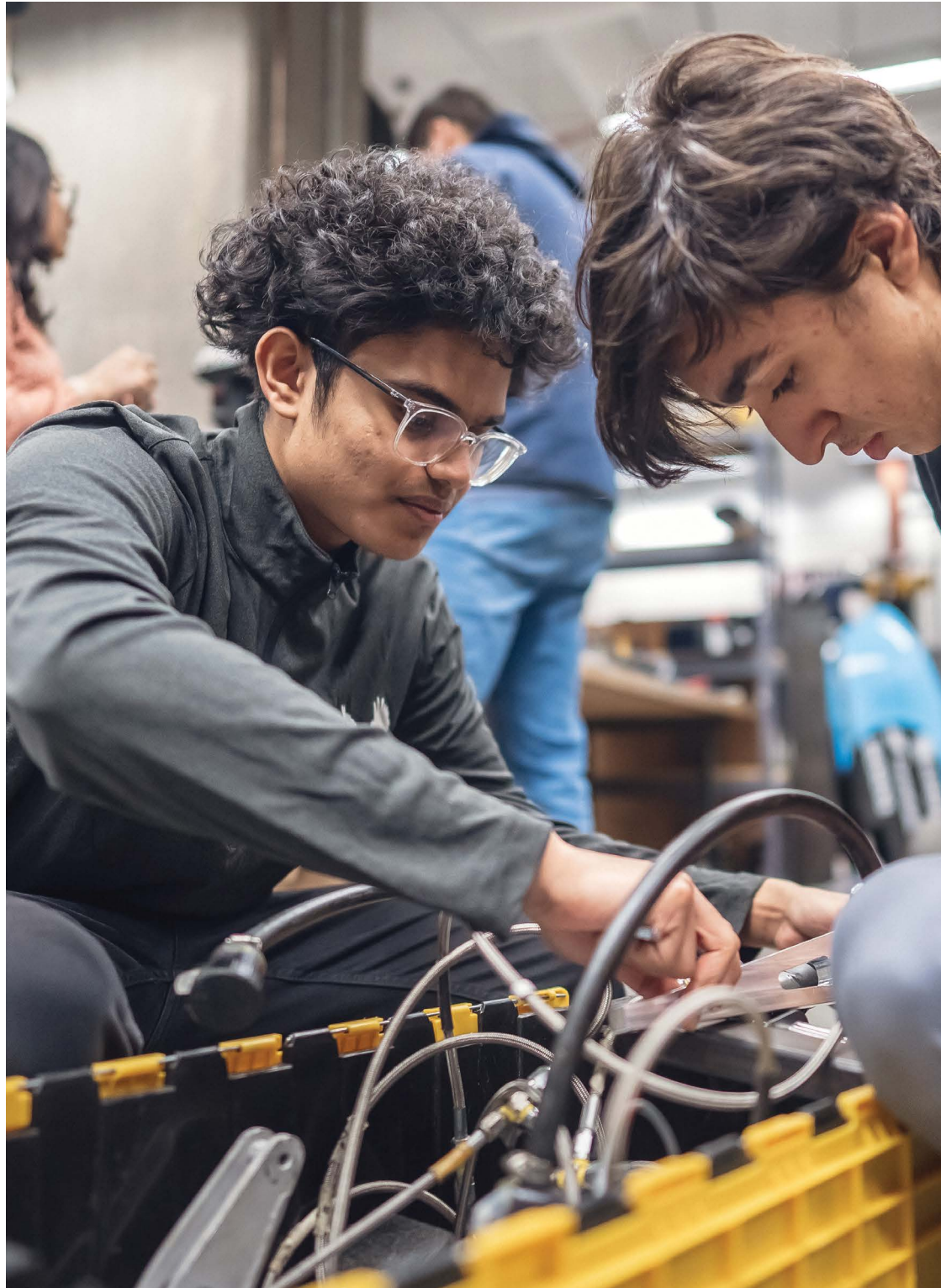


ELECTRICAL ENGINEERING

Focusing on the devices and processes that form the backbone of modern technology, the electrical engineering program tightly integrates electronics, signal processing, and computer science. Recent student projects reflect a wide range of applications: sustainable engineering, medical imaging, drone control, quantitative finance, wireless communications, hardware implementation of neural networks, and beyond. Students can take advantage of the department's laboratories and computing resources, including a GPU cluster that supports computationally intensive projects involving large data sets. One of the many opportunities for gaining practical experience is joining the "Microlab Staff," a student group responsible for maintaining the department's computing facilities. Projects in autonomous technologies reimagine societies and systems to make them more economically, environmentally, and socially sustainable. Projects in machine learning and data science allow students to solve real-world, data-oriented problems related to equity, justice, health, and economic development.

MECHANICAL ENGINEERING

Creativity, problem solving, and design are all at the heart of Cooper's mechanical engineering program, which is the broadest of the engineering majors. Students have the flexibility to study a variety of theoretical and technological interests, including solid mechanics, materials, fluid mechanics, vibrations and acoustics, heat transfer, thermodynamics, plasma engineering, combustion, control systems, manufacturing, CAD/CAM, and robotics. With access to research facilities such as the Maurice Kanbar Center for Biomedical Engineering and the Materials and Design Lab, students work on projects ranging from brain wave-controlled drones to designing zero-energy homes. Mechanical engineering is an ideal foundation for careers in the aerospace industry, marine engineering, biomedicine, the automotive industry, the power and utility industries, and virtually anything that requires analytical abilities combined with a strong background in design practice.





COMPUTER SCIENCE

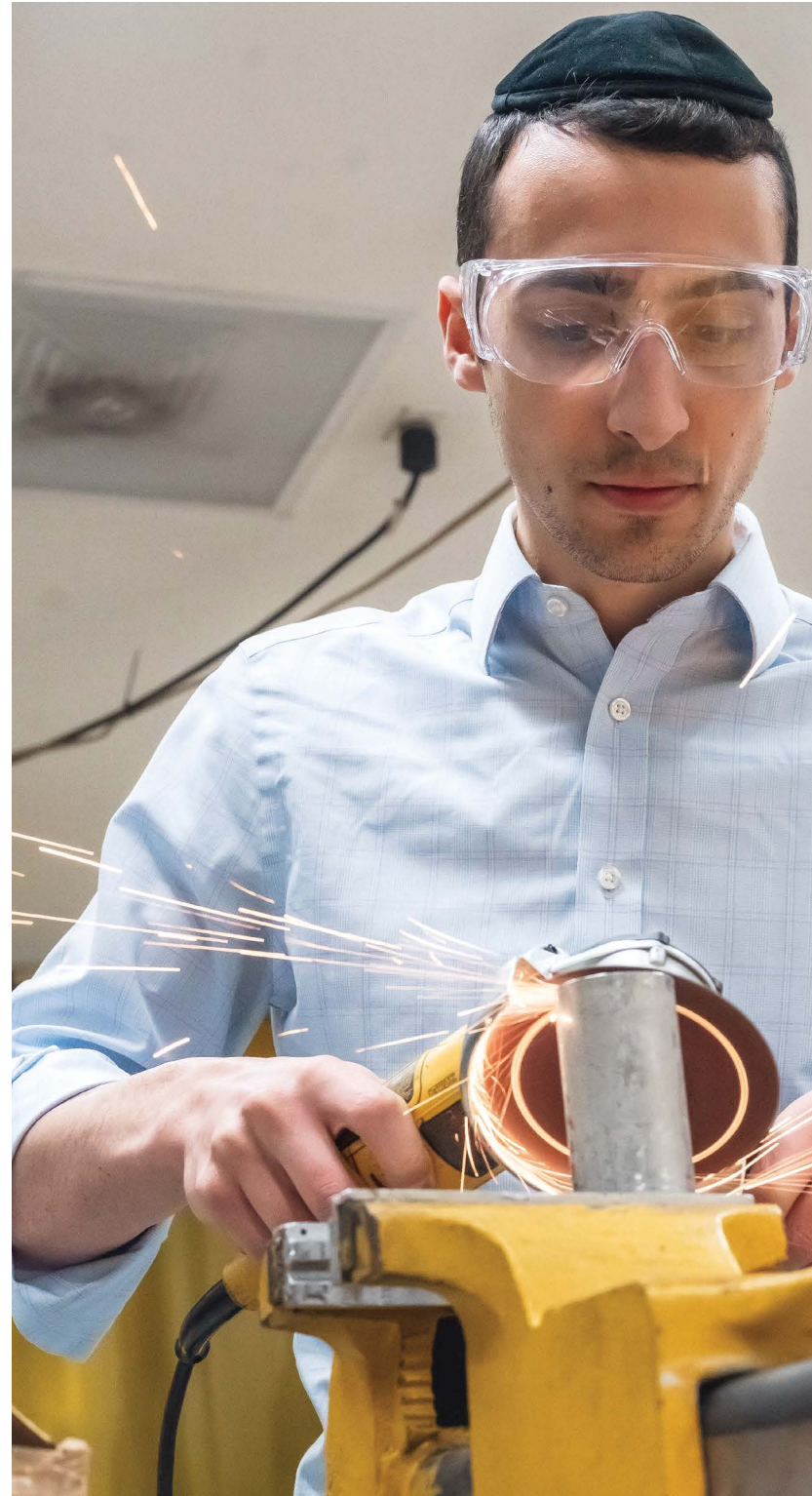
The rapidly evolving world of technology requires a strong foundation in mathematics, science, and theoretical computer science. Like other engineering majors at The Cooper Union, the computer science program integrates theory with practical application from the onset, starting with collaborative projects in the first year and progressing through specialized projects. Students develop industry-ready skills by focusing on group dynamics, project management, software development, debugging, and presentation skills modeled on real-world practices and enhanced through experiential learning opportunities.

Students engage in significant project work each year that solidifies their understanding and practical skills. Key focus areas include artificial intelligence, cybersecurity, robotics, distributed systems, and user-centric computing. Collaboration with peers and faculty from the School of Architecture, the School of Art, and the Humanities and Social Sciences (HSS) fosters interdisciplinary learning focused on methodology and societal impact. This interdisciplinary approach positions students to lead in emerging fields, such as bioinformatics/healthcare, autonomous systems, and generative AI applications.

Project-Based Learning

Small classes and experiential learning provide opportunities for students to enhance their education through research, independent study, and collaboration with peers and faculty. Together, they pursue innovative solutions to today's great challenges.

THE VERTICALLY INTEGRATED PROJECTS (VIP) PROGRAM introduces faculty-led, interdisciplinary initiatives in which students work on large-scale projects over several semesters. VIP projects provide students with faculty mentorship and the opportunity for professional research on topics such as the Solar Decathlon, drones, body tracking, modular agricultural systems, bioengineering, and Motorsports.



ENGINEERING DESIGN AND PROBLEM SOLVING is an immersive experience in which all first-year students work in small groups to develop projects that address societal challenges. Students develop skills in teamwork, leadership, presentation and communication, and entrepreneurship while iterating through the engineering design process. Recent projects include developing therapeutic devices, creating shelters for refugees in flight, and making fuel from food waste.

THE SUMMER STUDY ABROAD PROGRAM provides students with the opportunity to conduct research in a university lab or work on engineering-focused humanitarian projects in locations around the globe, including Bosnia, Germany, Guatemala, Iceland, Singapore, Spain, and Uruguay. Participants can receive course credit and apply for fellowships to pursue projects that range from building a solar-powered drip irrigation system in Guatemala to conducting research on microplastics at Reykjavik University.



Interdisciplinary Research

Students and faculty across disciplines participate in ongoing, large-scale projects supported by special lab facilities and research programs. At Cooper, we emphasize research in the following eight key concentrations:

- Bioengineering
- Materials and Fluids
- Autonomy, Control, and Cyber-Physical Spaces
- Machine Learning, Data Science, and Artificial Intelligence
- Sustainability
- Theoretical and Computational Science
- Signal Processing and Communications
- Pedagogy

IDC FOUNDATION ART, ARCHITECTURE, CONSTRUCTION, AND ENGINEERING (AACE) LAB is an interdisciplinary space housing state-of-the-art equipment, including 3D printers, laser cutters, CNC routers, robotic arms, and VR technology.

MAURICE KANBAR CENTER FOR BIOMEDICAL ENGINEERING provides facilities for bioengineering projects in tissue culture, genetic engineering, biomechanics, and related research. Faculty and students currently using the facility are pursuing groundbreaking biomedical research in biomedical devices, tissue engineering, obstructive sleep apnea biomechanics, and collaborating with Icahn School of Medicine at Mount Sinai and Memorial Sloan Kettering Cancer Center.

Student Life

The Cooper Union's historic location in the East Village of New York City, one of the city's centers of intellectual and creative life, enriches the student experience with an abundance of cafes, galleries, theaters, restaurants, and cultural institutions. Engineering students have unparalleled opportunities to explore the challenges posed for their discipline by studying and living in one of the most complex and vibrant cities in the world.

First-year students can elect to live in the Residence Hall where the camaraderie and shared interests among art, architecture, and engineering students in a close-knit community shapes their lives and future experiences at The Cooper Union. Each year there are over 80 student clubs, including professional organizations, cultural and social groups, intramural sports teams, and a student newspaper.

The Student Residence Hall offers apartment-style housing for approximately 170 students during a typical year. Most apartments accommodate four students, comprised of two bedrooms with a shared bathroom and kitchen.



Teams

Students at Cooper engineer outside the classroom, participating in extracurricular teams and competitions to apply their technical knowledge to solve real-world engineering and design questions.

MOTORSPORTS is comprised of an interdisciplinary group of students who work together to design, fabricate, test, develop, and race a high-performance Formula SAE vehicle. Students gain hands-on experience with state-of-the-art design, engineering, and manufacturing techniques.

STEEL BRIDGE competes to develop a scale-model bridge. Members collaborate on fabricating a steel bridge and strategize on rapid assembly under timed construction at the Steel Bridge Nationals.

CHEM-E CAR competes annually against college teams to design small-scale automobiles that operate by means of chemical reactions.

SOLAR DECATHLON is a US Department of Energy-sponsored national competition in which engineering and architecture students collaborate to develop innovative and high-performance building designs that tackle real-world issues related to climate change, affordability, and environmental justice.

AUTONOMY LAB students compete in the annual Intelligent Ground Vehicle Competition (IGVC) where they install autonomous driving technologies and implement them in real-world scenarios against other schools.

Minors

- Art History
- Bioengineering
- Chemistry
- Computer Science
- Economics and Public Policy
- Interdisciplinary Studies
- Literature
- Mathematics
- Philosophy, History and Society

Masters Program

The Cooper Union offers a Master of Engineering degree with areas of concentration in chemical engineering, civil engineering, electrical engineering, and mechanical engineering. The integrated Bachelor/Master of Engineering program integrates work at the undergraduate and graduate levels and prepares graduates for entry into the engineering profession at an advanced level, or for further graduate study.

Applying

Students applying to the Albert Nerken School of Engineering, are required to have completed at least one year of physics, one year of chemistry, and four years of math, including calculus. Advanced coursework is encouraged if available.

UNDERGRADUATE APPLICATION STEPS

- Common Application, including essay and additional writing prompts
- Two teacher recommendations (at least one from a STEM teacher, preferably in math, physics, or chemistry)
- One counselor evaluation
- Official high school transcript or GED certificate (include mid-year report if currently enrolled in school)
- Any official college transcripts (sent directly from the college or university)
- SAT/ACT
- English language proficiency test - TOEFL, IELTS, or DET (if applicable)
- \$75 application fee or fee waiver (if applicable)

APPLICATION DEADLINES

UNDERGRADUATE

Early Decision: **November 1** | Regular Decision: **January 5**

GRADUATE

Master of Engineering: **January 15**

AFFORDABILITY

The Cooper Union was founded on the principle of providing access to higher education regardless of race, creed, gender, or financial means. Every admitted undergraduate student receives a half-tuition scholarship currently valued at \$22,275 per academic year.* Applicants will automatically be considered for additional merit-based scholarships. To be considered for need-based financial aid, students must submit the FAFSA (code: 002710).

Life After Cooper

CAREER DEVELOPMENT

The Center for Career Development empowers students to pursue their personal, educational, and professional goals beyond the academic curriculum. Individual engagement is a core function of the center's services, with staff averaging over 500 one-on-one meetings with students per year. In addition, the center facilitates networking and employment opportunities ranging from one-on-one portfolio reviews, career fairs, company information sessions, and a biannual alumni networking reception.

Most engineering students complete two or more internships during their undergraduate studies, and many pursue research programs at universities and labs across the country and around the world. Engineering students' internships, research, post-graduate studies, and careers span a wide variety of fields, including infrastructure, technology, energy, defense, aerospace, automotive, the environment, health and medicine, climate change, business, and more.

ALUMNI

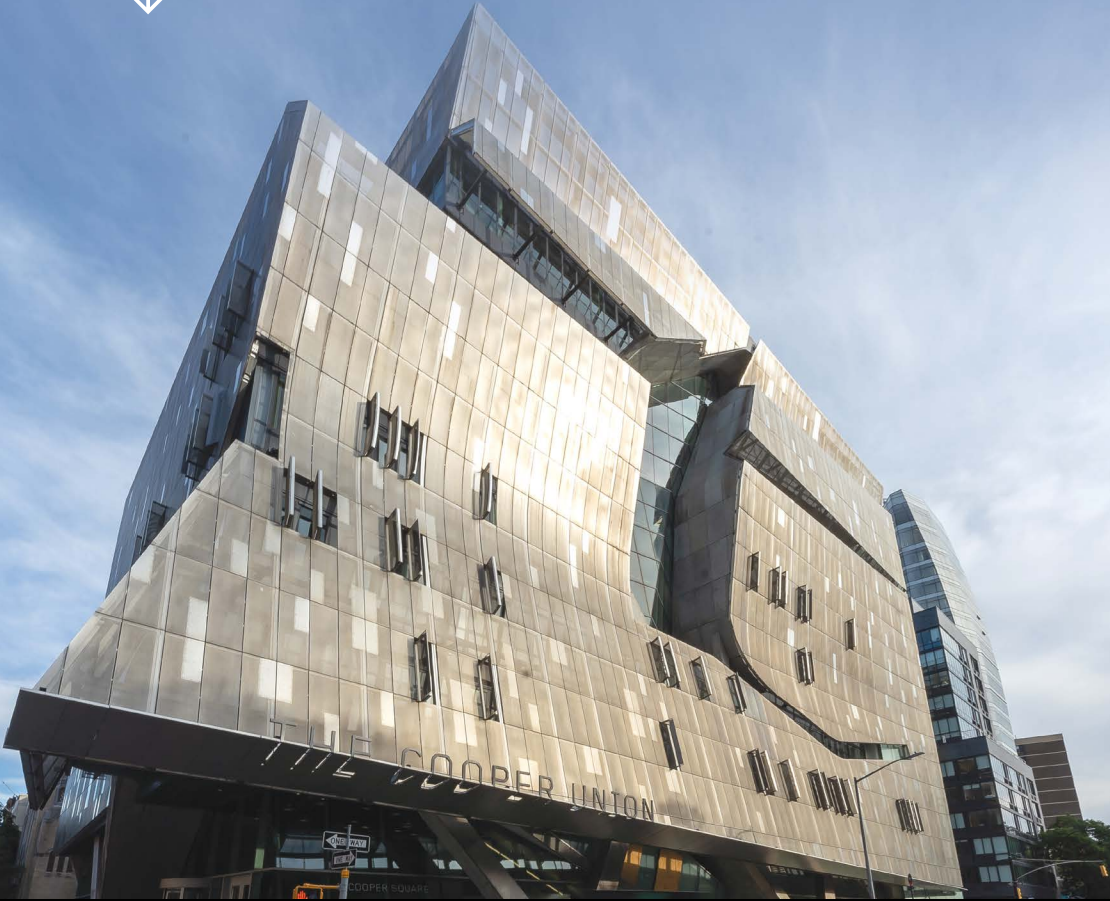
The Engineering Alumni-Student Career Mentoring Program matches students with alumni mentors for year-long, one-on-one advisory relationships, providing students with professional networking and support. The nearly 13,000 alumni of The Cooper Union span professions, continents, and generations. Alumni are found in the top management and research leadership of major corporations; hold key positions in federal, state, and city agencies; and distinguish themselves on university faculties and administrations nationwide.



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cooper.edu/admissions



Join our
mailing list.

Sign up
for an event
or tour.

Take a
self-guided
virtual tour.