

THE COOPER UNION
FOR THE ADVANCEMENT
OF SCIENCE AND ART



ALBERT NERKEN

School of Engineering

Introduction

Home to approximately 450 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.

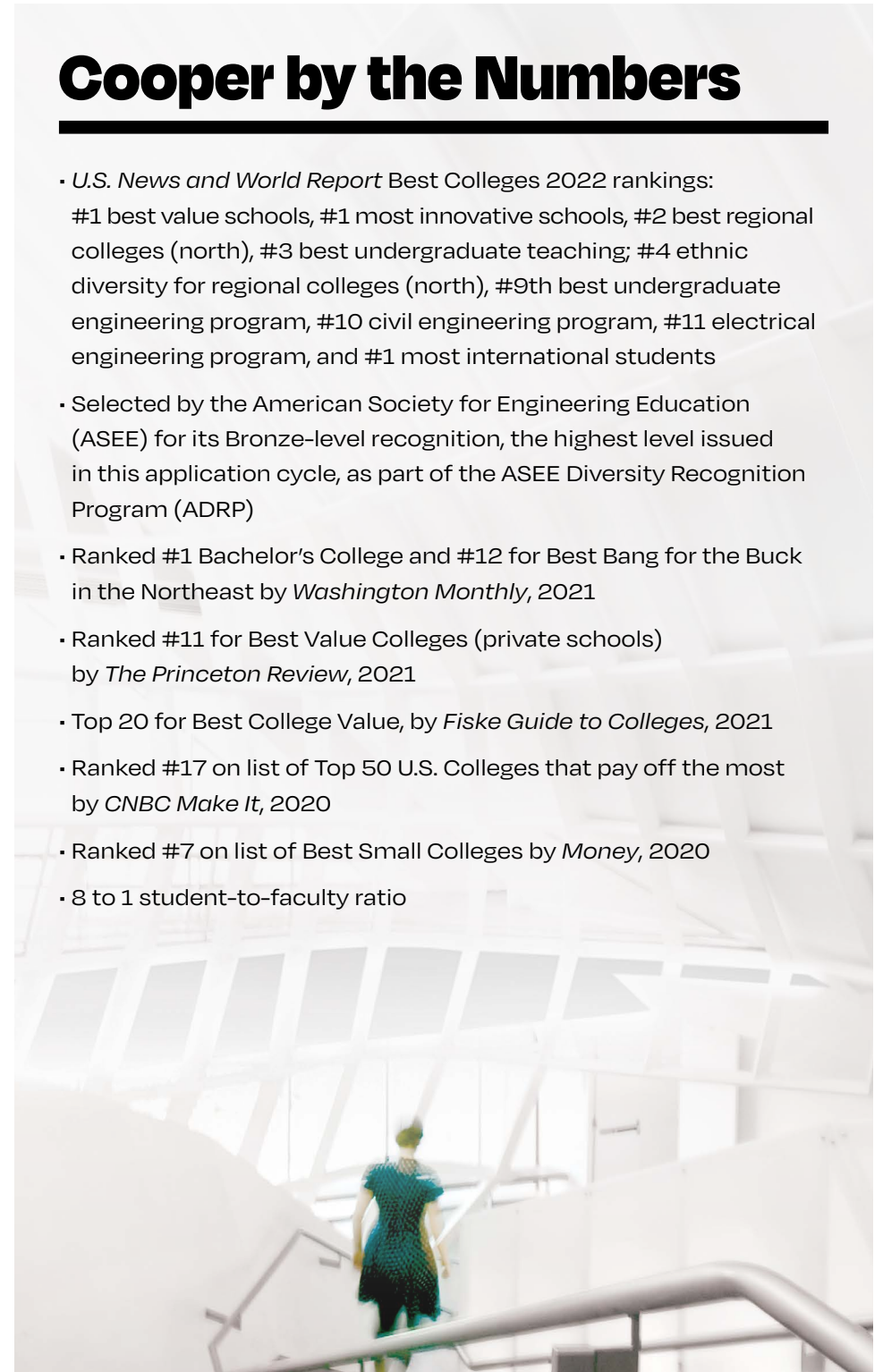
Cooper students closely engage with their fellow classmates and Cooper's distinguished faculty—with classes of 25 students in core courses and 10 students in elective courses. That tight-knit educational experience is defined by experimentation, collaboration, and innovation. Students delve into project-based 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. Cooper students are encouraged to think broadly across disciplines and to work collaboratively.

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

- *U.S. News and World Report Best Colleges 2022* rankings: #1 best value schools, #1 most innovative schools, #2 best regional colleges (north), #3 best undergraduate teaching; #4 ethnic diversity for regional colleges (north), #9th best undergraduate engineering program, #10 civil engineering program, #11 electrical engineering program, and #1 most international students
- 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)
- Ranked #1 Bachelor's College and #12 for Best Bang for the Buck in the Northeast by *Washington Monthly*, 2021
- Ranked #11 for Best Value Colleges (private schools) by *The Princeton Review*, 2021
- Top 20 for Best College Value, by *Fiske Guide to Colleges*, 2021
- Ranked #17 on list of Top 50 U.S. Colleges that pay off the most by *CNBC Make It*, 2020
- Ranked #7 on list of Best Small Colleges by *Money*, 2020
- 8 to 1 student-to-faculty ratio





Majors

CHEMICAL ENGINEERING

From energy and the environment to nanotechnology and biomedicine, many important industries and professions require experts who can synthesize knowledge of physical and natural sciences, mathematics, and engineering. At The Cooper Union, chemical engineering majors acquire this foundational knowledge through hands-on training in the classroom, the lab, and the field, and apply it to complex problems from the atomic and molecular level all the way up to technologies designed for the industrial scale. Recent graduates are working on groundbreaking research and new technologies in topics including sustainable energy and pollution prevention, 3D printing and manufacturing of pharmaceuticals, and the latest advances in materials science.

CIVIL ENGINEERING

Whether analyzing climate change resilience in New York City neighborhoods or researching sustainability through the green roof project at the Jacob K. Javits Convention Center, 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, hydraulic, environmental, transportation, urban planning, and construction management—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 towards obtaining a Professional Engineering (PE) license, Cooper students work to build a smarter and more equitable environment for all.





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 and thermodynamics, combustion, control systems, manufacturing, CAD/CAM, and robotics. With access to research facilities such as the Maurice Kanbar Center for Biomedical Engineering and the Material Science 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, ocean engineering, marine engineering, biomedicine, the automobile industry, the power and utility industries, and virtually anything that requires analytical abilities combined with a strong background in design practice.





GENERAL ENGINEERING

Students who enter the general engineering program at Cooper desire a strong, broad-based, and rigorous engineering background as preparation for fields such as biomedical engineering, business, chemistry, computer science, entrepreneurship, law, mathematics, or medicine. General engineering students graduate with a Bachelor of Science in Engineering.

MINORS

School of Engineering offers minors in:

- Math
- Computer Science
- Bioengineering

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.

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 Singapore, Spain, Egypt, Greece, Ghana, and more. 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.

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.

THE MOTORSPORTS TEAM is comprised of dedicated students from the engineering, art, and architecture schools 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.

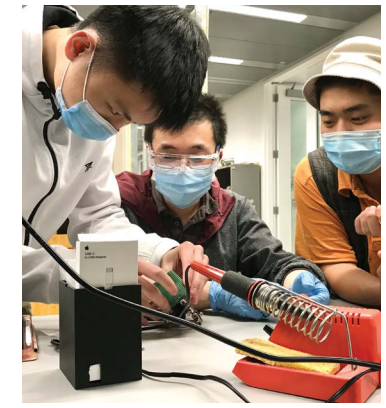
THE STEEL BRIDGE TEAM competes to develop a scale-model bridge. Members collaborate on fabricating a steel bridge and strategize on rapid assembly under timed construction at the Steel Bridge Nationals.

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

THE HYPERLOOP TEAM participates in an international design competition that requires teams to design, build, and test hyperloop-related technology. Teams are evaluated on design, innovation, feasibility, and other parameters.

Students are encouraged to prototype, pitch, and patent during **INVENTION FACTORY**, a six-week summer program where they compete to invent a tangible product that meets a significant need. Teams of two conceive an invention, research, build, and iterate through prototypes, and then file a provisional patent application.

Left to right, top to bottom:
Motorsports Team | Motorsports Team | Steel Bridge Team | Chem-e Car Team
Hyperloop Team | Invention Factory





Interdisciplinary Research

Students and faculty across disciplines participate in ongoing, large-scale projects supported by special lab facilities and research programs.

THE AUTONOMY LAB is dedicated to interdisciplinary collaboration on designing, innovating, and developing solutions to reimagine our cities and systems as more economically, environmentally, and socially resilient. The lab focuses on areas in autonomous systems, urban agriculture, energy, and transportation, including the annual Intelligent Ground Vehicle Competition (IGVC) where autonomous driving technologies are implemented and tested in a real-world scenario.

THE 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.

THE 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 several major New York City-based hospitals, including the Icahn School of Medicine at Mount Sinai and the 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 60 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.



Life After Cooper

CAREER DEVELOPMENT

The Center for Career Development provides resources and opportunities, including career fairs, mock interviews, and professional workshops to help prepare students for life after graduation. The center also helps connect students with employers, graduate programs, and members of The Cooper Union alumni network.

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, business, and more. Graduates are recruited by global corporations, consulting companies, new ventures, and graduate schools nationwide.

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.

Photos: Ryan Brenizier, Kathryn Gamble, Mario Morgado

Applying

Preparing for admission to The Cooper Union Albert Nerken School of Engineering, prospective students are required to have completed at least one year of physics and chemistry. They should ideally have completed four years of math, including Calculus. Advanced coursework is highly encouraged if available.

UNDERGRADUATE APPLICATION STEPS

- [Common Application](#), including essay and additional writing prompts
- Application fee
- Official high school transcript
- One high school counselor evaluation
- Two teacher recommendations (at least one STEM strongly encouraged)
- English proficiency official test (TOEFL, IELTS or DET), if applicable
- Standardized test scores are not required

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).

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mailing list.**

**Sign up
for an event
or tour.**

**Take a
self-guided
virtual tour.**