



NYU

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Immediate Release

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Record Number of NYC Students and Teachers

Dive into STEM this Summer at NYU Tandon

STEMNOW Brings Teachers and Students from Diverse Backgrounds to Campus for Cutting-Edge Research and Exploration of Smart Cities, Artificial Intelligence, Cybersecurity, Robotics, and More

Groundbreaking 65 Percent of STEMNOW Students Are Young Women

BROOKLYN, New York, Tuesday, July 10, 2018 – In July and August, hundreds of teachers and students will gather in Downtown Brooklyn for the sixth annual [STEMNOW](#), one of New York City’s largest and most comprehensive lineups of summer workshops, classes, and labs — most of them free. STEMNOW immerses middle and high school students and their teachers in science, technology, engineering, and math — the STEM subjects.

STEMNOW kicks off with a luncheon at NYU Tandon on July 12, 2018, 12:30 p.m. featuring [John B. King, Jr.](#), president and CEO of [The Education Trust](#) and a former U.S. Secretary of Education. For more information and to register, please visit: <https://engineering.nyu.edu/summer-stem-rsvp>

Throughout the summer, students will get hands-on experience in fields such as robotics and mechatronics, chemical engineering, smart cities, 3D printing, and cybersecurity. Many will learn the tools top entrepreneurs use to design products, build prototypes, and launch their own companies.

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STEMNOW also teaches New York's teachers. At the conclusion of this summer's program, NYU Tandon will have completed 80 percent of its 2013 [pledge](#) to the White House to educate 500 teachers and positively impact 50,000 public school students throughout New York City by 2023. A record 62 teachers and nearly 850 students will participate this year alone.

New programs will introduce teachers and students to white-hot fields like cybersecurity and artificial intelligence (AI). eCybersecurity may see as many as 3.5 million [job openings](#) by 2021, and demand for workers in AI is on track to create some 2.3 million [new jobs](#) for engineers and data scientists.

One of the new STEMNOW programs, a cybersecurity immersion, gives New York teachers the tools to return to their schools and launch cybersecurity classes and clubs for their female students, preparing them to enter a field [desperately in need of women](#). It will run alongside NYU Tandon's long-running series that introduces high school girls to computer science and cybersecurity, as well as a program on campus by [Girls Who Code](#). The new AI summer program introduces high schoolers to neural networks — a key architecture for AI systems — by teaching them to program radio-controlled cars to function autonomously.

Students and teachers will also have the opportunity to participate in such cutting-edge research as [COSMOS](#), a National Science Foundation (NSF)-funded collaboration to develop, deploy, and operate an advanced wireless research testbed in West Harlem; and [SONYC](#) (Sounds of New York City), a first-of-its-kind comprehensive research initiative to understand and address noise pollution, the number one complaint of New Yorkers.

In all, nearly 20 programs will be offered this summer, reflecting NYU Tandon's longstanding commitment to opening engineering — with its high salaries and many career opportunities — to students from a wide range of backgrounds and economic means.

"STEMNOW exemplifies the spirit of collaboration at NYU Tandon. It is much more than just a summer program; the entire school mobilizes — faculty, students, alumni, and administrators — to help hundreds of students access high-quality STEM education," said NYU Tandon dean [Katepalli R. Sreenivasan](#). "Our goal is to give as many young men and women from diverse backgrounds a chance to discover engineering and science through immersive, hands-on experiences, including participating in high-level lab research. We are proud to empower teachers with innovative ideas and curriculum so they in turn can inspire students to be our future engineers and scientists."

Forty faculty members and 130 undergraduate and graduate students and post-doctoral researchers from across New York University will teach or mentor students in labs as part of STEMNOW.

For middle and high school students, highlights of STEMNOW include:

- [ARISE](#) (Applied Research Innovations in Science and Engineering): A seven-week program designed for **10th and 11th grade students with little or no access to high-quality STEM education experiences, students of color, and those from low-income backgrounds**. Students are mentored by graduate students, postdoctoral fellows, and faculty members, and are immersed in challenging college-level coursework and lab research in such fields as civil and urban engineering, composite materials, robotics, sensors, and protein engineering. Many return to work in NYU Tandon labs during the school year.

- **Artificial Intelligence for Autonomous Vehicles (AI 4 AV):** In this three-week program from computer science and engineering professor and noted AI expert [Anna Choromanska's](#) Machine Learning Lab, students discover one of the most popular deep-learning frameworks and implement their own AI systems to make a radio-controlled car drive autonomously. Students learn about Convolutional Neural Networks (CNNs) and methods of collecting and preprocessing data obtained from vehicles. In the end, every team will be able to apply CNNs to program the autonomous car.
- **CrEST (Creativity in Engineering, Science, and Technology):** In this “camp within a camp,” high school students who were trained during the CrEST spring term work with NYU Tandon graduate and undergraduate students to run a series of one-week workshops for hundreds of middle school students. These summer camps are run by some of the city’s most prominent nonprofit organizations, including [Harlem Children's Zone](#), [Flatbush Development Corporation](#), [Grand Street Settlement](#) and NYU's own [College and Career Lab](#) program. Participants learn about electronics, circuitry, mechanical systems, physical computing, robotics, and other STEM disciplines. For the first time CrEST has also set up specialized STEM labs off-campus at summer camp sites run by [CAMBA](#) and [Horizons National](#).
- **CS4CS (Computer Science for Cyber Security):** This initiative introduces **young women in high school to programming, virtuous hacking, and digital forensics** during an intensive and supportive three-week program designed to encourage them to pursue educational opportunities in cybersecurity. Students become cyber-detectives seeking clues to the mysterious disappearance of Ariana Grande-inspired alter ego [Ariana Venti](#), who vanishes during her big concert.
- **Girls Who Code:** NYU Tandon is partnering with the national non-profit organization dedicated to closing the gender gap in technology and coding and teaching girls how to be change agents in their communities. The program **immerses high school girls in computer science** for projects in art and storytelling, robotics, video games, websites, apps, guest lectures, and field trips.
- **Science of Smart Cities:** In this highly successful program developed by NYU Tandon and shared internationally, **middle school students learn about energy, urban infrastructure, transportation, and wireless communications** — aspects of science and engineering that make cities more livable, efficient, sustainable, and safer. At the conclusion of the program, participants stage a Smart Cities Exposition, demonstrating their ideas, devices, smart buildings, and infrastructure. More than 600 students have completed the program since its inception.
- **ieSoSC (Innovation, Entrepreneurship and the Science of Smart Cities):** Taught by NYU Tandon graduate and undergraduate students, this intensive new program introduces upper middle school and high school students who previously completed Science of Smart Cities to **innovation and entrepreneurship**. After five weeks of hands-on instruction and mentoring, participants enter a three-week team-based workshop to create smart-cities devices or ideas that offer **solutions to urban challenges**.
- **SPARC (Summer Program for Automation Robotics and Coding):** This new, two-week, full-day summer program introduces domestic and international high school students to the basics of robotics, mechatronics, and programming.

- **Tech Kids Unlimited:** Technology can be a great equalizer for those with learning or emotional difficulties. Workshops by Tech Kids Unlimited aim to **provide special-needs students with the 21st-century technology tools they require for success.**

NYU is also offering [college credit courses](#) for high school students who want to get a jump on college-credit courses or simply explore hot fields of study can enroll in a variety of subjects. These tuition courses include **calculus** as well as **Introduction to Engineering and Design**, which provides a working knowledge of contemporary engineering practice and will culminate in designing and building a robot. Others include **Introduction to Cell and Molecular Biology** and **Introduction to Science and Technology Studies**, which explores the relations among science, technology, and society from philosophical, historical, and sociological points of view.

Why STEM Matters at NYU Tandon

A 2018 [study](#) by the Pew Research Center reported that STEM employment grew 79 percent since 1990, and computer jobs saw a 338 percent increase over the same period.

But diversity in STEM professions is not keeping pace: African Americans represent just nine percent of STEM workers, and Hispanics just seven percent. By contrast, nearly 30 percent of STEMNOW participants this year are African American and 14 percent are Hispanic. Eighty-five percent of students who are ultimately served by STEMNOW — thanks in part to teachers who participate in its teacher training programs — come from communities historically underrepresented in STEM disciplines.

STEMNOW also aims for economic diversity: A third of students this summer come from families in which no one has attended college, and more than a third come from households earning less than \$40,000 per year.

The opportunity gap in STEM is not just racial and economic. Nationwide, only a quarter of the labor force in STEM fields are women. According to the Pew research, women constitute only 14 percent of the engineering workforce and a quarter of computer science occupations. According to a 2017 [study](#) by Frost & Sullivan, they fill just 11 percent of global cybersecurity positions.

By contrast, young women constitute 65 percent of this year's STEMNOW participants. STEMNOW reflects the course for NYU Tandon, which has decreased gender disparity among undergraduate engineers. Women make up 42 percent of the class of 2022 – more than 20 percentage points better than the national average for all engineering undergraduates.

Injecting Ethics and Humanities into STEM

STEMNOW infuses science, math, and engineering with humanities and even acting classes:

- **Dimensions of Scientific Inquiry:** Part of the **ARISE** syllabus, this course explores science writing and ethical and moral considerations raised by contemporary research. [Brendan Matz](#), professor of science and technology studies at NYU Tandon and the NYU Gallatin School of Individualized Study, and [Leah Aronowsky](#), a Mellon Postdoctoral Fellow at the University of Illinois at Urbana-Champaign challenge students to think about such issues as the use of autonomous drones in warfare, how race and gender affect research funding and how we set

scientific priorities, and how we teach a self-driving car to make a snap decision about what to collide with when there is no other choice.

- Acting techniques taught by the renowned [Irondale](#) theater company: The Brooklyn-based theater company teaches improvisational acting skills to help students in the **ARISE, Science of Smart Cities**, and **ieSoSC** classes prepare for their final presentations to audiences of engineers, urban planners, businesspeople, and smart-cities experts.

Teaching Those Who Reach the Next Generation

This summer, teachers take part in:

- **COSMOS**: In this six week program school teachers will delve into [COSMOS](#) (“Cloud Enhanced Open Software Defined Mobile Wireless Testbed for City-Scale Deployment”) a collaboration with three universities and several organizations to develop a city-scale advanced wireless test bed in New York’s Harlem neighborhood. Teachers will carry out cutting-edge research in the field of wireless networks with graduate students and develop web-based laboratory curricula that they will use in their classroom in the upcoming year. The program will encourage them to publish or present the curricula at the regional or national level, and materials they develop will be posted online for other teachers to use.
- **Cyber Girls**: This brand new, three-week cybersecurity intensive for high school teachers immerses them in information security fundamentals to launch **cybersecurity clubs and classes for young women at their schools**. Learning side-by-side with CS4CS participants, the teachers in this NSF-funded program participate in hands-on, collaborative activities, join field trips, and hear presentations by female cybersecurity professionals. Back at the six participating schools, NYU Tandon students will help teachers with technical assistance and mentor girls in various activities throughout the year.
- **Discovery Research (DR) for Teachers**: Ten middle school science and math teachers will spend three weeks at NYU Tandon as part of a comprehensive year-round STEM professional development program, funded by a \$2.5 million grant from the NSF DRK-12 program. NYU experts in **robotics, engineering, education, curriculum design, and assessment** make robotics central to and sustainable in the city’s science and math classrooms. Math and science teachers will return to their schools supported by NYU Tandon graduate students. This summer, teachers who previously completed the program return to develop curriculum manuscripts that will be widely shared.
- [ieSoSC-SONYC](#): This unique four-week program immerses middle school science teachers in the NSF-funded SONYC research project. The SONYC team is deploying specialized sound sensors in key locations around the city to analyze ambient noises, from trucks and construction to crowds and bars. After two weeks of helping researchers identify patterns in the noise (and learning skills in data visualization, computer science and more), the teachers will work with student-instructors and a group of 24 upper middle school students, who will have just completed the ieSoSC program to conduct research for SONYC.

- **[ITEST Robotics and Entrepreneurship](#)**: Robotics and engineering drive professional development and educational enrichment for **high school teachers and their students**. Teachers, each joined by two of their students, learn about business planning, new-product development, intellectual property, and fundraising. Students will participate in entrepreneurship competitions, develop working models in STEM, and improve their laboratory skills. At the program's end, teachers will receive a kit of robotics equipment for summer courses that they take back to their schools.
- **[SMARTeR](#)** (Science and Mechatronics Aided Research for Teachers with an Entrepreneurship Experience): This NSF-funded program gives teachers, almost all from public schools, a chance to enhance their STEM curricula with a hands-on, mechatronics-based exploration of **mechanical engineering, control theory, computer science, and electronics**. Participants also learn such **entrepreneurship skills** as business planning, social entrepreneurship and technology, new product development, intellectual property, and fund-raising. During the last four weeks, teachers conduct engineering research alongside graduate and undergraduate researchers and faculty.

STEMNOW receives generous support from [Con Edison](#), [DTCC](#), [ExpandedED Schools](#), [National Grid](#), the [NSF](#), the [New York Building Foundation](#), [Northrop Grumman](#), [The Pinkerton Foundation](#), and the [Siegel Family Foundation](#).

For more information on STEMNOW, visit <http://engineering.nyu.edu/k12stem>. For information on summer credit courses, visit <http://engineering.nyu.edu/highschoolsummer>. To register for Tech Kids Unlimited, visit <http://www.techkidsunlimited.org/register>. Join the conversation at #STEMNOW.

About the New York University Tandon School of Engineering

The NYU Tandon School of Engineering dates to 1854, the founding date for both the New York University School of Civil Engineering and Architecture and the Brooklyn Collegiate and Polytechnic Institute (widely known as Brooklyn Poly). A January 2014 merger created a comprehensive school of education and research in engineering and applied sciences, rooted in a tradition of invention and entrepreneurship and dedicated to furthering technology in service to society. In addition to its main location in Brooklyn, NYU Tandon collaborates with other schools within NYU, one of the country's foremost private research universities, and is closely connected to engineering programs at NYU Abu Dhabi and NYU Shanghai. It operates Future Labs focused on start-up businesses in downtown Manhattan and Brooklyn and an award-winning online graduate program. For more information, visit <http://engineering.nyu.edu>.

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