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Turning High School Students into Cyber Sleuths

At NYU Tandon School of Engineering, summer brings a deep dive into a pool of STEM experiments

By ARDEN PHILLIPS - July 31, 2017



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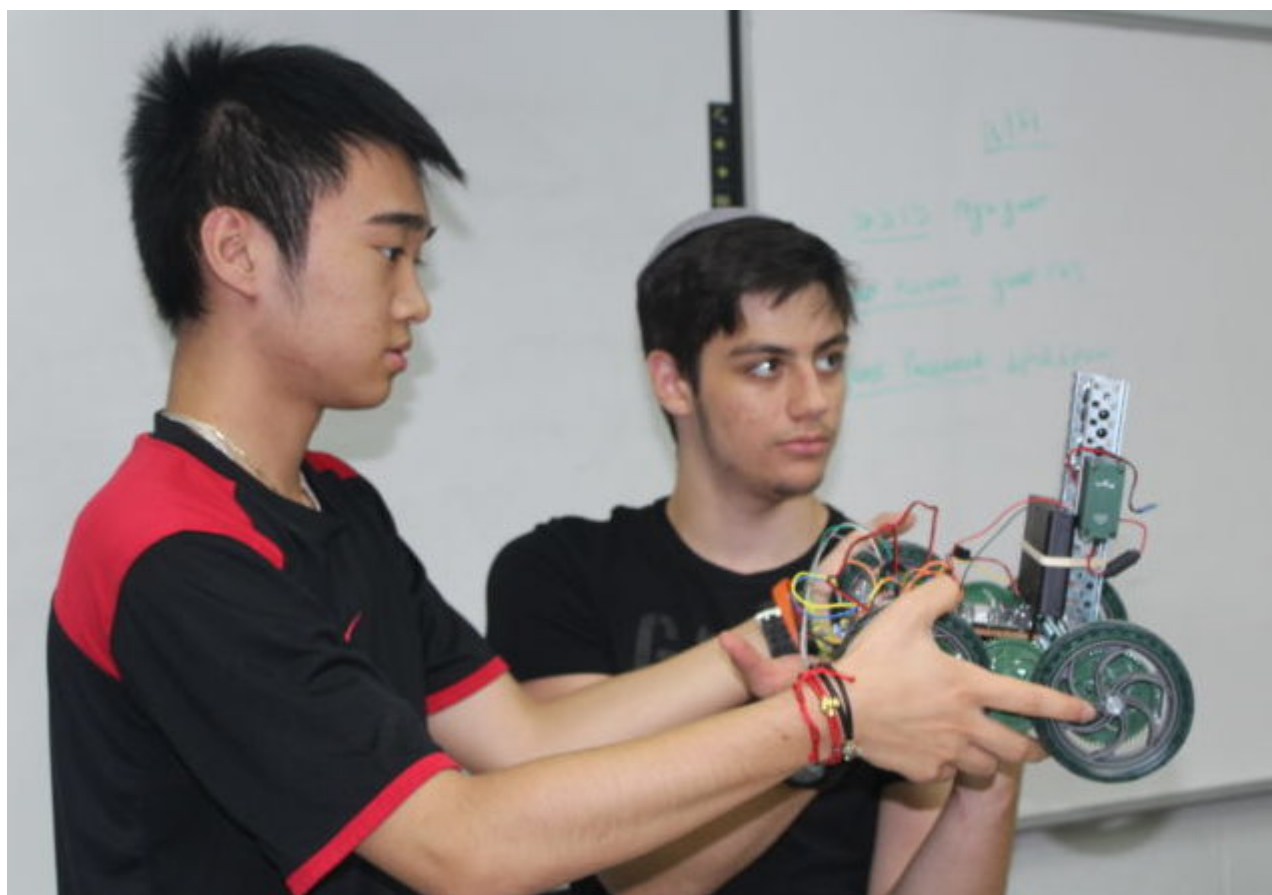


Students in the CS4CS class experience a three-week summer immersion in cyber security (Photo courtesy of NYU Tandon School of Engineering)

When asked about her interest in technology, Beatrice Karp doesn't hesitate for even a moment. The rising senior at Mamaroneck High School in Westchester County is quick to pitch the app she has been developing ever since her freshman year, a sensor-driven program "to optimize the parking-lot experience" at her high school. "I've been working with a mentor through the app-idea process and once I'm done with the entire thing," she says confidently, "I'll enter it in competition this year."

Karp is the kind of self-starting future technologist drawn to a Brooklyn summer program squarely at the intersection of two timely issues: cyber security and women in technology. Along with 44 other young women, she has just completed a three-week course called Computer Science for Cyber Security (**CS4CS**). (<http://engineering.nyu.edu/k12stem/cs4cs/>) at [NYU Tandon School of Engineering](http://engineering.nyu.edu) (<http://engineering.nyu.edu>). "I didn't really know about cybersecurity until this year, but then I heard about it because I'm really interested in the military and the intelligence side," Karp said. "As we increasingly become tech reliant, there needs to be a whole other side of that too, to make sure that things aren't crashed or hacked."

The women-only CS4CS class is part of a larger program at the Tandon school called STEMNow (<http://engineering.nyu.edu/press-releases/2017/06/28/its-summertime-nyu-tandon-invites-nyc-students-teachers-dive-stem>), which this summer is bringing more than 700 middle- and high-school students and 130 teachers to the Downtown Brooklyn campus for deep dives into the STEM subjects (science, technology, engineering and math). STEMNow puts a particular emphasis on diversity and providing hands-on research and experimentation for students whose regular schools may lack those opportunities. (About one-third of the students come from families in which no one has attended college, the school says.) “The program isn’t just speaking and talking, it’s actually doing,” said Vikram Kapila, a Tandon professor of mechanical and aerospace engineering. One such program is called ITEST (Innovative Technology Experiences for Students and Teachers), which matches a teacher with two students and provides the opportunity to learn about both robotics and entrepreneurship.



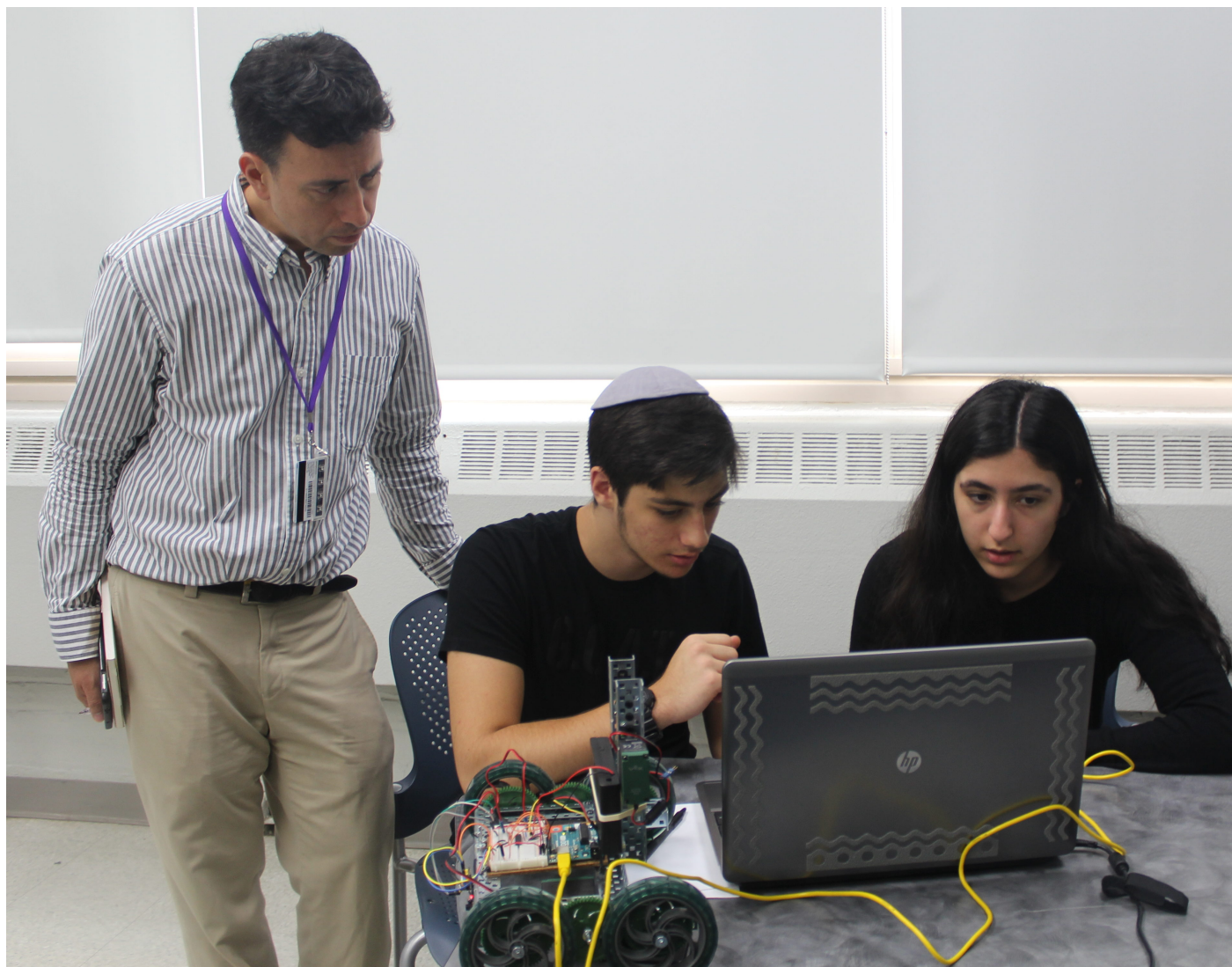
High schoolers in the STEMNow program get hands-on experience in their research subjects, including robotics (Photo by Arden Phillips)

Marking its fifth year in operation, STEMNow celebrated recently (<http://engineering.nyu.edu/news/2017/07/26/fifth-annual-stemnow-celebration>) with speeches from Tandon’s dean, Katepalli Sreenivasan, and New York City schools

chancellor Carmen Farina. “When a youngster is exposed to high-level research in a university lab or encounters a passionate NYU Tandon student mentor,” stated Sreenivasan, “he or she realizes unimaginable possibilities.”

In fact, the “she” pronoun applies to nearly 60% of students in the summer program, a reflection of Tandon’s determination to address the shortage of women in tech fields. Nationwide, only a quarter of the labor force in STEM fields is female, the school says. But the Tandon school’s own performance on that score is considerably better: among this fall’s incoming freshman class, a record 40% are female, vs. a national average among engineering undergraduates of 21%.

The fastest way to bring more gender diversity is in fields that are expanding—and cybersecurity is a prime example, with estimates that it will grow ten times faster than the overall job market. The director of Tandon’s CS4CS program, Meghan Clark, spoke to *The Bridge* about what the program looks like. “Today is our web development day. So they’ll learn about what protections happen in the web,” she said. “Yesterday was our networking day. They’ve learned some basics in Python,” a programming language. Other concepts they learn are virtuous hacking, digital forensics and cyber-detective work.



Collaboration and mentoring are major aspects of the Tandon school's summer program (Photo by Arden Phillips)

The summer class brings together students from all around the Tri-State Area, since a basic requirement is the ability to commute every day. "So girls are really traveling because they feel so passionate about this," said Clark, "and it's wonderful to get to teach them." Bhavika Teli, a rising senior at High Tech High School in North Bergen, NJ, found the CS4CS program while searching the web for information on the subject. "Cybersecurity wasn't a big topic a few years ago," she said, but now it's "a big part of the world. There aren't a lot of camps that are like this."

Alexa Freglette, a rising senior at St. Joseph Hill Academy on Staten Island, is intrigued by how computers actually work beyond the interface. "I've always been interested in everything behind the scenes," she said. "What you see is one thing, but what's going on behind it is what I always wanted to discover." She appreciates the collaborative spirit

of the program too. “The environment here is great because we can play off of each other. Bhavika and I sit next to each other a lot and when we’re coding, we can teach each other and learn as a group.”

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Other programs at STEMNow range from circuit design to urban infrastructure. One of the most substantial is the ARISE (<http://engineering.nyu.edu/k12stem/arise/>) program (Applied Research Innovations in Science and Engineering), which is a tuition-free, seven-week program for 10th and 11th graders who show aptitude but

have little or no access to high-quality STEM experience. Heavy on research, the program pairs the high schoolers with graduate students. In professor Kapila’s Mechatronics laboratory, graduate student Ashwin RajKumar is in the process of developing a rehabilitation tool for stroke victims. The program is centered around the idea of “co-operative rehabilitation” says RajKumar. The app allows users to track their progress and communicate with other, turning rehabilitation into an activity that’s social and even competitive. “Gaming is essential,” said RajKumar, “because rehabilitation is repetitive and this device makes it more engaging.” Combining health care and digital games? That’s a concept his high-school colleagues were happy to embrace.

Arden Phillips is a New York-based writer and a graduate of the S.I. Newhouse School of Public Communications at Syracuse University, where she received a degree in Television, Radio, and Film.



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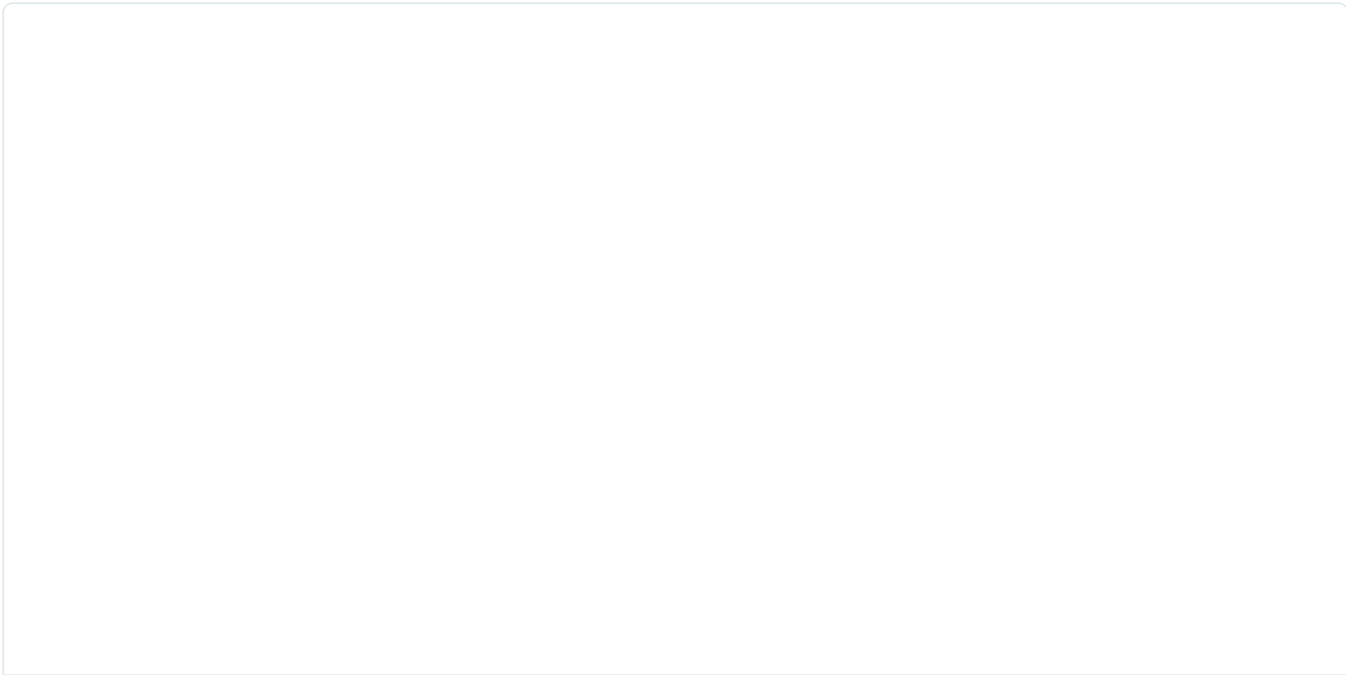
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