

8:30 a.m.



10:30 a.m.



12:20 p.m.

A day in the life of a Summer Academy for Math and Science Student

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hen a glorious summer day graces the skies, many high school students set out to soak up some sunshine. But Daniela Velez, a rising high school senior from Florida, spent a recent sunny day inside, soaking up college-level math at the Summer Academy for Math and Science (SAMS) at Carnegie Mellon. Her day began with a Concepts of Mathematics test, where she puzzled through combinations and permutations, followed by an SAT prep session to brush up on geometry. After lunch, she and her classmates worked on their group project involving game theory, specifically with tic-tac-toe and Yahtzee — putting a heady twist on the childhood classics.

Even as classes finished for the day, Velez wasn't done learning. At 7 p.m., she and a group of her classmates visited their professor during office hours, where they bonded over math puzzles and proofs. "To me, this is like a vacation. I love it," said Velez.



2:15 p.m.

Velez was thriving on the computer science track at SAMS, a six-week residential program for rising high school seniors intending to pursue STEM-related careers. SAMS supports students from groups traditionally underrepresented in computer science, as well as students from lower socioeconomic households and first-generation college students.

Those admitted to the highly selective program receive free room and board, with stipends available for additional expenses. Through rigorous academic instruction, group projects and mentoring, SAMS prepares students to succeed at elite universities and strives to one day bring greater diversity to STEM-related career fields.

But the SAMS experience isn't all game theory and no games. Between classes, Velez played Ping-Pong and then tennis with her new friends from around the country. She also squeezed in an hour of piano practice to prepare for an upcoming statewide music competition back home. In the evening, she and her roommate in Donner House stayed up late talking, bonding over details of their days and their lives back home.

"Before I came to SAMS, I thought everyone was going to be a nerd," Velez said. "Everyone here is really studious, but they are also very passionate and supportive of each other."

This is the second year that SAMS has offered a computer science track. The program only accepted 10 percent of applicants, resulting in a class size of

114. In addition to math, Velez and her classmates also took computer science, as well as other science classes. The effort pays off—graduating students receive college credit for Concepts of Mathematics, usually offered to incoming freshmen at CMU.

By design, SAMS opens up new possibilities for underrepresented groups of students. "This program gives kids the extra academic boost they need to apply to a different set of colleges," said Jonathan Reynolds, outreach project manager for the School of Computer Science.

Velez attends American Heritage School in Plantation, Fla., a private school with strong math and computer science programs. Growing up, she was inspired by her parents, both of whom work in computer science.

But not all high school students have access to those resources—only one in four U.S. high schools offers a robust computer science program, Reynolds said. "We are very intentional in expanding access to those who don't have resources," he said. "We look for other things in applications, such as willingness to learn."



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Rote memorization—plugging in numbers to get the right answers—might be enough to get by in many high school math classes, but SAMS pushes students to use higher-order thinking skills. Iowa State University Professor Michael Young is a math instructor and project director in SAMS, and challenges his Concepts of Mathematics class with a simple question—Why?

"We never really thought about why these formulas exist or how they were derived," Velez said. "We got into the core of math."

Young also found a way to encourage her to do more collaborative work in the classroom. After the first week of class, the professor pulled her aside and suggested that if she combined her ability to solve problems with the skills of others, she would get even more out of her efforts. As she started to engage with her classmates, she quickly realized he was right.

Velez first visited CMU in the fall of her junior year as part of an East Coast college tour. Carnegie Mellon impressed her with its strong programs in computer science and music, two of her passions.

She wants to go into computer science to make society better and use it to work on critical issues such as transportation, communications and education.

At 17 years old, Velez is already on the path to achieving these goals. Before the SAMS program started at the end of June, she visited her grandmother in Colombia and helped set up a computer-based class using games to teach basic math concepts to young girls in an orphanage. In a country where few women study math and science, Velez encouraged the girls to go into STEM fields.

On the last evening of the SAMS program, the students traditionally come together to listen to

each other give presentations about their group projects. Ty Walton, director of SAMS, announced the recipient of the EQT Fellow award, given to the "most promising student" who shows mastery of the material, willingness to help others and passion for computer science for the good of society. When Daniela Velez heard her name called, she beamed as she went to pick up her award.

"I have learned so much, not only from my classes and professors, but also from the people around me," she said. "I am so thankful to have been able to call this positive community my home away from home for six weeks. Thank you for giving me this amazing experience."

Late that evening, she teared up as she hugged her SAMS friends goodbye. The next day, they returned to their homes across the country.

But it won't be the end of their friendships. Since returning home, Velez and her friends have kept in touch by video calling, and she caught up with a few of them in Miami. As they enjoy their last year of high school, this group of friends has already started planning their SAMS reunion. Velez can hardly wait. ■

7:30 p.m.

