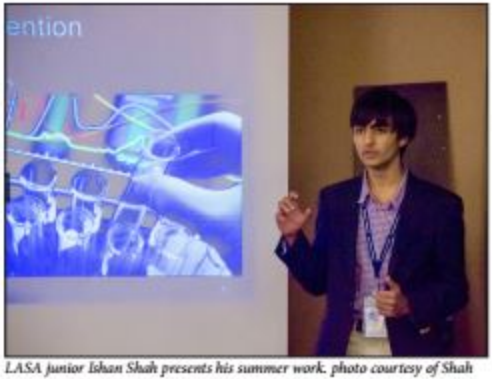
LASA students spend summer working for NASA

Quinn Simpson
Staff Writer

LASA junior Mathilda Nicot-Cartsonis sits in silence, holding her breath as she focuses apprehensively on the computer screen in front of her. Her team members gather around behind her chair, waiting with nearly tangible trepidation for the results of the telescope data analysis. After a brief moment that feels like an eon to the assembled interns, the computer displays the results of the script. Instantaneously, the tension evaporates and is replaced with jubilation that re-energizes the crew of budding NASA scientists.

"I love science, so any kind of science really fascinates me, so this internship really was, I'm not going to lie to you, a way for me not to get bored over the summer," Nicot-Cartsonis said. "I had no idea that I was going to be doing as much stuff as I did."

Over the summer, Nicot-Cartsonis worked in an internship at the University of Texas at Austin Center for Space Research. She and her team analyzed data from NASA's ICESat, or the Ice, Cloud and land Elevation Satellite, which collected two billion ice elevation measurements across Antarctica and Greenland by recording how long it took to reflect laser pulses off the surface of the Earth and back to a receiver on the satellite. Nicot–Cartsonis' team was responsible for figuring out which methods of analyzing the data would work best for different areas of the surveyed land masses. NASA offers students a variety of opportunities to develop their science and research skills, ranging from summer camps to more in-depth internships like Nicot-Cartsonis'.



LASA junior Ishan Shah presents his summer work. photo courtesy of Shah

"There were three methods of analysis of this data to interpret the points and show us changing ice– repeat track, crossover, and overlapping footprint," Nicot-Cartsonis said. "So what my team was supposed to do, and we did, was to create maps of Greenland and Antarctica that showed which method of analysis was best to use in which sections."

Nicot-Cartsonis and her team faced a steep learning curve as they worked together to become skilled in an unfamiliar programming language and subsequently write scripts that could efficiently process billions of individual ice elevation measurements.

"I really enjoyed working with my team," Nicot-Cartsonis said. "We had to create scripts of code in a language called UNIX, so instead of having to apply every process that we did individually onto each point of data we created scripts that we could run mass amounts of data through, and that was really difficult."

LASA senior Connor Kordes also had an experience at NASA over the summer, participating in NASA's High School Aerospace Scholars program (HAS). The program comprised a nine week online astrophysics class and a one week stay with a group of 40 other high school seniors at the Johnson Space Center. Kordes said the one week camp combined presentations from influential NASA scientists, behind-the-scenes tours of notable facilities at the Space Center and hands-on projects that put participants' engineering and teamwork skills to the test.

"There was one [activity] where they just gave us a bunch of random resources, kind of like SciTech, and told us to build something that we're going to drop from 10 meters high or a little bit more than thirty feet, and whatever has the softest impact is going to win– and you can use parachutes and everything," Kordes said. "I don't know, it was really fun just to go through that kind of SciTech phase again and just put my ideas to the test and work with other people."

Kordes is one of two LASA seniors who took part in the HAS program– Ishan Shah also completed the online class and was selected to attend the week-long camp. Along with his team, he worked on projects that applied research in bioastronautics, a field concerned with studying the effects of outer space on living things, to actual problems NASA faces in safely transporting astronauts to Mars.

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"So there are a couple big problems with long duration space missions—one of them is bone decalcification due to the micro-gravitational environment," Shah said. "I designed a bioreactor that could be implanted within a human that would produce a hormone called calcitonin, and so that's what prevents bone decalcification."

While Shah was at the camp, he talked to a visiting researcher who spoke to the participants about bioastronautics. Partly as a result of Shah's work on the calcitonin bioreactor, Gibson offered Shah a summer internship at NASA in the Biomedical Engineering Department. Shah will most likely be screening physiological readings from ISS astronauts and he may also have an opportunity to actually create the bioreactor he designed.

"Potentially I would be creating the bioreactor that... prevents bone decalcification," Shah said. "I would most likely be screening the blood from... Scott Kelly, who's on the space station. Scott Kelly is the person who is going to be there for one year, and his physiology is being measured."

Shah said that he wants to be a cardiothoracic surgeon. Though he is yet to actually create his calcitonin bioreactor, he said that just his experience in designing it at NASA has confirmed his interest in medicine and, more specifically, surgery.

"I wanted to be a cardiothoracic surgeon, and I still want to be a cardiothoracic surgeon, I just think that it has given me a little bit more interest in surgery and in medicine," Shah said. "Because I got to actually see, I got to actually design, and I got to design a structure that could be actually implanted into humans... and so that got me more interested into the surgical side of medicine."

Like Shah, Kordes and Nicot-Cartsonis also came away from their summer experiences at NASA with new perspectives on their future careers. Kordes, who is interested in computer science, said that participating in the HAS program left him more open to engineering as a potential major.

"Well, my main interest is in computer science and I really didn't want to do [the camp] at first," Kordes said. After doing it I think I look at engineering as a much more viable major for me instead of just computer science."

Nicot-Cartsonis, on the other hand, has always wanted to be a doctor for Doctors Without Borders. However, Nicot-Cartsonis says that after her internship introduced her to a plethora of intertwined and intriguing areas of study she's completely reevaluated her future plans.

"I am now interested in aerospace engineering and perhaps geology– glaciology is actually a fascinating subject," Nicot-Cartsonis said. "It radically changed what I want to do. I had always had my mind set on becoming a doctor and a virologist, and working with Doctors Without Borders, and now I'm seriously considering aerospace engineering or some kind of space research."

While Nicot-Cartsonis, Kordes and Shah each had very different experiences at NASA, their unique opportunities convinced them of NASA's importance not only to their own personal development but also to the future of our generation and humanity as a whole. Nicot-Cartsonis elaborated, explaining how internships like hers will stimulate a new wave of interest in NASA research amid flagging funding and public interest.

"I think a lot of people are starting to doubt NASA, we're getting less and less government funding, and they're saying, 'Oh, NASA's going down,'" Nicot-Cartsonis said. "Space science is just starting– there's so much we don't know about the Earth, even, and the solar system, it's ridiculous! There's so much analysis to do, so many things to discover, and I think internships like these are what get people interested."

LASA junior Mathilda Nicot-Cartsonis presents her NASA summer research. photo courtesy of Mathilda Nicot-Cartsonis.