



Satellite engineering student Mehr Bawa, right, with fellow student Brian Coyne of University High and rocket scientist Natalya Brikner, CEO, founder of Accion Systems, which makes satellite propulsion systems

High School Students Reach For Stars Via Engineering

Irvine, Tustin Teams Build Satellites for Launch

By CHRIS CASACCHIA

Irvine High School's fall semester is underway, but incoming senior **Mehr Bawa** had already been hard at work.

The 17 year old is part of a team of about 150 students from the Irvine and Tustin unified school districts on the verge of sending a satellite into space.

Yes, you read that right.

"The great thing about this is it runs year-round," said Bawa in an interview last month with the Business Journal. She's been in the Irvine CubeSat STEM Program since she was a freshman.



Jain: "these kids are hungry for so much more"

Bawa and the rest of the team have even been working on a second satellite, IRVINE02, during the summer break. It's a far cry from shop class. The project, if successful, would be the first high school program in the Western U.S. to launch an operational CubeSat, or mini satellite, into orbit. IRVINE01, the first of many in the pipeline, has already been recognized by NASA as a program to watch.

"It's just been incredible to see what students are capable of teaching themselves and learning," said **Archana Jain**, engineering teacher and CubeSat instructor at Irvine High School.

If it wasn't for multiple flight delays beyond its control, IRVINE01 would have been in orbit last year, taking images of nearby stars and planets while communicating information back to Earth.

It was packed onto a loading vehicle operated by Irvine-based **Tyvak Nano-Satellite Systems Inc.** in June and shipped to New Zealand, where it will hitch a ride later this year—barring any further setbacks—on the first commercial launch of

Huntington Beach-based **Rocket Lab USA.**

"Each of these kids are hungry for so much more. It's a great program that really pushes them to the limit," said Jain, an engineer by trade and one of eight teachers providing guidance and real-world mentorship to students, who defend their projects to engineers at NASA, **JPL** and **Northrop Grumman.**

NASA Specs

The satellites they build from off-the-shelf products must pass rigorous testing, including "shake and bake" vibrations and thermal capacity.

Each of the six high schools in the program has its own mission:

- Beckman High School: avionics
- Woodbridge High School: communications
- Northwood High School: power
- Irvine High School: propulsion
- University High School: primary scientific instruments
- Portola High School: biotech

The Irvine CubeSat Program is funded by the **Irvine Public Schools Foundation** and sponsorships and donations from the likes of **Microsemi Corp., Five Point Holdings LLC, Google, NASA** and **Ingersoll-Rand PLC.**

Jain worked at the U.S. Department of Defense in Maryland, and at **Rockwell International**, splitting time between its Seal Beach and Downey locations.

"It was fun to think about doing something that brings me back to my original interest and roots," said the former aerospace engineer.

Long View

One of the program's underlying goals is to build a qualified workforce in science, technology, engineering and math, or STEM, with an emphasis on creating opportunities for underrepresented groups, including women and minorities.

"Both of our IRVINE01 and IRVINE02 programs are comprised of 50% females, which is pretty huge for a STEM program,"



Fine-tuning: Bawa and former Northwood High student Lauren Seelig practice building mechanisms behind antenna deployment

Satellites

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Jain said.

Bawa, who plans to focus on STEM curriculum in college and eventually attend medical school, has been working on propulsion applications for IRVINE02 for months, completing frame machining and wiring, which are scheduled for a December delivery to Northwood High School for the power features.

IRVINE02, designed to teach optical communications by transferring data at a faster rate than radio from orbit to Irvine, is one of 34 small U.S. satellites selected to partici-

pate in NASA's CubeSat Launch Initiative and fly on its 2018 mission.

Bawa and her team have had some big setbacks.

The program held an event June 22 at Portola High School to watch the live take-off of Rocket Lab's "It's Business Time" and to celebrate the final milestone of assembling, testing and launching a nanosatellite into space. The launch was pushed to November after the company identified a motor controller issue on the vehicle.

"It was a little disheartening," Bawa said. "We're all about making sure it's perfect. We don't want any inaccuracies. You get up and move on." ■