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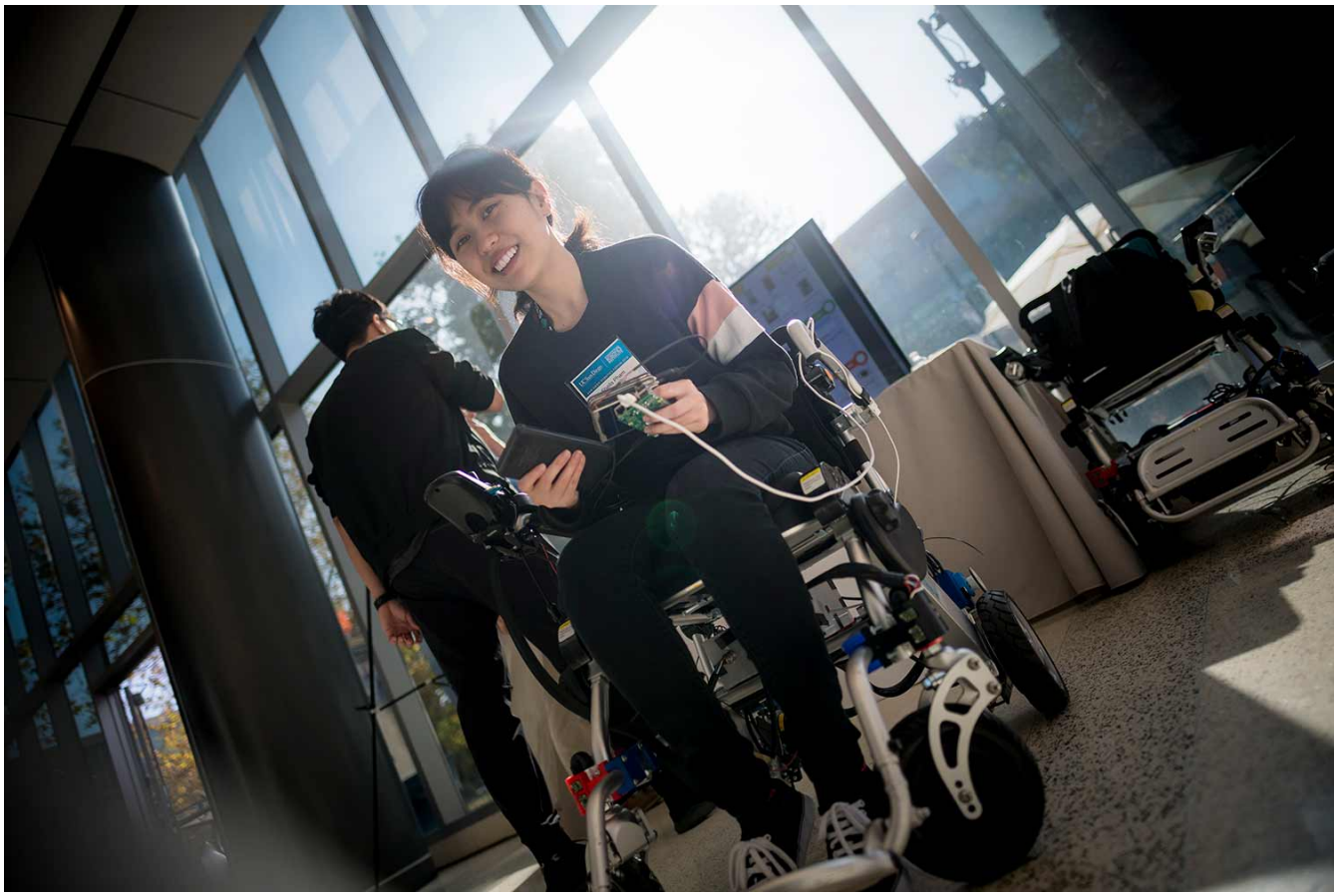
By Ioana Patringenaru Nov 14, 2019



Computer engineering student Sheila Pham demonstrates a smart wheelchair developed by a group of undergraduate students at the Jacobs School of Engineering. Photos by Erik Jepsen/UC San Diego Publications

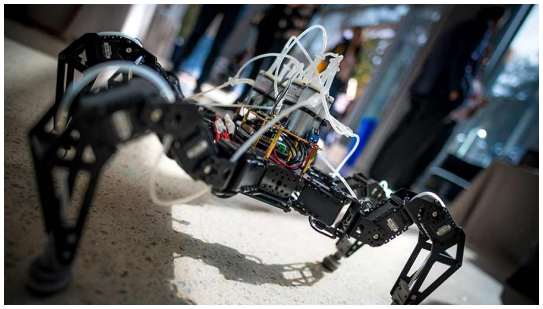
UC San Diego Alumni Power San Diego Robotics Ecosystem

Local companies, alumni took part in the San Diego Robotics Forum on campus

From companies worth billions of dollars to startups employing a small number of people, UC San Diego engineering alumni are at the core of the robotics ecosystem here in San Diego County.

This was clearly evident at the sixth annual robotics forum organized by the UC San Diego Contextual Robotics Institute Nov. 7. The forum focused exclusively on local companies this year and was dubbed the San Diego Robotics Forum for the occasion. The goal was to showcase the breadth and depth of

the region's robotics strengths, and solidify San Diego's reputation as Robot Beach.



This robot developed by mechanical engineering professor Nicholas Gravish and colleagues can walk over rough and varied terrain.

"We have an important mission here to showcase how strong San Diego is in the area of robotics," said Henrik Christensen, director of the UC San Diego Contextual Robotics Institute. "We have all these amazing companies in San Diego."

UC San Diego plays an important role in the local economy, both by providing engineers and computer scientists for the workforce, and by making discoveries that can be licensed by industry, said Denine Hagen, assistant dean at the Jacobs School of Engineering at UC San Diego.

"We are very proud of our role of delivering talent, leadership and technology that fuels our local economy," she said.

In order to best prepare students to meet the demands of the local and global robotics industry, the Jacobs School is launching a new robotics master's degree program in summer 2020.

The robotics community in San Diego is already thriving and growing, forum speakers said. Many companies are led by or employ UC San Diego alumni.

Postdoc Cedric Girerd shows how a prototype for a new tool for robotic surgery could be used. Girard works with mechanical engineering professor Tania Morimoto.

The San Diego Robotics Club has 1,600 members, making it the fourth largest robotics club in the nation. It is led by UC San Diego alumnus Hansol Hong, who is also the CEO of Robolink. The startup builds robotics kits that teach students programming and artificial intelligence skills. The kits are used by about 1,000 schools across the nation, and many of Robolink's instructors in San Diego are UC San Diego engineering students. Robolink's goal is to help teachers give students the STEM skills they need, starting in elementary school. "We are trying to hand down skills that are needed in industry," Hong said.

At TuSimple, a company with more than one billion dollar valuation, dozens of UC San Diego student interns and full-time engineers have worked on the firm's autonomous trucking platform. The company's senior director of technology is UC San Diego alumnus Chuck Han, who earned bachelor's

degrees in computer engineering and economics and a master's degree in computer science here.

The company is working toward self-driving trucks and has revenue-generating projects in Arizona, New Mexico and Texas today. TuSimple uses cameras predominantly with AI to allow its truck to navigate roads and highways without driver input. "The goal is to have driverless vehicles by 2021," Han said.

Mechanical engineering Ph.D. student Saurabh Jadhav shows off a robot built without any electronic components and developed by the Bioinspired Robotics and Design Lab.

VectorZero is led by computer science alumnus Steven Rotenberg, and provides software that allows car companies, for example, to build 3D road simulations to train autonomous vehicles. The company, headquartered in Carlsbad, has 14 employees, more than half of whom are UC San Diego alumni. It also has more than 50 customers in the autonomous vehicle space.

"The road to autonomous vehicles will involve millions and millions of hours of simulations," Rotenberg said. Many of those hours will be performed on Vector Zero maps.

Lytx provides machine vision and artificial intelligence-powered video telematics solutions to help commercial and public sector fleets improve safety, efficiency and productivity. Stephen Krotosky is a UC San Diego alumnus and manager of applied machine learning for the company. About 80 percent of Lytx's AI engineers were educated at UC San Diego, he said, as was the firm's CEO Brandon Nixon, a computer engineering alumnus.

"We want to comprehensively understand what the driver is doing and how they interact with the road so we can give the driver feedback that will help them understand and improve their driving behavior," Krotosky said.

Other alumni taking part in this year's San Diego Robotics Forum included engineering alumna Gioia Messinger, a board member and executive consultant at Kelzal, a leading developer of third-generation neural network-powered vision sensors for high performance object and activity recognition with applications in surveillance, autonomous vehicles and mobile robots.

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Companies with alumni in leadership positions also took part, including NXT Robotics, which provides service robots to support security needs. Accel Robotics, cofounded by bioengineering alumnus Marius Buibas, builds check-out free convenience stores and employs many alumni.

This year's event included talks and panels on empowering people; drones for security and defense; autonomy in transportation; and artificial intelligence at the edge.

Graduate students from many robotics labs demoed various technologies in a wide range of fields, from healthcare robotics, to soft robotics, to drone and autonomous vehicles.