

Adrian Rivera
Class of 2016

Adrian Rivera's never-ending quest to find out how things work made the 2016 Morton College graduate a natural fit on a 12-member team from Illinois Tech that finished third at NASA's eighth annual Robotic Mining Competition at the Kennedy Space Center in Florida.

Teams consisting of undergraduate and graduate students from more than 40 colleges and universities across the nation showed off their excavating prowess during the three-day competition held the week before Memorial Day in May of 2017.

The teams had to design and build either remote-controlled or autonomous excavator robots that traversed a simulated Martian terrain, scoop up the dirt and return it to a deposit bin within 10 minutes, according to NASA's web page.

On top of mining the most resources, the teams were graded on such things as the robot's use of bandwidth and energy consumed. The teams had to come up with a dust tolerant design.

One part of the team stayed behind at "mission control" to control the robot while the other half maintained contact through walkie-talkies on the terrain.

The competition is a NASA Human Exploration and Operations Mission Directorate project designed to engage and retain students in science, technology, engineering and math or STEM fields by expanding opportunities for student research and design. The project provides a competitive environment to foster innovative ideas and solutions that could potentially be used on NASA's journey to Mars.

"This project helped with getting hands-on experience," said Rivera, who is starting his senior year at Illinois Tech. "Projects like these are very beneficial."

The Berwyn resident, who received his Associate in Liberal Studies degree from Morton College in 2016, said this was a year-long project with the planning process starting his first semester at Illinois Tech last fall.

The team was put together by recruiting students and friends through classes and other events. Once the team was assembled, they created a list of materials needed to build the robot.

The fall semester was devoted to contacting companies for sponsorship and discussing design ideas.

"We needed to get funding to build the robot," said the Morton West graduate. "We had the help of a professor who helped us with that. With 12 of us, it took a lot of organization skills to build it."

The next semester was dedicated to finalizing the design and bringing “Lofty,” the robot’s nickname, to life.

“Even after spring classes were over, most of us were still putting in 15 to 30 hours per week in the lab fixing the problems we had with ‘Lofty,’” Rivera noted. “Every time we modified some part of ‘Lofty’s’ code or mechanism, it presented us with a challenge because of the changes.”

With “Lofty’s” size, airfare for the robot was out of the question. Rivera said “Lofty” weighed a little over 100 pounds with dimensions of 35 inches in length, 29.5 inches in both width and height. So a 1,200-mile drive was the only way to get “Lofty” to the Kennedy Space Center, which is near Orlando.

“The Space Center was pretty cool,” Rivera said. “They gave you badges, so you had access to all the areas. All the teams could use NASA’s machine shop and their machinist, who could cut a bolt to a certain size if you needed.”

The team ran into some technical difficulty with “Lofty” the night before the competition.

“One of the belts was falling off,” Rivera said. “We wound up going to Home Depot and started brainstorming – ‘how can we fix this?’ We added a third wheel and sewed a piece of plastic on the Kevlar to keep the tracking in place.”

Rivera is an electric engineering major at Illinois Tech. As a child, he’d put his belt buckle into an electric socket and wonder why he got shocked. His parents would buy him toys and instead of playing, Rivera would take them apart. As he got older, Rivera built his own computer for video-gaming purposes.

“Adrian was an excellent student,” recalled Morton College instructor Craig Casey who taught Rivera in engineering, physics and computer programming courses. “He’s accomplishing a lot and representing Morton College well as a transfer student. I know he’ll succeed in his future academic and career goals.”

Rivera did a robotics internship with the after-school programs at Berwyn’s Freedom and Heritage middle schools. He felt his time at Morton College, especially with instructors Casey and Carlos Dominguez, was very beneficial.

“It opened a lot of doors,” Rivera said. “With Mr. Casey, we were introduced to circuitry in his physics class. A C++ programming class helped me with understanding computers and what they’re capable of. Mr. Dominguez was a huge help as well. He always pushed me and told me to never stop learning.”