RoboBronc becomes inventor

Jackson Hole student works on wheelchair robot at the University of Wyoming.

By Brielle Schaeffer

LARAMIE — Until Carter Schultz's sophomore year in high school, he aspired to be a musician. He played guitar obsessively and even practiced audition pieces for the Juilliard School.

But then he stumbled upon the Jackson Hole High School robotics team.

Joining the team was "the best decision I ever made in my life," he said.

Now a sophomore at the University of Wyoming studying mechanical engineering, Schultz works with technology as a job.

When he isn't studying or playing gigs with his coffee shop rock band, Clear Stone Nation, he is building the future.

"Guitar is my hobby," he said. "Robotics is my life."

Through an undergraduate research grant, the 19-year-old is trying to design an affordable motorized wheelchair that people who are severely disabled can control with a touch screen that displays a map.

Aiming high on a shoestring budget

The wheelchair is meant for those who cannot operate a conventional joystick, Schultz said.

"It's never been done before on a shoestring budget," he said. "We do have plans and are figuring out a system [for the wheelchair] to map its own environment."

Typical autonomous wheelchairs cost thousands of dollars. Schultz, building on work done by other students over the years, is trying to make a wheelchair at a fraction of that price.

"It's modeled similar to the way a car is modeled," Schultz said. "Several systems each do a separate task, and then they are networked together."

He is trying to get the systems used for the chair — analog for motor movement and digital for processing — to work together.

"That's my portion," he said, "to try to get disparate elements working."

So far, they haven't been. The wheelchair has been propped up on cinder blocks in the fifth-floor lab of the university's engineering building while Schultz fine-tunes the touch screen and microcontroller. He wasn't concerned that the chair hasn't been moving, however.

"The ideal objective at the end of the semester would be to see this thing roll for the first time," he said.

When the touch screen for the chair was not working, Schultz and other engineering students thought interference was the issue. But it turned out it was a glitch with the touch screen.

"It took three weeks to find out that was the problem," Schultz said. "The devil's in the details, and there's enough of them in a system like this it's hard to get it right. If one wire breaks it won't work, and I have to find the broken wire."

Robot building sets education path

Schultz ended up writing code to adjust how much pressure the touch screen needed to respond. He also had to build all the fonts for the controller.

"You don't have Windows to do all of that for you," he said.

One chip in the touch screen's computer "has more processing power than all of the U.S. in WW II," Schultz said, "but to be able to use that processing power is tricky and difficult to write code. ... The whole system is a big puzzle."

It's a puzzle and a full-fledged robot. That's what keeps his attention. Schultz chose to study mechanical engineering to further his education in robotics.

"You need to be a master in every discipline to build a robot," he said.

He has solid backgrounds in computer science and electrical engineering. Those would've been easy choices for majors, he said.

"Mechanical [engineering] was a hard choice," Schultz said.

To work in robotics requires several higher education degrees. Schultz chose to attend UW, he said, so he would be able to afford to pursue a doctorate.

He's getting many research opportunities in Laramie. Aside from the wheelchair project, he has a job with the mechanical engineering department creating an application to distribute weather information from a meteorological tower to the public.

"It's a hectic college life," Schultz said.

Being the captain of his high school robotics team, the RoboBroncs, shaped who he is, he said. It helped him get internships with Square One Systems Design, a robotics development company in Jackson.

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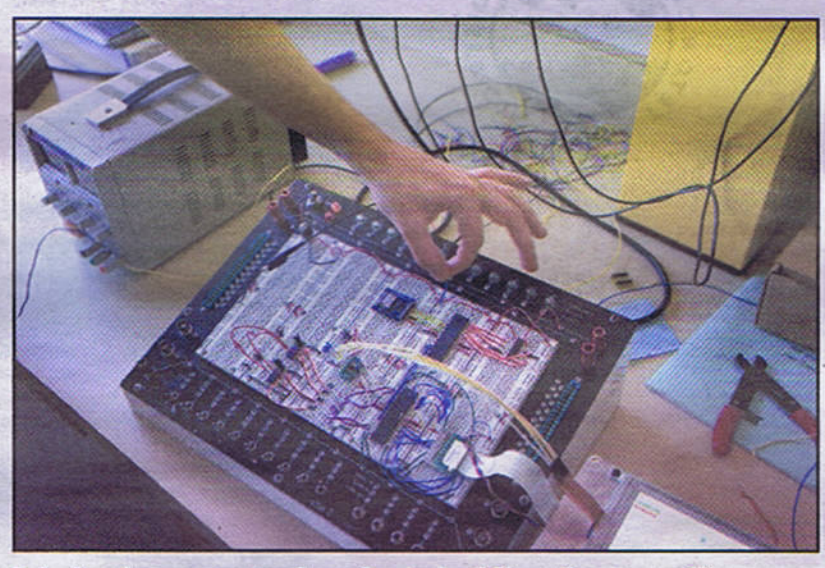
Carter Schultz, in a lab at the University of Wyoming's engineering building, explains how he hopes an autonomous wheelchair he is designing would work. The 19-year-old sophomore became interested in robotics through a program at Jackson Hole High School.



Schultz demonstrates how he is building the controlling computer for his wheelchair. He hopes to incorporate a touch screen interface to aid severely disabled people who can't use a conventional joystick.

Schultz still mentors the team, checking in with regular phone and Internet meetings. He is planning to attend the Salt Lake regional robotics competition with the high school during his spring break to help team members, he said.

Gary Duquette, RoboBroncs advisor and Jackson Hole High School math teacher, said Schultz was an amazing leader on the team.

"He spoiled us," he said. "He has a great sense of humor. He's fun to be around. He's a kid that everybody liked."

Schultz also is extremely talented, Duquette said, and loves to learn and figure things out.

"Of all the kids you meet and all the kids you see, he's a kid that can be anything, do anything," he said. "He's the next great inventor."

Schultz directly relates his success to the RoboBroncs. The program "gave me the interest, curiosity and drive," he said.

And the drive to seek out the undergraduate opportunity that really could make a difference.

The research enables him to "learn and experiment with robotics that actually matters in the end," Schultz said. "It impacts someone's life."