



CIWRO scientists empower teens in robotics competitions

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By day, Travis Smith leads a team of meteorologists working to improve the quality of warnings for severe convective weather events. By night, he leads a team of teen engineers building robots to engage their community and play a fierce game of basketball.

Smith is a senior research associate at the Cooperative Institute for Severe and High-Impact Weather Research and Operations (CIWRO). With nearly 30 years with the institute, he guides the work of its Warning Research Division. But it's his volunteer work in youth leadership that drives his evenings and weekends.

Smith mentors Team OKC, a club made up of high school students who participate in the FIRST Robotics Competition. In their workshop housed at Science Museum Oklahoma, these kids design robots to solve problems and recently traveled to the world championship in Houston.

Smith's involvement in team robotics began as he and his daughter began experimenting with a robotic LEGO set. They saw a television program on the FIRST Robotics Competition and were hooked.

“We watched the special on TV, my daughter's like, 'Oh, we got to do this.' We started looking around for a team for her, and we couldn't find one. And so naturally, when that happens as a parent, you end up volunteering to do it yourself,” Smith said.

Twelve years ago, Smith rallied to begin a robotics club at his daughter's school. Then during the pandemic, he led other students and parents to form Team OKC Robotics, an open club that invites any interested young innovator to join, regardless of school affiliation.

Members of Team OKC log about 12 to 20 hours a week for 12 weeks starting each January to design a 150-pound industrial robot to compete in that season's new game, which is played by robots in a three-on-three competition on a basketball court-sized area. The team uses a computer-aided 3-D modeling program to design the robot, which starts out as a drive base that resembles a large Roomba. It's up to the students to customize the robot with apparatus to score points in the game.

However, the team integrates skills beyond science, technology, engineering and math. Creativity is encouraged, as is resourcefulness.

“If you have a kid who has an idea, for instance, for a part that's kind of funky and it has some holes on the side to bolt it on and it makes everything fit together perfectly well, maybe they can 3-D print that. We had some parts this year that they designed and wanted cut out of aluminum. I was able to walk their design over to the Innovation Hub. They've got a waterjet that cuts metal very quickly and nicely,” said Smith, who praised the students for securing other generous sponsors, including NASA, Boeing, Love's Country Stores and the Gene Haas Foundation.

Team OKC, only in its second year, won the Judge's Award at the world championship for their outreach efforts. Its robots have performed during Oklahoma City Thunder basketball games, as well as for the Oklahoma City Dodgers. The team even costumed a robot as a rat to scurry about the stage for the Lyric Theater production of “Shrek the Musical.”

“In Houston, the judges were super impressed with the fact that the students were working with the museum on all this stuff. It's pretty rare to have a team that's making such a large impact on their community that they're getting recognized for it,” Smith said.

Other CIWRO scientists and recent CIWRO student employees also mentor student engineers on Team OKC. Vanessa Dunham and Justin Kleiber, who both worked as undergraduate research assistants in the Warning Research Division, assisted students to perfect their oral presentations and programming skills, respectively. Noah Zemlin, a member on CIWRO's Radar Engineering and Development Team, helps students with the programming and computer engineering parts of the robots on Team OKC. He also serves as a mentor on the University of Oklahoma's robotics team, Sooner Competitive

Robotics. Zemlin said team robotics challenges spur tremendous growth in his high school students.

“One student on the programming team on Team OKC stands out and is one of those students who works tirelessly all season long,” Zemlin said. “That student was so excited to learn more about robotics and programming that he participates in the college-level programming challenges we create for the college robotics team. His programming skills grew exponentially because of the program, and he is now enrolled as an incoming freshman to OU to study computer science.”

Smith echoes the positive impact that real-world engineering challenges have on the students, not just in strengthening STEM skills, but also in building leadership and self-confidence.

“We have multiple jobs on our team, so it's more like running a small business - almost like a tech startup,” Smith said. “What you see at the end is these kids who just transform over the course of a four-year period. You see some kid who was super timid and barely able to talk to anybody, and now they can tell you all about the robot that they built.”