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WKU engineering students showcase work at expo on campus

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From left to right: Western Kentucky University seniors Savannah Bell, Emily Sage and Hunter Gipson pose wit space debris-collecting robot, which they designed as part of an engineering competition. The students showed work at an engineering expo on campus Wednesday, May 8.

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Picture this: The year is 2069. Mars has been successfully colonized and there's regular space travel between Earth and the Red Planet.

But there's a one big problem – a buildup of space junk that makes travel between the two worlds treacherous. That's where a robot designed by engineering students at Western Kentucky University comes into play.

On Wednesday, WKU seniors Savannah Bell, Emily Sage and Hunter Gipson showcased a small, boxy robot they created to collect space debris for a competition that posed the scenario as an engineering challenge.

The students were among many others sharing their engineering projects, some of which took months to create, during an expo in WKU's Complex for Engineering and Biological Sciences and College High Hall.

"We had a lot of issues with the size constraint," said Sage, referring to a competition rule that required the robot to fit within a spatial footprint of no more than nine inches long, nine inches wide and 11 inches high.

Initially, the team wanted to design a robot that could collect a dozen pieces of debris and sort them with an intricate internal system.

But once they set to work drafting the designs in a 3D modeling computer program, they got a reality check.

"We realized that that was kind of absurd," Sage said.

Bell agreed.

“It was hard to figure out how to account for the footprint as well as to incorporate the space for debris once you had picked that up,” she said.

“I’d say the biggest part of it was project management and timeline management,” Gipson added.

Still, the students managed to put something together in time for the competition in Huntsville, Ala.

While the team focused on developing the robot’s ability to detect debris color and sort it accordingly, hoping to capitalize on a provision that rewarded that capability with bonus points, other teams took a different approach. Sage said other teams developed robots that could quickly orbit a central point, which amounted to a pretty successful strategy for a lot of teams despite it rewarding fewer points.

“It was also interesting to see that other people had a very different take on the competition,” Sage said, describing the atmosphere as friendly despite many students competing.

Another group of engineers at the expo confronted a more earthly design problem: how to keep a noisy washing machine from vibrating too much.

Inspired by a request from Samsung for help reducing vibrations in one of its washing machines, seniors Will Goodman, Parker Howell, Mohammed Almubarak and Kyle Martens took on the project.

The team started with 3D modeling and drew on the experience of Howell, who was the only student in the group that had in-depth experience studying vibrations through an elective course.

“A lot of our time was spent understanding the project,” Goodman said.

The students developed a computer simulation, and that’s when they had a breakthrough.

“If you add a secondary spring to this ... you can actually reduce vibrations quite substantially,” Goodman said.

The team designed a spring system that would push down on the machine, which Goodman describes as a proof of concept to allow further research. The entire machine is framed with aluminum bars for support.

“We found out that our design reduces the vibration by about 60 percent,” Goodman said, adding the group initially anticipated only a 15 to 20 percent decrease.

For Goodman, that shows the project has a lot of room to grow.

For Howell, the project came together well despite a tight deadline.

“We really weren’t even sure we were going to have it finished by the end. We kind of came in just to piece it together a lot quicker than we anticipated,” he said, adding the easily attachable aluminum bars helped immensely. “It really turned out really well for the time frame we had with it.”

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