Local university team is top scorer in math competition on self-driving cars

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A University of Puget Sound team was one of the top-scoring teams in an international math competition using modeling to predict traffic flow if self-driving cars were widely adopted.

By Katherine Long

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A team of math whizzes at the University of Puget Sound provided a top-rated answer in a mathematics-modeling competition that required them to examine how self-driving cars might affect traffic patterns in Greater Seattle.

Their answer? If their model is correct, self-driving cars could help lessen traffic jams.

Three students — Jordan Fonseca, Jesse Jenks and Matthew Moreno — applied mathematical-modeling skills to compete with 1,527 student teams across the globe participating in the international Mathematical Contest in Modeling.

Their answer in the online competition placed them in the top 11 teams — seven Chinese teams and four American teams — whose answer scored "outstanding" or "finalist" on the math problems.

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The students proposed an answer to impact on traffic flow if self-driving cars took to the streets on major highways in Thurston, Pierce, King and Snohomish counties. The students were provided with real-world data and created a mathematical model that could be used to answer questions about how traffic would be affected.

Their answer, which was 22 pages long, used a macro, or big-picture model and a micro, or low-level one, to capture the impact of self-driving cars on the road, said their adviser, Puget Sound math professor Mike Spivey.

Their models showed that at high traffic densities, traffic delays would decrease when the number of self-driving cars on the road increased. The team's model also showed that if the concentration of self-driving cars were to rise above 5 percent, a car lane reserved for self-driving cars only — on roads with three or more lanes — would reduce travel delays for both human-driven and self-driving cars.

The team's answer included a letter to Gov. Jay Inslee that summarized their findings. "Our simulation suggests that when self-driving cars impact traffic flow at all, they improve roadways for everyone, not only for the owners of self-driving cars," they wrote.

The students also raised some caveats. Their simulation was limited, they said, and didn't take into account a variety of other issues — including changes in traffic volumes over the course of a day, the effect of bad weather on traffic patterns, even the psychological effects that the presence of self-driving cars could have on other motorists.

"Their paper covered the complete modeling process well," said Spivey, who has been advising the math-model team for 10 years and served as a regional judge for two years. "It was well-written, with clear explanations and clear recommendations. Combining a macro and a micro model was a good idea, too, as it allows you to look at the problem from two different angles."

The competition is run by Consortium for Mathematics and its Applications. Students could choose one of three problems to solve, and they had four days to come up with their answer — which included constructing and testing the models and writing everything up.

A second Puget Sound team, made up of Leslie Joe, Rachel Hirsch and Henry Woody, also did well, scoring a "successful participant" rating on a different problem.

Spivey said he thinks the liberal-arts college does a good job preparing students not only to be good mathematicians and scientists, but also to explain the math and science behind their ideas.

“A large part of this competition is not just constructing a good model,” he said, “but also explaining it well.”

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