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# OU Summer Mathematics Institute alums gear up for international competition

Each year, exceptional high school students descend on Oakland University's campus to take part in its Summer Mathematics Institute (OUSMI). The six-week program offers students the chance to study advanced math concepts and receive college credit. Two recent OUSMI participants are preparing for an international competition at which they will present a research project that started at the Institute. Troy High School juniors Justin Xu and Dhruv Medarametla collaborated on a graph theory project, studying the structural properties of a class of networks known as 2-Bijective Connection Networks, or 2-BCNs.



*Troy High School students Dhruv Medarametla (left) and Justin Xu prepare for an international competition with guidance from OU mathematics professor Eddie Cheng.*

"A network is just a collection of nodes with links connecting these nodes. So, in our project, we essentially created a new, versatile type of network and found out what happened when we deleted many nodes or links from it," Medarametla explained. "Our results showed us that it was an extremely strong and resilient network."

The pair qualified for international competition after being named "Best Team" at the Science and Engineering Fair of Metro Detroit. The honor earned them a chance to compete at the Intel International Science and Engineering Fair, the world's largest international pre-college science competition, which will take place May 10-15 in Pittsburgh. They will present a poster of their research to a judging panel of industry professionals and university faculty. More than $5 million in prizes is up for grabs, according to the event **website.**

Xu and Medarametla are eager to compete against students from around the world and both say that attending OU's Summer Mathematics Institute has deepened their enthusiasm for the subject.

"I really liked the attitude toward math that was prevalent there," said Medarametla, who attended the institute in 2013. "It encouraged me to explore and study new, exciting branches of math that I had never considered before."

Xu, who attended the institute in 2014, said, "I learned a lot about number theory that I didn't know before. Some of the theorems I apply to mathematics now."

Along with their success in competition, the pair recently published a paper on their research in two refereed mathematics journals, "Congressus Numerantium" and "Parallel Processing Letters," and also presented their findings at the 2015 Southeastern International Conference on Combinatorics, Graph Theory and Computing.

Tracing its roots to an OU summer math camp from the 1970s, the OUSMI has attracted hundreds of the area's brightest and best high school students. It is funded through an anonymous donor's generous gift, which covers tuition costs for two undergraduate mathematics courses, lab activity, books and tutoring, counseling and on-campus expenses.

OUSMI Director Eddie Cheng says the Institute gives exceptional students a chance to challenge themselves among equally bright peers.

"They are really smart," Dr. Cheng says of the hundreds of students who have participated in the Institute. "They come here, and they are surrounded by students who are as talented as they are. They grow with each other, challenge each other and work together on projects."

Learn more about OU's Summer Mathematics Institute at **oakland.edu/mathematics/OUSMI**.