

# Eclipsing binary stars discovered by high school students

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Artist's impression of an eclipsing binary star system. As the two stars orbit each other they pass in front of one another and their combined brightness, seen from a distance, decreases. Credit: European Southern Observatory/L. Calçada

Two Dallas high school students discovered five stars as members of a Southern Methodist University summer physics research program that enabled them to analyze data gleaned from a high-powered telescope in the New Mexico desert.

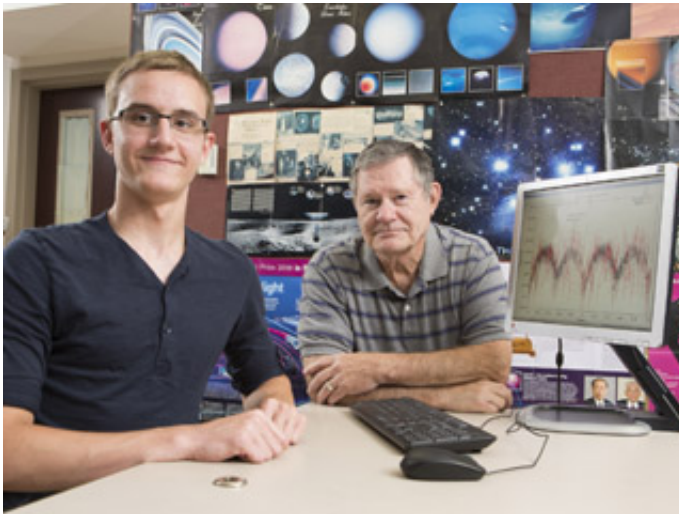
All five [stars](#) discovered by Lake Highlands High School seniors Dominik Fritz and Jason Barton are eclipsing contact binary stars, pairs of stars that orbit around each other so closely that their outer atmospheres touch. As the stars eclipse, they dim and then brighten as one emerges from behind the other. These stars are categorized as variable stars, stars that change brightness, which make up half the stars in the universe.

Fritz and Barton are the first [high school](#) researchers at SMU to discover new stars. The stars discovered by the students are located in the northern sky constellations of Pegasus and Ursa Major, but they can't be seen by the naked eye.

Working in a campus science building basement laboratory, the students used analysis software, perseverance and patience to parse the data collected (but never analyzed) in 2000 by Robert Kehoe, SMU associate professor of physics, through ROTSE-I, a telescope at Los Alamos, New Mexico. Their discoveries have been accepted into the [American Association of Variable Star Observers International Variable Star Index \(VSX\)](#).

"Scientists are driven by the sense of discovery," Kehoe says. "These students can lay claim to information that didn't exist before their research."

Fritz and Barton are among nine [high school students](#) and two high school physics teachers conducting physics research at SMU through the QuarkNet program



Lake Highlands High School student Dominik Fritz and teacher Ken Taylor at SMU. Fritz participated in Quarknet, an SMU Physics Department program for area high school students.

QuarkNet is a physics teacher development program with 50 centers at U.S. universities and national laboratories. Funded by the National Science Foundation and the U.S. Department of Energy, the program gives teachers and students opportunities to learn about the most recent discoveries in physics. Other sponsors include two of the world's leading high-energy physics research centers – CERN in Switzerland and Fermilab in Illinois. SMU is one four Texas universities to offer the QuarkNet program and the only QuarkNet university in North Texas.

"High school physics curricula includes very little modern physics," says Simon Dalley, a member of the SMU physics faculty and coordinator of its QuarkNet program. "This hurts recruitment to the field and prevents the general population from understanding physics' contribution to the modern world."

Ken Taylor, Lake Highlands High School physics teacher, is determined

to introduce new physics research to his students. He has participated in QuarkNet at SMU since 2000, seizing opportunities to join [physics](#) researchers at high-energy particle colliders at CERN and Fermilab. This is the first summer he has selected students to join him in [physics research](#) at SMU.

"I like to support students beyond the classroom walls," he says. "These students have gone through the whole process of scientific discovery and can use these projects as jumping off points for the next phases of the their lives."

With acceptance into the VSX catalog of variable stars, the students' names are forever linked with their stars on the official registry. But instead of creating new star names, star discoverers follow a protocol that includes the name of the telescope and the stellar coordinates. Dominik Fritz discovered ROTSE1 J115128.40+493130.5, ROTSE1 J120809.03+503321.7, and ROTSE1 J232109.31+170125.6. Jason Barton can include his stars, ROTSE1 J223452.37+175210.5 and ROTSE1 J223707.20+212657.9, on his resume. Both students plan to pursue science careers, Fritz in nuclear engineering and Barton in medicine.

Other student QuarkNet researchers include KeShawn Ivory from Garland High School and Madison Monzingo and Lane Toungate from Lake Highlands High School. In addition, Hockaday School teacher Leon de Oliveira and his four students – Eliza Cope, Allison Aldrich, Sarah Zhou and Mary Zhong – also conducted QuarkNet research this summer.

"These students have made a real contribution to science," says Farley Ferrante, the former [high school physics](#) teacher and current SMU astrophysics graduate student who supervised the [students'](#) research. " A better understanding of variable stars helps us to understand the age and

formation of the universe; the sun, which is a [variable star](#); and even the possibility of extra-terrestrial life."

Provided by Southern Methodist University

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