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Star-struck

Summary: When you wish upon a star, it may make no difference who you are, but to Gordon McIntosh and University of Minnesota, Morris students who together are studying the stars, it’s the stars that make the difference.

(November 9, 2006) When you wish upon a star, it may make no difference who you are, but to Gordon McIntosh and University of Minnesota, Morris students who together are studying the stars, it’s the stars that make the difference.

McIntosh, an associate professor of physics at UMM, along with several of his students, has been researching silicon monoxide masers or, in lay terms, monitoring how the stars change over time to determine what that tells us about stars and the stellar environment. Another aspect of the research is to look at the whole motion of the stars and the movement of stars in orbit around each other.

“It’s a complicated physical system and that makes it interesting,” shared McIntosh. “The stars ‘puff off’ material – carbon and oxygen – which we need for life and which are then incorporated into the next set of stars and planets.

“The likelihood of life would be reduced without these stars,” said McIntosh. “The materials that the stars release affect the probability of life evolving.”

To facilitate his research McIntosh has received a significant award of $97,036 from the National Science Foundation. The NSF award will help to fund one student researcher for the next three years, along with some equipment. So far, two computers with 27” monitors have been purchased. The award will also provide funds for McIntosh and student researchers to attend meetings of the American Astronomical Society.

Nearly half of all UMM students include collaborative research with faculty in their educational plans. Students have ample opportunity to be involved in quality research resulting in national presentations and publications every year. Opportunities include local and university funding, competitive stipends and mentorships with faculty. A yearly Undergraduate Research Symposium provides a forum for students from all areas of campus to present original research, art and other scholarly work.

Senior physics major Anne Hayes has been looking at the SiO emission of the star, R Cassiopeia. Senior physics major Gus Rustan has been researching the orbital parameters of R Aquarui, a binary star. Ben Rislow, a junior who is majoring in physics, is looking at maser polarization Mike Stammer, a junior, who is a biology major and physics minor, is studying the velocity structure of the masers of the star, Mira.

“Not all stars have maser emission,” said McIntosh, “but masers do provide a probe of the stellar environment.”

Beginning in 2007, McIntosh, who has been researching in this area since 1979, will develop a collaboration with a similar study in Sicily. Meanwhile he and the students are using Haystack Radio Telescope in Westford, Mass., – which is 120 feet in diameter – to carry out their observations. They observe remotely by computer from the campus astronomy
laboratory located in the fourth level of the UMM science building.

“Observing time is free when it is available,” shared McIntosh. “Students can use this research quality instrument, which is a sophisticated piece of equipment used by other professional astronomers. When they present their results at a scientific meeting, they know how the data has been acquired, what analysis they’ve used and they can interpret the results of the research.” UMM students present their findings at region and national meetings including the National Conference of Undergraduate Research.

The National Science Foundation (NSF) is an independent federal agency created "to promote the progress of science to advance the national health, prosperity, and welfare to secure the national defense…” NSF is the funding source for approximately 20 percent of all federally supported basic research conducted by America's colleges and universities.

Photo by David Nieves, University Relations: Gordon McIntosh with research computer monitor at UMM

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