

Star-Gazing, Harvard Style

Physics teachers Bob Rotier and Nathan Carle participated in unique summer research opportunity sponsored by the Harvard-Smithsonian Center for Astrophysics (HSCA). “Exploring the Frontiers of Science with Online Telescopes,” funded by the National Science Foundation (NSF), is a collaboration between Harvard University, the Smithsonian, and NASA. Participants are charged with developing pilot materials for students to be able to search for and identify extra-solar planets. According to Project Manager for the HSCA and former Souhegan science teacher, Ruth Krumhansl, “Students will use the MicroObservatory, a system of robotically-controlled telescopes, to analyze images of distant star systems, searching for changes in the light caused by orbiting planets. They will also use computer models to interpret the light signals we might some day receive from an earth-like planet.” Krumhansl said that the information generated might reveal if these planets have water, ice, continents, plant life, and/or oxygen.” These questions are of the utmost importance to the scientific community.

The outcome of this project will be to develop and evaluate an investigation during which physics students will use this technology in their own classrooms. Students will learn how to gather, display, and interpret data and contribute their results to an online journal linked to other data sources. This project will also align with the National Science Education Standards.

Bob Rotier was excited as he recounted his experience. “Participants worked with six staff members from the HSCA, along with two astronomers. We didn’t realize

initially that our task was to define the skills and resources that teachers would need to teach this new curriculum. We thought we would be test-driving the result of their work, and discovered that the vehicle had yet to be built. The participants in this program were vital in helping to frame the work for teachers.”

For Nathan Carle, the fascination was “that so much information could be gained by looking at a pixel of light. We became students ourselves as we studied the brightness of the star to approximate its distance from Earth, found a planet, determined the size, length of a year for the planet, and the distance between the planet and the star and more. Combined with other data we determined the density of the planet—all from looking at the brightness of a star over the course of a night. This is the authentic work of astronomers. By recording and sharing their data with others in the scientific community, our students will be true members of the scientific community.”

Nathan and Bob spent their days working as students collecting data, analyzing and discussing their findings. Nathan says, “As far as we know, we are the first group of teachers to detect a planet around a distant star. Astronomers knew that there was a planet there, but we were able to provide solid evidence of the planet’s existence.”

Bob noted the unique opportunity to work with other teachers. “Nathan and I worked alongside teachers from both rural and urban schools, from New Mexico, South Carolina, Chicago, Los Angeles, and Boston. The teachers taught middle school science, high school physical science, physics, and astronomy. This created an opportunity to share experiences and our unique situations. The curriculum we developed will be better and be able to reach more students because of the diversity of the teachers in attendance.

The time we spent together helped bond us as a team, committed to our students' success.”

Bob and Nathan will continue developing this curriculum as participants in this project. They are grateful to have been invited to participate in the earliest stages of this revolutionary opportunity.

“Going Public”

Peggy Silva

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