

back



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AHS students partner with NASA to conduct unique research







Kyle Jones/Staff Photo

Science teacher Theresa Paulsen assists and oversees her students as they graph their data.

By Kyle Jones Copy Editor/Staff Writer | Posted 4 days ago

Local high school students at Ashland High School have been selected to work with the NASA/IPAC Teacher Archive Research Program (NITARP).

NITARP describes itself as a program that gets teachers involved in authentic astronomical research. The program partners small groups of educators with a professional astronomer as

 Home	 0 Comments	 More Schools	 Full Site
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back



Seyferts) is tasked with using ultraviolet images from the Galaxy Evolution Explorer satellite and optical images and spectra from the ground-based Sloan Digital Sky Survey to find a correlation between the color and luminosity of the hot gas around supermassive black holes at the centers of galaxies.

“We’re looking at Seyfret galaxies that are a little less bright than the quasars, but more bright than the average galaxy,” said Paulsen. “At the center of these galaxies, the theory is that there is a black hole and that’s what’s creating this enormous amount of light at the center. As material is going into that black hole, it’s getting ripped and light is coming out from that.”

Their data will be used to extend the work of the 2010 and 2012 NITARP teams in demonstrating a hypothesized correlation between the luminosity and color (temperature) of the accretion disk within Type I Active Galactic Nuclei.

The 2012 NITARP team was successful in finding a trend in the UV luminosity and color of the AGN in Type I quasars. However, the sample size was not sufficient in demonstrating a substantial correlation.

More data will be needed to see if a more substantial correlation exists. The project will attempt to investigate whether a more significant trend is revealed when Type I Seyfret galaxies with redshifts are added to the previous quasar sample.

In much simpler terms, Paulsen describes their research as, “We’re trying to find a second way to find out how far away they [Seyfret galaxies] are. Right now, we use Hubble’s constant to determine how far away they are. So Hubble found out the more red shifted something is, the further away it is. We’re trying to come up with another way then to see if that’s accurate, we’re trying to validate that.”

This research may be used to better estimate the distances to galaxies and therefore improve our understanding of the structure of the universe.

Paulsen describes that her journey in the program began last January.

“I attended the last annual American Astronomical Society (AAS) meeting in Long Beach and met our mentor astronomers and teachers on our team,” she said.

“In July, I took girls from Mellen and Washburn to Caltech to learn how to access NASA’s archives and to begin performing the necessary data analysis. Now we are finishing that up with the Ashland students,” said Paulsen.

Currently, Paulsen’s students are working through a mountain of data and graphing their findings. Though there has been tedious work with graphing data, senior Brian Meyer said the best part of the project is getting to work with scientists and actually making something where you don’t know the answer or what you’re supposed to get.

“It’s real science, applied science,” he said.



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“We had to get introduced to basic astronomy, because its not something you really get a background in in high school science,” she said. “We kind of had to learn a lot in a little bit of time and make sense of it all. The opportunity to do research like this when you’re in high school, I’ve never really heard of any other high school kids doing it so I thought it was really cool that we could be involved with something like that.”

All their hard work will culminate in a presentation at the American Astronomical Society meeting near Washington D.C. this January.

The team is actively raising funds to allow all the team members to be able to attend and present their research findings.

After they return home, Paulsen says the team plans to present their findings to the local community through presentations in elementary schools and potentially through Science on Tap.

For more information on the project and how to support their efforts, contact Theresa Paulsen at tpaulsen@ashland.k12.wi.us.

Speaking of her students, Paulsen said, “These guys have been really great. The kids have been really committed.”

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