

Undergrad uses Observatory to predict path of asteroids that could impact Earth

Part of a series profiling undergraduate researchers provided by University of Pittsburgh Office of the Provost.

By Niki Kapsambelis

With the help of a telescope that's 94 years old, Lauren Cashman is measuring the heavens and calculating the probability that an asteroid could one day strike the Earth.

Cashman, a senior majoring in physics and astronomy, is working under the guidance of Associate Professor, Arthur Kosowsky to develop a method to predict an asteroid's path based on observations of its location at various times. Working under Kosowsky's direction, and running computer programs, Cashman plans to use the 30-inch circa-1914 Thaw Telescope at the Allegheny Observatory to make precise measurements of asteroid positions. The method she employs is known as astrometry.

And while Cashman's work might sound like something taken straight from the pages of a science fiction movie, it's strictly based on proven research methodology.

"If we can accurately measure the position of an asteroid, we can plot out its future path and determine if it has the potential to impact the Earth," says Cashman.

And while the chances of an asteroid crashing into the Earth are relatively remote, it's still a worthy field, stresses Kosowsky. "The consequences are cataclysmic, so it's worth scouting around," he says.

She began the project as part of a summer Brackenridge Fellowship, but she has continued the research into this fall and plans to submit it to the Smithsonian Astrophysical Observatory's Minor Planet Center, which is a central repository of asteroid and comet observations. With this goal in mind, Cashman works with observers hired by the Allegheny Observatory to work with the telescopes and take pictures of the asteroids.

The observatory, which opened in 1861, was donated to Pitt six years later. The observatory's main telescope is the Thaw, which is the third largest refractor in the United States, although very small for a professional telescope by today's standards. The Thaw telescope is important because it was instrumental in gathering observations that helped set the distance scale of the universe in the early 20th century. And as Cashman's research demonstrates it still has a use in observing asteroids.

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— Arthur Kosowsky, Associate Professor

Longtime director George Gatewood, who was also a Pitt professor, retired in the summer of 2008 after running a research program at the observatory for upwards of 30 years.

"Since he retired, some of us in the astrophysics group are exploring potential research projects we can do from the observatory," explains Kosowsky. "Our goal isn't necessarily to revolutionize the field, but rather to keep the observatory active. There is a really excellent educational opportunity for (Pitt) students here."

Kosowsky, who serves as an adviser for other undergraduates, says he was approached by Cashman when she took his introductory course. He came up with the idea for asteroid tracking as a means of giving her a project that would challenge her considerable intellect.

"She's very good; she's one of our really top students," he says of Cashman, who grew up near Harrisburg, Pennsylvania. "She originally was taking physics and astronomy with an eye on becoming a high school teacher, which I think is a terrific idea."

The experience of doing research has broadened Cashman's horizons, and she now hopes to pursue graduate school before making a final career decision.

"It's gratifying to see students get so engaged with a particular area that they say, 'Well, I think I might have to try graduate school,' says Kosowsky. "The trick is to try to find things that undergraduates can usefully do. They tend to come to us with a lot of brains and a lot of energy so we need to find projects that will enable them to channel their talents."

In spring 2009, Cashman will present her undergraduate research to potential incoming freshman, demonstrating the importance of research experience to the intellectual and career development of undergraduates at the University of Pittsburgh.



Undergraduate Physics and Astronomy researcher, Lauren Cashman stands with her faculty mentor, Associate Professor Arthur Kosowsky.

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