

# Union College

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## Koopmann receives major NSF grant for astronomy research

Rebecca Koopmann, associate professor of Physics and Astronomy, has received a five-year NSF grant to lead a consortium of 14 institutions across the country in a large radio astronomy project using the Arecibo Observatory in Puerto Rico

The \$172,495 grant will fund a five-year collaborative effort, "The Undergraduate ALFALFA Team," to develop undergraduate research opportunities within the Arecibo Legacy Fast ALFA (ALFALFA) survey.

The Arecibo radio telescope is the world's largest telescope.

"The project involves mapping a large area of the sky at radio wavelengths appropriate for the detection of neutral hydrogen gas in other galaxies," says Koopmann.

"The grant provides undergraduate students and faculty at Union and 13 other primarily undergraduate institutions access to a major, ongoing, scientific research project involving a collaboration of astronomers around the world."

Estimated to take six to seven years to complete, the survey is expected to detect more than 25,000 galaxies out to a distance of 750 million light years, she noted.

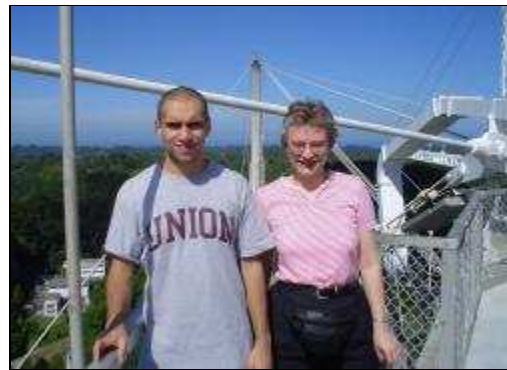
Koopmann has been collaborating with the ALFALFA group since the beginning of the survey two years ago, using the data in her work on the star formation and gas properties of nearby galaxies. She spent her sabbatical year, 2006-07, at Cornell University as a guest of the Department of Astronomy and a visiting scientist at the National Astronomy and Ionosphere Center, which runs Arecibo Observatory.

The ALFALFA survey is led by astronomers Riccardo Giovanelli and Martha Haynes of Cornell. Koopmann will work with Colgate University astronomer Thomas Balonek and Georgia Southern University astronomer Sarah Higdon to develop the Undergraduate ALFALFA Team program. Core components include:

- an annual group workshop at Arecibo;
- observing runs for several groups per year at Arecibo;
- a summer student research stipend program supporting seven students each year, culminating in a presentation at a national meeting; and
- funding to provide computers to each team school.

The annual workshops will be modeled after two NSF-sponsored ALFALFA workshops held at Union in summers 2005 and 2006. The workshops at Arecibo Observatory will feature observing sessions and lectures and group activities about Arecibo science. The first workshop is scheduled for Jan. 13-14.

"This grant makes it possible for undergraduates to contribute to the scientific output of the ALFALFA extragalactic HI survey and follow-up studies while learning valuable lessons about the way that a science collaboration functions through their interactions with their faculty mentors, their peers, and the leaders of the ALFALFA project," says Koopmann.



*Bilal Mahmood and Prof. Rebecca Koopmann are pictured on the platform suspended over the Arecibo telescope in this 2005 photo.* [Enlarge](#)



*The Arecibo radio telescope*

As part of the grant, Koopmann will also collaborate on curriculum and public outreach endeavors with Jose Alonso, director of the Angel Ramos Foundation Visitor Center at Arecibo Observatory, resulting in publicly-available activities and exercises written in English and Spanish.

Astronomers around the world are collaborating on the ALFALFA project. One of the main goals is to discover low mass, "starless" galaxies, which contain hydrogen gas but have not yet formed stars.

"The abundance of these 'dark' galaxies, their characteristics and location are key clues to understanding how galaxies form and evolve throughout the universe," says Koopmann.

To date, four Union College students have participated in ALFALFA research and activities: seniors Nathan Calabro, Michael Gillin and Bilal Mahmood, and Jay Read '07. Mahmood is a co-author of the first data catalog paper released by the ALFALFA collaboration. Calabro is currently working on his senior thesis with Koopmann.