

Middle schoolers to explore sky with robotic telescopes

November 17 2012



The University of North Carolina at Chapel Hill's Skynet system includes these robotic telescopes at the Cerro Tololo Inter-American Observatory in Chile. Thus far Skynet has taken nearly five million exposures for approximately 30,000 professional astronomers, students of all ages and the general public. Credit: University of North Carolina at Chapel Hill

Approximately 1,400 middle schoolers will explore the universe with

research-grade robotic telescopes over the next three years, thanks to a \$1.6 million program funded by the National Science Foundation. The University of Chicago will lead the effort, in partnership with the National Radio Astronomy Observatory in Green Bank, W.Va.; the University of North Carolina at Chapel Hill; the Astronomical Society of the Pacific and 4-H.

Called Skynet Junior Scholars, the program will train 180 4-H leaders and informal educators in Wisconsin, North Carolina and West Virginia to engage their youths in [telescopic observations](#) of planets, asteroids, galaxies and other cosmic targets during summer camps or weekly club meetings. Skynet will build upon existing 4-H science programs, which provide hands-on learning experiences designed to prepare youths for careers in science, technology, engineering and mathematics (STEM).

"The concept for the National Science Foundation grant is to leverage this technology and apply it to out-of-school STEM education in an organized way at the middle school level," said Richard Kron, UChicago professor in astronomy & astrophysics, who heads the project. "We are not trying to make astronomers out of everybody. We are trying to get people pumped up about science, and we think of astronomy as a very good vehicle for doing that."

Skynet Junior Scholars will have at their disposal a global network of telescopes that Dan Reichart, the Bowman and Gordon Gray Professor of Physics and Astronomy in UNC's College of Arts and Sciences, and his associates have assembled to detect gamma-ray bursts, the most powerful explosions in the universe.

"Dan has made these telescopes available for others, and the education community has jumped on the opportunity," Kron said. Students and educators submit an observation request via the Skynet website, and in a day or two, they receive their data for download and analysis. "It's a

rather impressive concept, and it actually works."



Skynet Junior Scholars will observe the invisible universe with this 20-meter radio telescope at the National Radio Astronomy Observatory at Green Bank, W.Va. The University of North Carolina at Chapel Hill's Daniel Reichart has been using Green Bank telescopes since 1991, his senior year in high school. Credit: National Radio Astronomy Observatory

Unpredictable cosmic bursts

Discovered in 1969, gamma-ray bursts last for minutes or less, occur unpredictably, come from any direction in the sky and shine billions of

times brighter than their host galaxies. "We can go weeks without a GRB, and sometimes when we get one, we can cancel our observations within minutes or hours, so they don't eat up a lot of time," said Reichart, MS'98, PhD'00.

Reichart and his associates originally wondered what to do with their unused telescope time. They began filling that time in their original grant via a partnership with a dozen undergraduate North Carolina institutions.

"Now we have users all across the United States and the world, and they all do different science, not gamma-ray bursts," Reichart said. Skynet has become the leading discoverer of supernovae in the Southern Hemisphere, and also the world's leading tracker of near-Earth objects (Earth-approaching comets and asteroids). In fact, Skynet observers study a full range of fleeting phenomena of varying brightness that can be seen with a small telescope.

A computer schedules Skynet's observations, with GRBs the priority. Whenever one occurs, Skynet automatically stops whatever else it might be doing to observe the burst.

The next priority is time-critical observations, followed by the education and public outreach requests. The lowest priority goes to observations that can be made at any time without data loss.



The University of Chicago's Yerkes Observatory has developed astronomy programs for students who are blind, visually impaired, deaf, or hearing impaired. Similar programs will be available to the Skynet Junior Scholars. Credit: Kyle Cudworth

Skynet's global reach

Skynet includes six telescopes in Chile, with six more under construction there and in Australia. The network also includes a 20-meter radio telescope at Green Bank, the 24-inch telescope at UNC- Chapel Hill's Morehead Observatory and the 41-inch telescope at Yerkes Observatory in Williams Bay, Wis.

Yerkes has developed programs to make astronomy accessible to students who are blind, visually impaired, deaf or hearing impaired.

Similar programs will be offered to the Skynet Junior Scholars. UChicago's Center for Elementary Mathematics and Science Education, meanwhile, is designing a web portal for the Junior Scholars.

Reichart's outreach work has evolved into a four-credit course at UNC that enrolls 1,000 or more students annually. That Skynet-based curriculum now is attracting interest from a variety of other institutions in the region, including Wake Technical Community College, Guilford College and North Carolina A&T State University.

"So far we've had about 30,000 elementary school students use the system," Reichart said, via a curriculum developed in partnership with the Morehead Planetarium and Science Center. Using a web page on a kiosk in the planetarium, students pick the object they want to image and type in an e-mail address. Skynet then takes the image and sends it back.

Thousands of high school students also have made observations, using the same web-based interface that professionals use to operate Skynet. With the addition of the Junior Scholars program, Skynet will have served every age group from elementary school to the professional ranks.

The middle school years, though, are the most critical for introducing youths to potential STEM careers. "High school is often too late to convince someone to go into science," Reichart observed.

Provided by University of Chicago

Citation: Middle schoolers to explore sky with robotic telescopes (2012, November 17) retrieved 26 April 2024 from <https://phys.org/news/2012-11-middle-schoolers-explore-sky-robotic.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.