

STUDENT SPACE PROGRAM RECEIVES NSF FUNDING TO DESIGN, BUILD, AND LAUNCH SATELLITES

For the first time, the National Science Foundation awarded a grant for the construction, launch, and operation of two, three-unit, CubeSats. CubeSats are small satellites that come in multiples of 4-inch cubes.

The funding was secured by a team of scientists and undergraduate students who were led by Auburn University faculty members J-M Wersinger, professor emeritus in the Department of Physics and Auburn University Student Space Program director, Mike Fogle, associate professor in the Department of Physics, Daniel Harris, associate professor in the Department of Mechanical Engineering, and Professor Saad Biaz of the Department of Computer Science and Software Engineering. The grant is in the amount of \$893,873 for a project titled, "Collaborative Research: CubeSat: Observing Terrestrial Gamma-ray Flash (TGF) Beams With A Pair Of CubeSats."

"To receive this kind of funding from NSF is a real feather in our cap," said Wersinger. "The Auburn University Student Space Program is now recognized as offering one of the most prestigious CubeSat programs in the nation."

Fogle and Wersinger will submit a proposal to NASA to obtain a rocket launch that will carry the CubeSats into low Earth orbit for an approximately 18-month mission. The two satellites will undergo many tests and reviews before launch, which will take place in about three years.

The project is a collaboration with The University of Alabama in Huntsville, and researchers will ultimately study the structure of powerful gamma-ray flashes associated with thunderstorms in the tropical regions of Earth using three-unit CubeSats. Auburn launched its first, single-unit CubeSat, AubieSat-1, in October 2011. The two, three-unit CubeSats for the NSF-funded mission are named

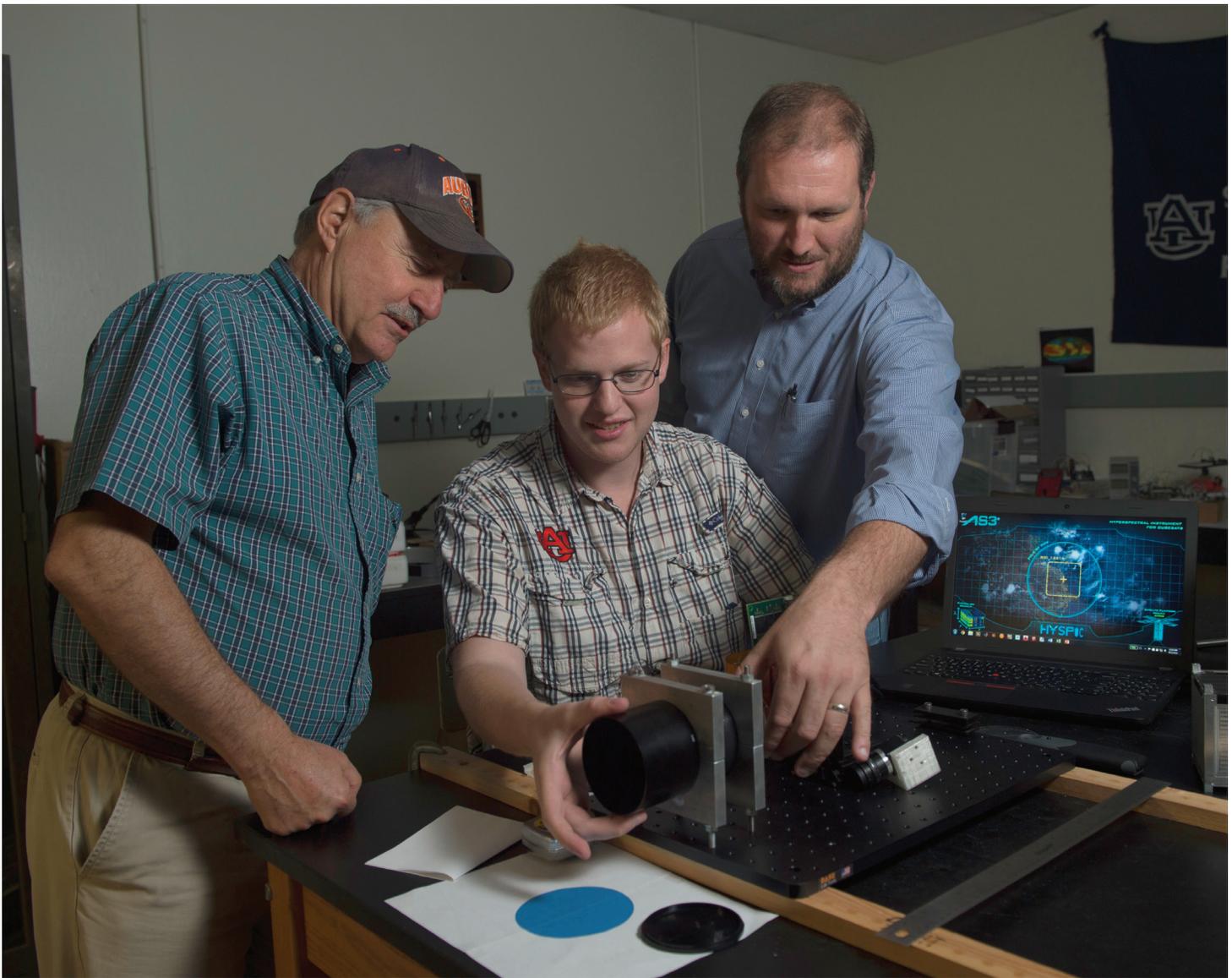
TRYAD 1 and TRYAD 2. "TRYAD" stands for Terrestrial RaYs Analysis and Detection.

"CubeSats are great for research because they are inexpensive to build, you can fly a lot of them at the same time and receive more information, and you can look at data in almost real time," said Fogle.

The two CubeSats are currently being designed, built, and tested solely by undergraduate student members of the Auburn University Student Space Program under the guidance of faculty in the Department of Physics and the College of Engineering. More than 30 students during fall semester alone are balancing their classroom obligations with 15 to 20 hours per week working in the lab on TRYAD 1 and TRYAD 2.

"The work pays off because people in industry recognize the program creates future leaders. The students are given a unique, work-force development experience where they work in teams to complete a space experiment, understand the importance of deadlines, and gain a basic understanding of management and systems engineering," said Wersinger. "And we have worked and continue to work with several NASA partners like Goddard Space Flight Center, Ames Research Center, and Marshall Space Flight Center."





In addition to designing and building TRYAD 1 and 2, the Auburn students will also be responsible for commanding and controlling the CubeSats in space using the NASA Near Earth Network of ground stations. Through communication with the two satellites, students will also test PULSAR, a new high-bandwidth radio developed by NASA engineers, capable of transmitting 150 million data bits per second.

The UAH collaborators on the project, Michael Briggs, assistant director and principal research scientist, and Peter Jenke, research associate, both from the Center for Space Plasma and Aeronomic Research, are responsible for developing the science instrument used to detect the gamma-rays while in orbit. They will also collect and analyze the science data. Auburn University will have access to the data before it is distributed to the scientific community at large.

“We are grateful for our NSF funding, but we are always in need of additional funding so that we can involve more students in the program and push it to the next level. Added funding would allow our students to travel to conferences, satellite reviews, and the actual launch of the satellite. It

would also allow us to produce more advanced and more competitive satellites. We welcome private and corporate gifts,” said Wersinger. “Your support will directly contribute to the education and career advancement of Auburn students, and a strong Auburn presence in space.”

The Auburn University Student Space Program is part of the College of Sciences and Mathematics. For more information, visit the website at www.space.auburn.edu. For more information on funding opportunities, contact the COSAM Office of Alumni and Development at 334.844.2931, or send an e-mail to cosam.development@auburn.edu.

Pictured on page 42, from left, is J-M Wersinger, Student Space Program director and professor emeritus in the Department of Physics, Mike Fogle, Student Space Program faculty mentor and assistant professor in the Department of Physics, and Student Space Program participants Mark Gallagher, a junior in computer engineering, and Michael Phillips, a senior in physics.

