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"As an undergrad, you're just going through the curriculum. That's important, but it's not what research is all about. You need to be able to break ground and figure things out."

Michael Mehlman, physics doctoral candidate and former Cyclotron Institute REU Program participant

- [Article](#)

COLLEGE STATION --

Michael Mehlman wasn't exactly experienced when, in the summer of 2008, he began working in the [Cyclotron Institute](#), Texas A&M University's venerable hub for accelerator-based science and technology. On top of having no prior familiarity with research, he was still several semesters away from earning his bachelor's degree in physics -- and from another university, at that.

But Mehlman didn't fudge on an application or weasel his way in. Quite the opposite, in fact: The Cyclotron Institute picked *him* as one of a carefully selected group of students chosen to participate in the institute's annual [Summer Research Experiences for Undergraduates \(REU\) Program](#).

For the remainder of that summer, Mehlman worked alongside a bevy of world-class researchers as he learned to deduce large sets of data taken from heavy-ion interactions. And although he eventually completed his undergraduate degree, he credits his hands-on REU experience at the Cyclotron as the spark of inspiration he needed to return to Texas A&M the following year to pursue a master's in applied physics.

"As an undergrad, you're just going through the curriculum," said Mehlman, who is [now a doctoral candidate](#) in the [Department of Physics and Astronomy](#). "That's important, but it's not what research is all about. You need to be able to break ground and figure things out."

Prestigious pipeline

Funded by the [National Science Foundation \(NSF\)](#), the REU program is a grant-based summer platform hosted by universities across the nation to enhance undergraduate participation in science, technology, engineering and mathematics (STEM) research. For eight to 10 weeks, REU students participate in real-world scientific investigations under the guidance of a faculty mentor and receive both a stipend and housing for the duration of the program.

Texas A&M is just one of an increasing number of colleges making REU programs available to undergraduate students. The College of Science [currently offers seven different REU programs](#) in a range of fields including chemistry, mathematics and physics and astronomy.

The impact of an REU can be far reaching, says Dr. Ginger Carney, associate dean for undergraduate research in the College of Science. For starters, she says students who participate in undergraduate research are more likely to stay in their majors and have a higher GPA than those who don't.

"What we're hoping to accomplish is to let students know that this is an opportunity they can and should take advantage of and then give them the resources to do so," Carney said.

REU programs are highly competitive, often attracting applicants worldwide. Hundreds of students might apply for any given program, but only a dozen or so will be hand-selected by program directors to participate.

Jordan Benzie traveled from Glasgow for the [Department of Chemistry's NSF-REU Summer Research Program](#). A junior chemistry major at the University of Strathclyde, Benzie was heavily involved with an investigation of the absorption properties of silicon dioxide.

"The things you'll see and the people you'll meet -- that'll be with you forever," Benzie said. "It's such a life experience that you're never going to forget it."

Chew on this

A defining feature of the REU program is the opportunity for students to learn crucial analytical skills and research techniques by working collaboratively with their faculty mentor on cutting-edge research. This way, students get a behind-the-curtain look at breakthrough science in motion, including all the trial and error that comes with it.

Outside the lab, REU students attend a variety of research-relevant activities, such as guest lectures, interdisciplinary seminars and field trips to national laboratories.

As the program's capstone, students must design and complete their own original research project. At the end of the summer, they present their results at a symposium of their REU counterparts. Past REU students have even been invited to present their work at national conferences and published in peer-reviewed journals.

Dr. Jay Walton, professor of mathematics and director of the [Department of Mathematics' Mathematical Modeling in Biology REU](#), noted that while students are given complete creative freedom to explore any number of research topics, they must also provide the elbow grease required to reach an outcome.

"We like students who can jump in with both feet, chew on a problem for a while and keep on going," Walton said. "They have to have a natural scientific curiosity, and the key is that they have to really be vested in their work."

A little research goes a long way

These days, it's nearly impossible to be admitted into graduate school without some form of undergraduate research training -- sometimes an unattainable goal for students from liberal arts universities or smaller colleges. Beyond a leg up, REUs give students top-quality research experience, in addition to a clear window into what life is like as a graduate student. Many students use the REU as a barometer to determine if they have what it takes to make it in grad school.

That's the case with Jessica Sutter, who is taking part in the [Department of Physics and Astronomy's Astronomical Research and Instrumentation REU](#). An astronomy major at Whitman College in Walla Walla, Wash., Sutter spent the summer analyzing images from the Hubble Space Telescope.

"At this point, I'm almost 100 percent certain grad school is what I want to do next, and this program has been a big reassurance," Sutter said. "It's been a big learning experience and a lot of information to absorb. Now, I'm figuring out where I stand with it all."

Full circle

Mehlman never forgot his REU roots nor the impact the experience has had on his academic career. Even though he is immersed in Ph.D. coursework, he also is a mentor to new REU students in the Cyclotron Institute, a role in which he has happily served for the past five summers.

"You have to guide them in a way that you're not forcing them, because you want them to figure out things for themselves," he said. "If you're not being mentored, it's easy to get into this stagnant place where you never progress."

For more information on summer REU programs in the College of Science, visit <http://www.science.tamu.edu/research/undergraduate/reu.php>.

To learn more about other undergraduate research opportunities and how to get involved, go to <http://www.science.tamu.edu/research/undergraduate/index.php>.

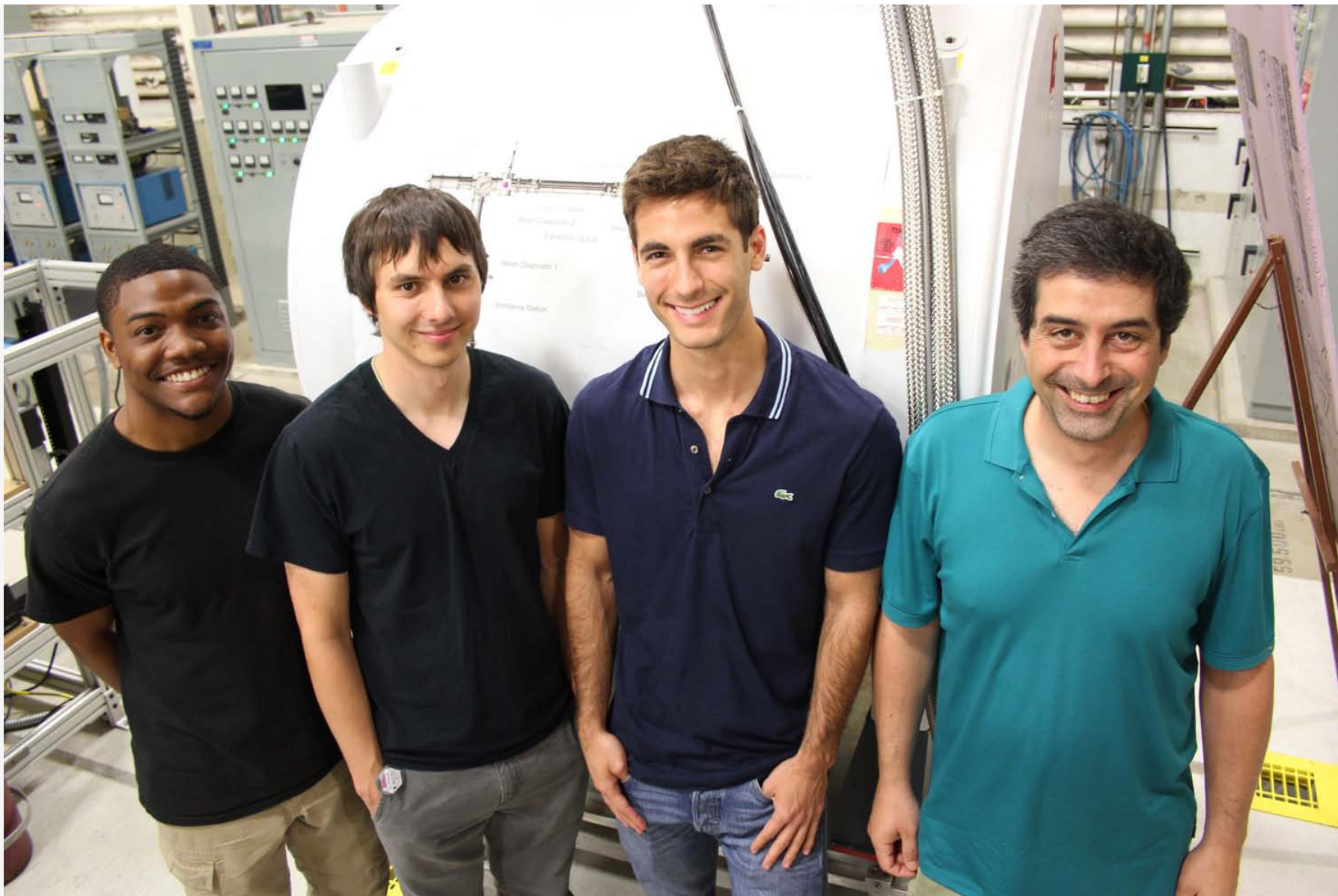
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Contact: Chris Jarvis, (979) 845-7246 or cjarvis@science.tamu.edu or Dr. Ginger E. Carney, (979) 845-6626 or gcarney@bio.tamu.edu



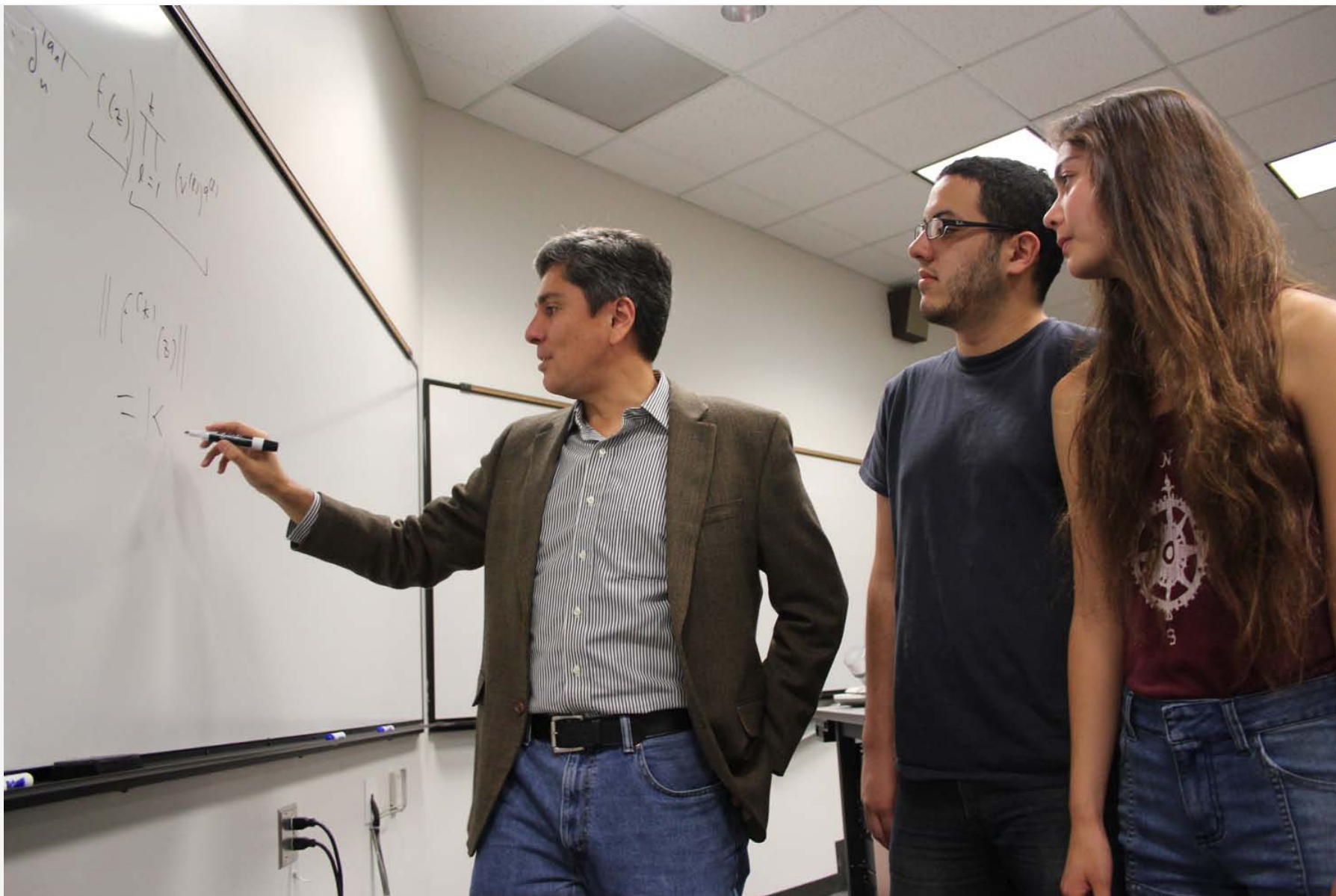
Full Circle

As a one-time participant in the Summer Research Experiences for Undergraduates (REU) Program offered through the Texas A&M University Cyclotron Institute, current physics doctoral candidate Michael Mehlman (second from right) stays involved in the program by mentoring current REU students. Pictured from left are 2014 participants Louis Cooper (Florida A&M University), Robert McAfee (University of Texas at El Paso), Mehlman and Dr. Dan Melconian, assistant professor of physics and astronomy.



Summer Abroad

Texas A&M chemistry professor Dr. Janet Bluemel and Jordon Benzie observe the absorption properties of a sample of silicon dioxide. Benzie traveled from the University of Strathclyde in Glasgow to take part in the Department of Chemistry's NSF-REU Summer Research Program. (Credit: Kyle J. Cluff.)



Applied Experiences

Texas A&M mathematics professor Dr. Maurice Rojas (left) describes the certification of numerical solutions of polynomial equations to mathematics REU students Samuel Perez-Ayala (University of Puerto Rico, Rio Piedras) and Paula Burkhardt (Pomona College). Rojas is director of the Department of Mathematics' REU in Algorithmic Algebraic Geometry, one of three REU programs offered by the department.

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