GEORGIA COLLEGE & STATE UNIVERSITY

This Week

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Astronomist and recent graduate measure neutron star bigger than sun

Cody Cox and Dr. Arash Bodaghee.

You might think a neutron star or black hole is nothing but empty darkness and, thus, immeasurable.

But they're not vacant.

Matter is squeezed tightly into a small space creating a gravitational pull so strong even light can't escape. They come in different sizes and move about in space, consuming their twin star and anything else in their path as fuel.

Now, Georgia College & State University Physics Professor Dr. Arash Bodaghee and Cody Cox of Milledgeville—a recent physics graduate experienced in C++ computer language and MATLAB—have calculated a dark star never previously measured.

It's a neutron star "several times more massive than the sun," Bodaghee said. "This is the first time the magnetic field of this particular neutron star has been measured. Neutron stars are hard to find. In terms of measuring the magnetic field—that's another step beyond finding them, and you need a very good telescope to get data for long-term observation. It's a lot of work."

Neutron stars and black holes are born when dying stars explode, but black holes are denser and less frequent.

Bodaghee and Cox previously worked together at Georgia College to create a first-of-its-kind map showing exactly where these roaming, dark masses were born and how far they've traveled.

For their latest project, the team used X-ray observations from NASA's NuSTAR space telescope to study a "high-mass X-ray binary." It's the remnant core of a massive dying star after its supernova explosion—and is now 'eating' its massive stellar companion.

The neutron star itself was discovered 20 years ago with the Japanese telescope ASCA. Bodaghee inherited the NuSTAR data and draft of an article from collaborators at the University of California, Berkeley. He was tasked with completing the analysis and submitting an article.

The neutron star had a "telltale signature wiggle" in its spectrum of light that made it possible to measure. When the neutron star consumed mass from its companion, it created an X-ray—what Bodaghee calls "a candidate cyclotron line"—enabling them to measure the strength of the star's magnetic field for the first time.

Only a few neutron stars or black holes present these lines, so this is a rare accomplishment.

Scientists estimate there are tens of thousands of neutron stars and black holes in the Milky Way but only about 150 have been identified. This newly measured high-mass binary joins a list of only 50 neutron stars with magnetic fields that have been measured.

Bodaghee discovered two of them—the other in 2016.

But he modestly brushes away praise.

"We're not gonna win the Nobel Prize for this. We're not solving world hunger or contributing to world peace. We're just advancing knowledge," Bodaghee said.

"It's just another incremental step in the science of these objects," he said. "If there are only 50 of them, and we measure another one, well that's a 2% increase. It's incremental. We're not going to revolutionize the field. We're just adding another stone to the wall of knowledge."

But Dr. Sayo Fakayode, chair of Chemistry, Physics and Astronomy at Georgia College, begged to differ. He applauded Bodaghee's humility but stated this achievement is "a big deal" for the professor and the university.

The project took two years of collaboration with NASA, telescope study, data collection and analysis. It was published in one of the most respected periodicals for astronomy, the Astrophysical Journal. Bodaghee and Cox co-authored the article based on their findings.

While the nearest black holes to earth are 1,000 lightyears away, they seem closer to students who join Bodaghee's lab.

"Science is continuously evolving. It's really exciting," Bodaghee said. "Only in the last five years have we been able to measure black holes that collide, merge and send out gravity waves. For all of human history, astronomy has been using light waves. Only now can we use a different type of wave—gravity waves to measure black holes."

Imagine what we'll do tomorrow.

Student's second study abroad in Costa Rica focused on sea turtles

Junior Parker Luke Wilson can tell you firsthand how after-school jobs and study abroad help you zero in on a correct career path, boost your skills and put you ahead of others in the job market.

Growing up with a love for animals, Wilson got his first crack at being a veterinarian assistant as a senior in high school working at Gadd's Animals Doctors of Gray. Since then, he's been on track to double major in biology and Spanish at Georgia College & State University, while getting a minor in Latin American/Caribbean Studies and a concentration in pre-veterinary medicine.

If that's not enough?

Well then, there's always a really cool two-week, study-away, veterinarian-in-training program called Loop Abroad Costa Rica.

In 2022, Parker enjoyed working with sloths there so much, he signed up for another stint this summer with Loop Abroad—this time researching sea turtles.

"Sea turtles always have been special to me," Wilson said. "I am genuinely taken away by love for these animals and plan to devote my life to helping them. They have this beautiful nature and are such an important part of the ecosystem within the ocean."

Wilson worked with a conservation organization called Latin American Sea Turtles (LAST). A group of students and veterinarians from around the world spent time on land and sea, scooping turtles up by net.

The team helped repopulate mangrove trees by potting, building soil containers and watering. Students were also trained in data collection and analysis—crucial elements for career readiness when working with nature.

Loop Abroad is the largest pre-veterinary study abroad program in the United States. This year, it spent more than $1 million on conservation projects worldwide. It hosts students in nine countries and six continents throughout the year.

Parker Wilson, right, with study abroad group in Costa Rica.

The experience reinforced Wilson's desire to become a vet. He'd like to work in Latin America. He credits Georgia College with helping him find this path and connecting him to multiple opportunities, like Loop Abroad.

Did you know?

The Baldwin County School District's Program for Exceptional Children, in collaboration with the Georgia College Music Therapy Clinic and Music Therapy Program, cordially invites the community to join them for, "All Originals!"

This special concert, showcasing the incredible talents of students from BCSD's Program for Exceptional Children (PEC), will take place at 9 a.m. Friday, Dec. 1, at Oak Hill Middle School.

The "All Originals!" concert is the culmination of an ongoing collaboration between the students from the PEC, board-certified music therapists from the Music Therapy Clinic and students of the music therapy program at Georgia College.

These sessions focus on enhancing expressive communication and interpersonal skills. Students wrote lyrics, explored various instruments and technology, and collectively produced their own songs. This concert is free and open to the public. For more, call 478-445-8579.

Podcast puts Bobcats in the booth with business bigshots

Over the last two and a half years, student-run podcast GC Bizcast has recorded three seasons of interviews with wide-ranging and elite business professionals.

For three of the podcast's eight student hosts and producers, it's been more than a side project—it's changed who they are.

"As a college student, you think you don't have much to say—but of course you do," said Sruti Sajja, senior marketing major and co-host of the show. "Our professor was one of the first people that told us we have something important to say, and people should hear it. So, we started from that seed."

Using his connections to the business world, Dr. Ward Risvold has brought guests like London professor of finance Dr. Alex Edmans and Brooke Deterline, CEO of Courageous Leadership, to the podcast.

"Our students learn to network," Risvold said. "They learn to engage in conversations with corporate and academic leaders; but most importantly, they learn they belong in these conversations."

To help with editing, the podcast partners with Evelina Galova, media lab coordinator. Also a part of their collaboration with the Department of Communication, Jonathan O'Brien, '22, a graduate of the department, helped each member on the team learn sophisticated recording equipment.

But the work, from researching guests and developing questions to recording episodes and publicizing their podcast, is all students.

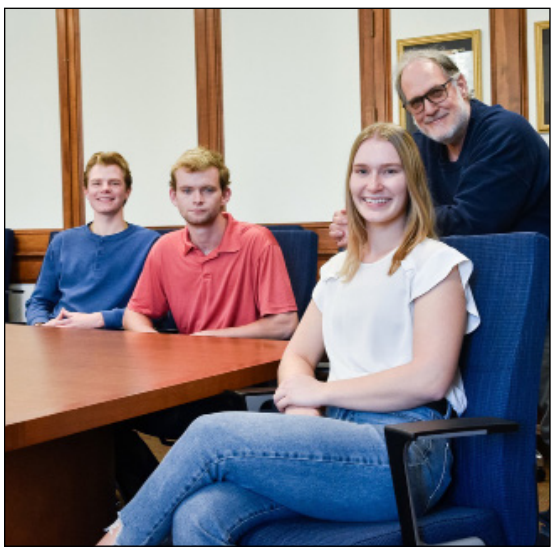
Senior management major Maura Foreman and senior marketing major Charlotte Joiner are president and vice president, respectively.

As president, Foreman does a little of everything. She's always loved creating media and jumped at the chance to work with Risvold on the project.

"It's been something bigger than myself," Foreman said. "And it's been a really fun way to combine all the things that I love: creating, talking to people and putting things out for people to experience. To me, it's been a full-circle moment with everything I love put into one project.

Joiner, on the other hand, has seen herself grow from the ground up.

"Finding confidence within myself was a big thing for me," Joiner said.



Dr. Risvold (right) with podcasters (left to right) Eli Daniell, Sam Jones and Maura Foreman.

What's going on in Bobcat Territory?

Visit frontpage.gcsu.edu/events

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