

CST's Goldwater Scholars for 2025

by Jonny Hart

The Goldwater Scholarship is one of the oldest and most prestigious national scholarships in the natural sciences, engineering and mathematics in the United States. It is awarded to college sophomores and juniors based on their research merit and potential as a future researcher. Since 2018, 10 Temple University students have earned a Goldwater, with eight having a CST major or minor.

ELLIE HAN

Ellie Han's road to a computer science and physics major was a winding one. She tried biology, then bioengineering, then biophysics, then physics, and along the way she dove into various research projects that helped her find her path.

She started in an experimental biology lab and later moved to a theoretical physics project, but it was a quantum computing algorithms project she conducted at the University of Notre Dame that really clicked for her. "That really changed the trajectory of my research interests, because it gave me the time and the space to delve into work that I hadn't really thought of before," she said.

Han explained that in the general field of quantum computing there's a specific subsection called neutral atom quantum computing, and the team she joined at Notre Dame was trying to benchmark those systems. She contributed to their work by creating an algorithm that would solve an optimization problem to see what parameters are most important, how well the system can solve the problem and at what size.

"It's important because we're entering this new era of technology," Han said. "There are many applications for quantum computing, so it's exciting to see and work with some of their developmental roots."

Han presented her research at the Physics Department's inaugural research symposium in 2024, where she met Maria Iavarone, Physics Department chair. Iavarone was so impressed that she invited Han to join her experimental physics lab. "In my years of mentoring undergraduate students, I have rarely encountered someone with her drive and potential," Iavarone said.

Han is aiming for a PhD in either applied physics or quantum science and engineering. Further down the road, she's interested in doing quantum hardware-software codesign. "I've seen bits and pieces of it. I've done algorithm work, on the software end, and that introduced me to hardware more conceptually," she said. "But being able to piece it all together and do something that combines hardware and software for some kind of hardware development would be really cool for me."



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DAVID PALOMINO

It didn't take long for David Palomino, a computer science and physics and mathematics major, to begin carving out his own research path at Temple. By spring of his first year, Palomino was working in a lab with Jim Napolitano, professor of physics, conducting real-time simulations and visualizations of black holes.

"It was a very interesting experience for me because it wasn't an existing project on a list of research groups at Temple," Palomino said. "This was something that Professor Napolitano and I decided to do."

Since then, Palomino continues to home in on the work he'd like to do. "I'm very much interested in the intersection of topology, geometry and physics," he said. "That is a fascinating area, but it's also a very niche area."

Palomino crossed paths with Jie Wang, assistant professor of physics, who is leading research in that niche area. Palomino worked with Wang on a project focused on topological Chern band systems, a set of insulating materials that are effective against natural elements.

"These are important at the industrial level, especially with regards to computer manufacturing, where you need materials that are really good insulators under high stress and high heat," Palomino said. "As energy inputs get higher and higher, or as we keep trying to fit more and more onto tiny computer chips, it's important that we have good insulating materials."

Palomino leveraged his computer science background to code an application that could verify some of the theoretical results. "He has a strong background in mathematics and theoretical physics, and in many cases, it was me who consulted him for mathematics-related questions," Wang said. "I learned a lot from him."

Palomino has continued to work alongside Wang, and he's even been credited on one of Wang's published research papers.

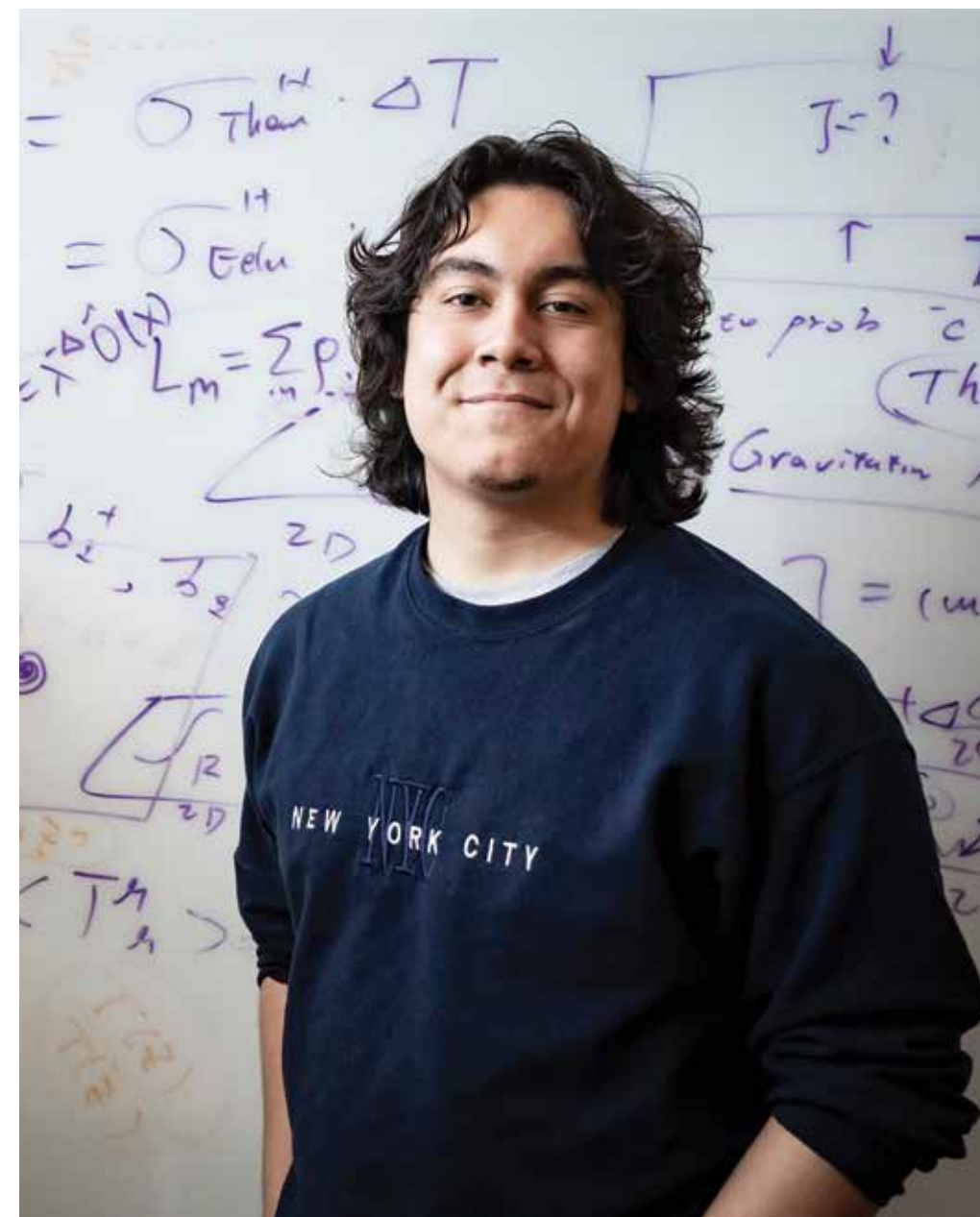


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After graduation, Palomino intends to pursue a graduate degree in mathematical physics. "I would love to teach at the upper level and do research," he said. "If that's what I end up doing in the foreseeable future, I would be very happy there."