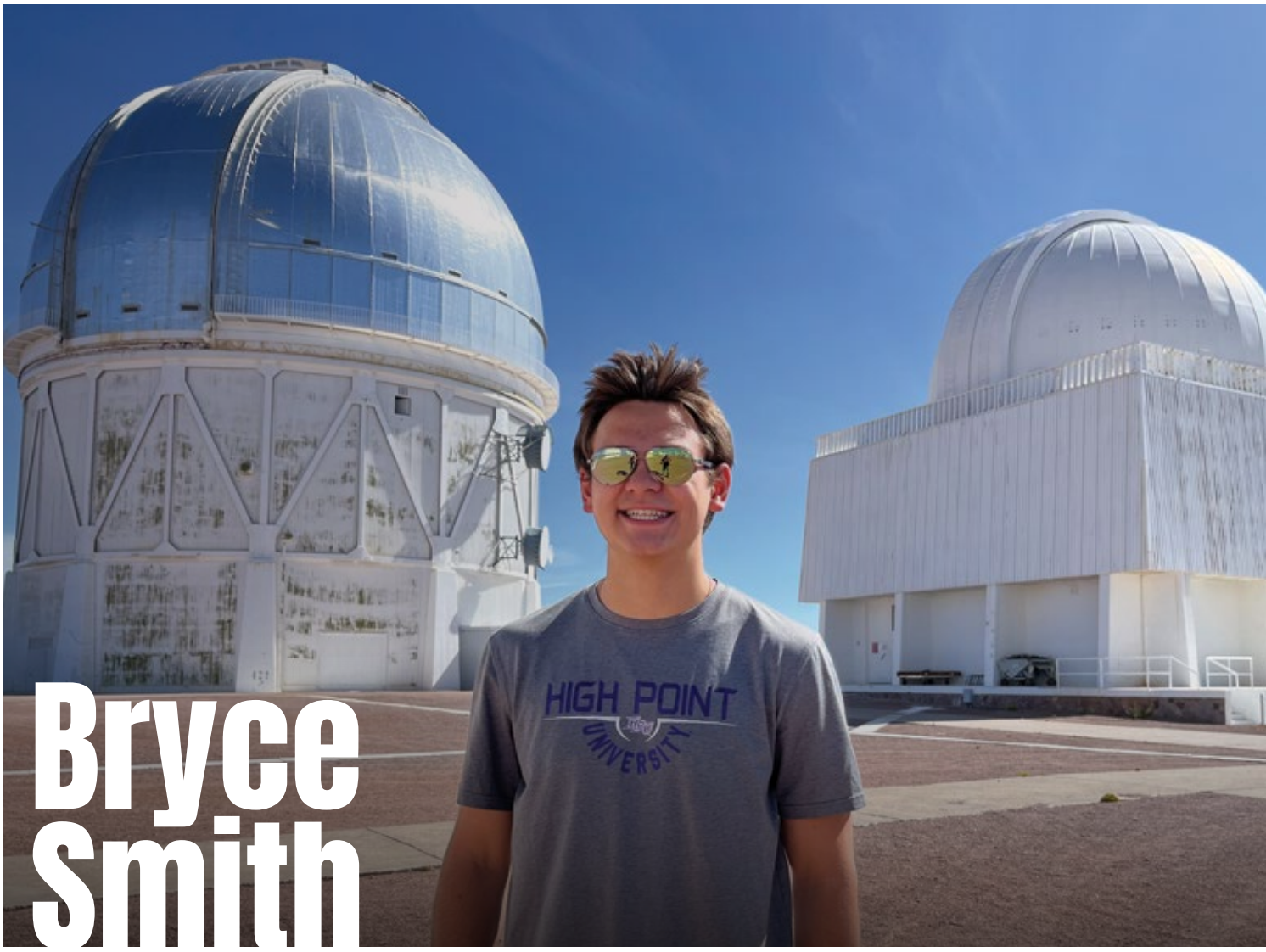

Bryce Smith

Achieving Stellar Success

Finding his passion was only the beginning of what he discovered at HPU.

Bryce Smith, ’23, reached for the stars when it came to research. After all, it was the access to undergraduate research opportunities that led him to choose HPU in the first place.

From spending his summer diving into research through HPU’s Summer Research Program in the Sciences (SuRPS) to seeking faculty mentorship — his experiences have paid off.

Already, the physics major from Evergreen, Colorado, has an incredible list of achievements under his belt.

For one, he discovered a previously unknown star. Smith discovered what is a small dense star known as

a white dwarf, which is a companion to the hot subdwarf star BPM 36430 — a core helium-burning star at the hotter (blue) end of the horizontal branch phase of a star's life.

The discovery was a collaborative research effort between Smith, Dr. Brad Barlow, associate professor of astrophysics, and astronomers at Boston University. His leading work was published in The Astrophysical Journal, one of the highest-ranked journals in astronomy and astrophysics, as a first and corresponding author.

The Road to Research

When Smith was a freshman, he didn't know the path he wanted to take. But when he found a mentor match with Barlow, he found an interest in astrophysics.

"I didn't really know what I wanted to do, then I got to dive into this (astrophysics) and I really enjoyed it," says Smith.

HPU has science professors who have experience in many fields, so students have the opportunity to study just about anything they're passionate about.

For resources at HPU, there are plenty, according to Smith.

"Dr. Barlow has access to all of this incredible technology. I've used telescopes that are halfway across the world and traveled to where they are to use them in person."

He joined Barlow at an international conference in Belgium that attracts astronomers from around the world who study evolved stars like hot subdwarfs. Undergraduates rarely speak at conferences like this, yet Smith presented his research and received rave reviews.

In the fall of 2022, Smith and Barlow spent five nights at the Cerro Tololo Inter-American Observatory in Chile, one of the premier astronomical observing sites in the world, observing at the 0.9-m SMARTS telescope. There, Smith participated in all aspects of observing, including opening the telescope dome at dusk, filling the camera's dewar with liquid nitrogen, pointing the telescope, acquiring data, and working with Python code to analyze the data.

"A lot of people think they know what they want to do but once they try it, they find out they don't like it," says Smith. "Being able to work on the telescopes in Chile and stay there allowed me to sample what that life is like. It helped me solidify that this is what I want to do after I graduate."

Shoot for the Stars

Smith's advice for underclassmen? "Try everything. Get experience in different areas and don't look back," he says. "That goes for research and social opportunities, too. Don't sit in your dorm every night. There's always something to do at HPU, whether that's playing club or intramural sports or joining one of the many organizations on campus."

Smith is in the Honors Program, Society of Physics Students, Alpha Phi Omega (the service fraternity) and Charcoal Pony (HPU's improv troupe).

Smith has some stellar career plans after graduating in December with degrees in physics and math. His next step is to get a Ph.D. in astrophysics. After that, he plans to join the military to fulfill his aspiration of being a fighter pilot.

But Smith doesn't want to stop there; he sees himself eventually becoming an astronaut. ■

An Out-Of-This-World **Discovery**

Bryce Smith discovered a previously unknown white dwarf star companion to the hot subdwarf star, BPM 36430, by noticing the star's pulses sometimes arrived earlier or later than expected, using data from NASA's Transiting Exoplanet Survey Satellite (TESS) spacecraft. This is a sign that the star is "wobbling" in an orbit due to gravitational influence of another nearby star. He obtained follow-up data with a high-resolution spectrograph on the SMARTS 1.5-m telescope in Chile to confirm the wobble. His work confirms that the pulse timing method is an efficient avenue for discovering faint companions to hot subdwarfs and paves the way for future studies to be conducted with TESS.