U.S. DEPARTMENT of ENERGY | Office of Science

Jaden Cunningham

Super Mario to Super Computers

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Video games sparked computer interest for Oak Ridge National Laboratory intern

By Allan Brettman

For Jaden Cunningham , it's a long way between GameCube and Summit, one of the world's most powerful super computers, yet he traces his computer science career ambitions back to his youthful infatuation with the home video game console.

"My older cousin let me play with his GameCube when I was about 7 years old," said Cunningham. "From that point on I was captivated by the stories you could play through that. I've been interested in software ever since."

That interest blossomed in summer 2024 when Cunningham spent 10 weeks at Oak Ridge National Laboratory (ORNL) in Tennessee. The opportunity was through the Science Undergraduate Laboratory Internships (SULI) program offered by the Department of Energy (DOE) Office of Workforce Development for Teachers and Scientists.

Reaching the Summit

The experience allowed him to work near Summit, which is located in theOak Ridge Leadership Computing Facility , a DOE Office of Science user facility based at ORNL that houses some of the world's fastest supercomputers.

Cunningham is a junior majoring in computer science with a minor in mathematics at Tennessee Tech University in Cookeville, Tenn. In late 2023, Cunningham stopped by a career fair where he learned about SULI while chatting with an ORNL representative about the program.

"I didn't think I would even have a chance before I applied, but I decided that I might as well apply and see," Cunningham recalled. "I worked hard on the application. I spent several days on it because I really did think after reading more about the program and the application process, I thought I might actually have a chance."

In early 2024, he learned he'd been accepted.

ORNL earns rave review

"The experience was one of the best opportunities I have ever been given," Cunningham said.

As a history buff, he was intrigued with ORNL before he arrived on the campus. He knew the national laboratory's important past in the Manhattan Project .

He was much more interested in the ORNL's current pursuits.

"I was very, very interested in what kind of research they might be doing with artificial intelligence—AI—and how I could possibly be a part of that," he said.

As it turned out, Cunningham contributed to a research project exploring new methods to anticipate electricity consumption and distribution.

"My little niche in that research project was to incorporate different algorithms for an aggregation method of different models," he said, "to make the models faster and to make them work better."

The project sought to improve accurate forecasts for residential electricity loads by leveraging a technique called "Privacy-Preserving Federated Learning for Short-Term Load Forecasting," said Jaden's mentor, Abhishek Potnis , a researcher in ORNL's Geospatial Artificial Intelligence group.

"It was a fantastic experience working with Jaden during the 10 weeks. His eagerness to learn new concepts on Federated Learning—and perseverance towards rapidly prototyping them—were remarkable," Potnis said. "I'm proud of all that he was able to accomplish and am excited to see all the amazing things he will achieve in the future."

Code for success: career network

Cunningham enjoyed applying his classroom knowledge to a real-world setting. That was one of the many things he liked about being a SULI student.

"The best part of the program was the people I had the pleasure of working with," he said, singling out the mentoring he received from Potnis.

"This program gave me an environment where I was encouraged by my peers to dig deep into any questions I had and not to be afraid to take on hard challenges," Cunningham said. "Everyone I met welcomed me and made this work experience a joy to have. It has also introduced me to a professional atmosphere which will help me in my future career."

For the immediate future, Cunningham anticipates pursuing a master's degree in computer science. Before SULI, working in a federally funded research and development center hadn't been part of his long-term career considerations. That possibility now exists, along with working in the private sector.

And for summer 2025?

"SULI was great. I would gladly do it again!"