EAGLE DRIVE

TENNESSEE TECH UNIVERSITY DEPARTMENT OF COMPUTER SCIENCE • VOLUME 4 • 2025

SOAR WITH HPC

A WORD FROM THE CHAIR

DR. GERALD C. GANNOD
DEPARTMENT OF COMPUTER SCIENCE CHAIR

"THE BEST WAY TO PREDICT THE FUTURE IS TO INVENT IT."

Several people are purported to have uttered the quote above, ranging from Abraham Lincoln (the 16th president of the United States) to Alan Kay (a computer science pioneer), to Yogi Berra (New York Yankees Hall of Famer). Regardless of to whom we attribute the quote, its wisdom is clear – we all have the ability to impact what and who comes next. With that, I am pleased to be writing to all of you again as we share highlights of the accomplishments of the faculty, staff and students of the Department of Computer Science at Tennessee Technological University. This past year has seen us achieve some significant milestones in the growth of our programs, in the success of our students and the prominence of our faculty.

As we have grown, we have continued to be strategic in how we prepare for the future, especially in helping prepare our students to be the technical and organizational leaders for the next 50 years. The theme of this year's magazine is focused on high-performance computing, one of the research and educational thrusts of our department. The look and feel of the artwork in this edition of Eagle Drive is meant to be "futuristic" in its use of polygonal shapes and ties together the idea that the future of computing (especially artificial intelligence, cybersecurity, software development, etc.) is highly dependent upon an HPC backbone.

With our proximity to Oak Ridge National Laboratory, home of some of the fastest computers in the world, our own efforts in supercomputing have begun to flourish. You'll read about the newly proposed Advanced Scalable Computing, Extreme Networks and Data (ASCEND) Center being led by our faculty, changes in our curriculum being introduced to prepare students to develop software for parallel and distributed computing systems and the experiences some of our students have had on HPC internships.

In the magazine you will also read about the successes of our students, ranging from those taking on university student leadership roles, student competition teams and those reaching the pinnacle of academic achievement through the completion of the Ph.D. degree. Plus, you will learn about new additions to the faculty and the successes of some of our highest-soaring Golden Eagle faculty.

We again thank SAIC (Science Applications International Corporation) for their sponsorship of the Eagle Drive magazine and the production staff, including Amy Davis ['00,'23] and Rebecca Hahnert ['23], for their efforts in this edition. Enjoy reading and thank you for your support.

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COMMUNITY BUILDING


RESEARCH

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SOARING HIGHER IN 2024

Computer science majors Harrison Kay, Connor Smith, Kailyn Culpepper, Jason Risner leave Bruner Hall after class.

TENNESSEE TECH RANKED AMONG STATE'S TOP THREE COMPUTER SCIENCE PROGRAMS

Tennessee Tech's Department of Computer Science rose 56 spots in U.S. News & World Report's 2025 rankings to be named among the top three computer science programs in the state and top two among public universities.

"We are just outside of the top 100 computer science programs from public institutions in the U.S.," Gerald Gannod, Ph.D., department chair, said. "It is satisfying to know that our efforts to improve student success and develop faculty have led to well-deserved recognition."

Tennessee Tech has been ranked as a top national university for 10 consecutive years by U.S. News & World Report. The university's latest position in the rankings follows a notable enrollment boost for fall 2024, marked by the fourth largest freshman class in its history with 2,006 students and largest total headcount since 2015, reaching 10,511. In computer science specifically, enrollment rose to nearly 900 students across both undergraduate and graduate programs.

TOP PRODUCER OF CS GRADUATES

Along with its higher ranking, Tennessee Tech emerged as the leading producer of computer science graduates among Tennessee's public universities for the 2022-2023 academic year, according to enrollment data from the university's Office of Institutional Assessment, Research and Effectiveness. Tech graduated 129 students, surpassing its nearest competitor, which had 113 graduates.

For the 2023-24 academic year, the number of computer science graduates from Tech reached 136, marking a further increase, according to the latest Integrated Postsecondary Education Data System (IPEDS) data.

"The growth of computer science programs across the country has been rising due to market demand, but we also work hard to recruit and retain students," Gannod said.

"THEY SEE THAT TECH IS CENTERED ON STUDENT SUCCESS AND THAT EMPLOYERS ARE COMING TO US TO HIRE OUR GRADUATES."

LARGEST UNDERGRADUATE PROGRAM

Furthermore, Tech ascended to Tennessee's largest undergraduate computer science program in 2023, according to Institutional Research IPEDS data.

Concentrations

- Data Science & Artificial Intelligence
- Information Assurance & Cybersecurity
- High-Performance Computing

Enrollment

- **888**
  - Fall 2024:
  - Undergraduate CS majors – 744
  - Undergraduate CS interest – 64
  - Master's – 39
  - Ph.D. – 41

Graduates

- **136**
  - Fall 2023-Summer 2024:
  - B.S. – 112
  - M.S. – 20
  - Ph.D. – 4

Department highlights

- Increased undergraduate majors to 744 (up 17% since 2022)
- Achieved all-time high for first-time freshmen (fall 2024)
- Increased first-time freshmen retention to 86.1% (fall 2023 cohort)
- Increased Data Science & Artificial Intelligence concentration to 132 (up 28% since fall 2023)

** Institutional Research IPEDS data*

University highlights

- **A Best National University** – *U.S. News & World Report*
- **Debt-Free Success:** 45% of graduates leave debt-free. Those who graduate with debt have the least of any public university in Tennessee. – *U.S. News & World Report*
- **Top ROI:** Based on total cost and alumni earnings, Tech provides highest return on investment for any public university in TN and ranks third overall among both private and public universities. – *PayScale*
- **Leading Early Career Salaries:** Tech graduates earn highest early career salary of any public university graduates in TN. – *PayScale*
- **Record-Breaking Research Funding:** Tech secured $46M in sponsored research activations in FY2024.

ASCENDING WITH HPC

TECH STUDENTS AND FACULTY SHINE AT SC24 CONFERENCE

The stars are aligning for HPC in Tennessee – especially at Tennessee Tech, where students and faculty with a passion for high-performance computing are poised to shine.

"We couldn't be better positioned to grow and prosper than we are right now," said Tony Skjellum, professor of computer science, noting not only Tech's successful debut as an exhibitor at the SC24 international supercomputing conference but also its prime location amid the state's ramping tech sector.

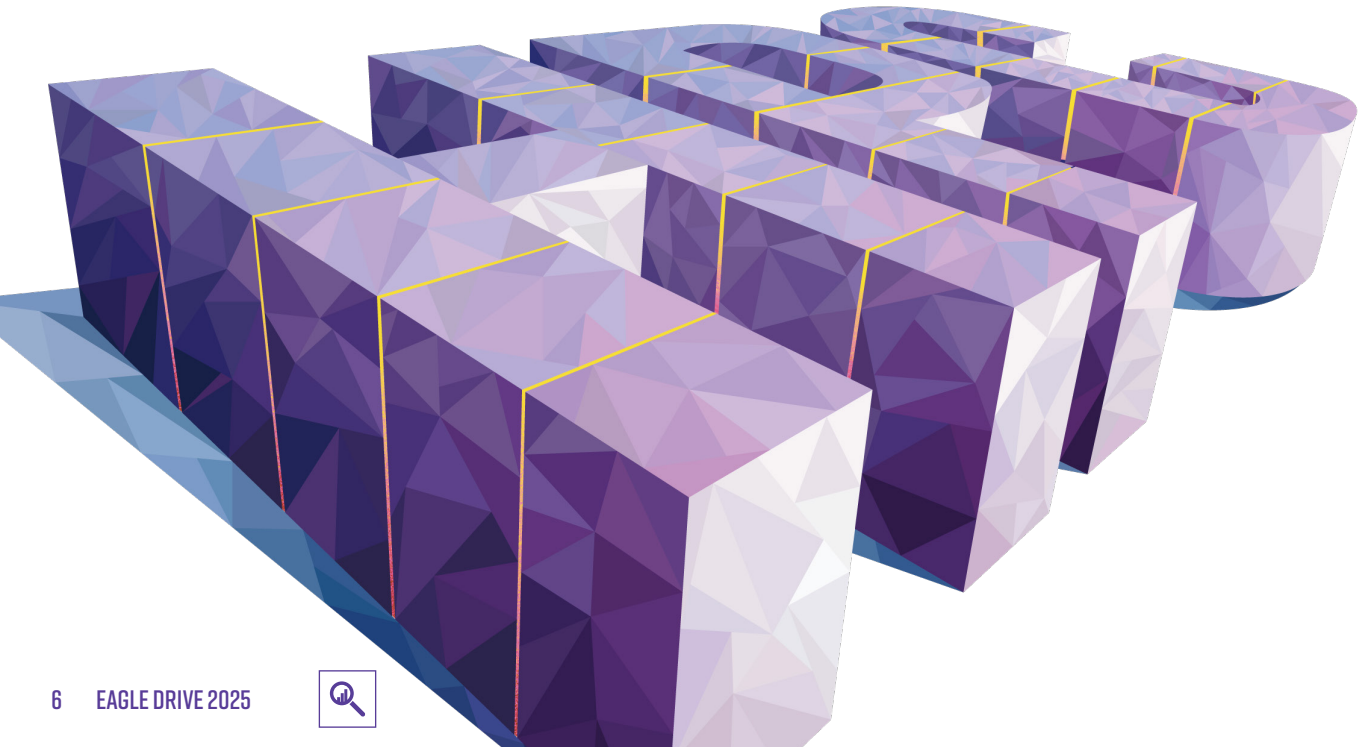
"Tennessee is the center of the world for supercomputing, from Oak Ridge National Laboratory, home of the world's fastest supercomputer, to Memphis, where Elon Musk and xAI are set to build the world's fastest AI supercomputer," he said. "In between, Tennessee Tech is advancing HPC research, driving workforce development and building large-scale HPC and quantum resources at our forthcoming data center. Plus, a proposed ASCEND (Advanced Scalable Computing, Extreme Networks and Data) center is in the works."

To spotlight its ascent in the HPC space, Tech was among nearly 500 exhibitors at SC24, which drew a record-breaking 18,100 attendees to Atlanta in November to explore the latest innovations in high-performance computing, networking, storage and analysis. More than 20 students, faculty and staff represented Tech at the event, with some showcasing the university's achievements at its new 20x20-foot booth and others taking part in technical workshops, networking with industry professionals and presenting their research. The conference also provided an opportunity to connect with alumni, as well as strengthen Tech's efforts to recruit, engage and retain students and faculty.

"We achieved more than 100 percent of our goals at SC24," Skjellum said. "We built a lot of goodwill around the quality of our students, department and university, especially among local employers who didn't realize they could tap into our talent. They know about us now."

And that presents new opportunities for everyone.

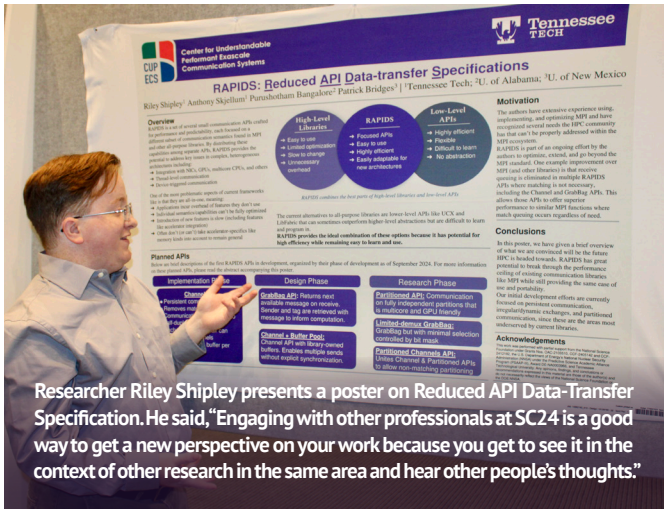
"We have follow-up meetings with organizations like Oak Ridge National Laboratory," Skjellum said. "Plus, we've established collaborations with key technical partners, providing our students with valuable opportunities to engage directly in the profession."



SC24 MOMENTS

Corbin Cawood, senior scalable systems and networks architect, left, and Tony Skjellum, Ph.D., computer science professor, stand by Tech's booth at SC24.

Ph.D. student Sepideh Abdollah volunteers with SCinet after having spent two weeks helping to set up the network infrastructure for the conference.



Researcher Riley Shipley presents a poster on Reduced API Data-Transfer Specification. He said, "Engaging with other professionals at SC24 is a good way to get a new perspective on your work because you get to see it in the context of other research in the same area and hear other people's thoughts."

Tech computer science students Kyle Davis, Cal Stewart, Shawn Shankar and Evan Suggs, from left, hand out rubber "debugging" ducks at SC24.

These new connections are solidifying Tech's position as a key player in computing – and, as if by cosmic design, the playing field is becoming increasingly bright in Tennessee.

"With companies like Microsoft and AWS (Amazon Web Services) already established here and Oracle moving its world headquarters to Nashville, the demand for a skilled AI workforce is skyrocketing – and HPC makes AI go," Skjellum said.

Tennessee Tech aims to build on its SC24 debut by increasing its technical presence at supercomputing conferences.

"Our investment has been in engaging with others to raise awareness about Tennessee Tech so that we're attracting prospective students and faculty and ensuring employers recognize the value of our graduates," Skjellum said. "At the same time, we're putting our current students front and center in their discipline."

So they can shine like stars. ■

COMING SOON...

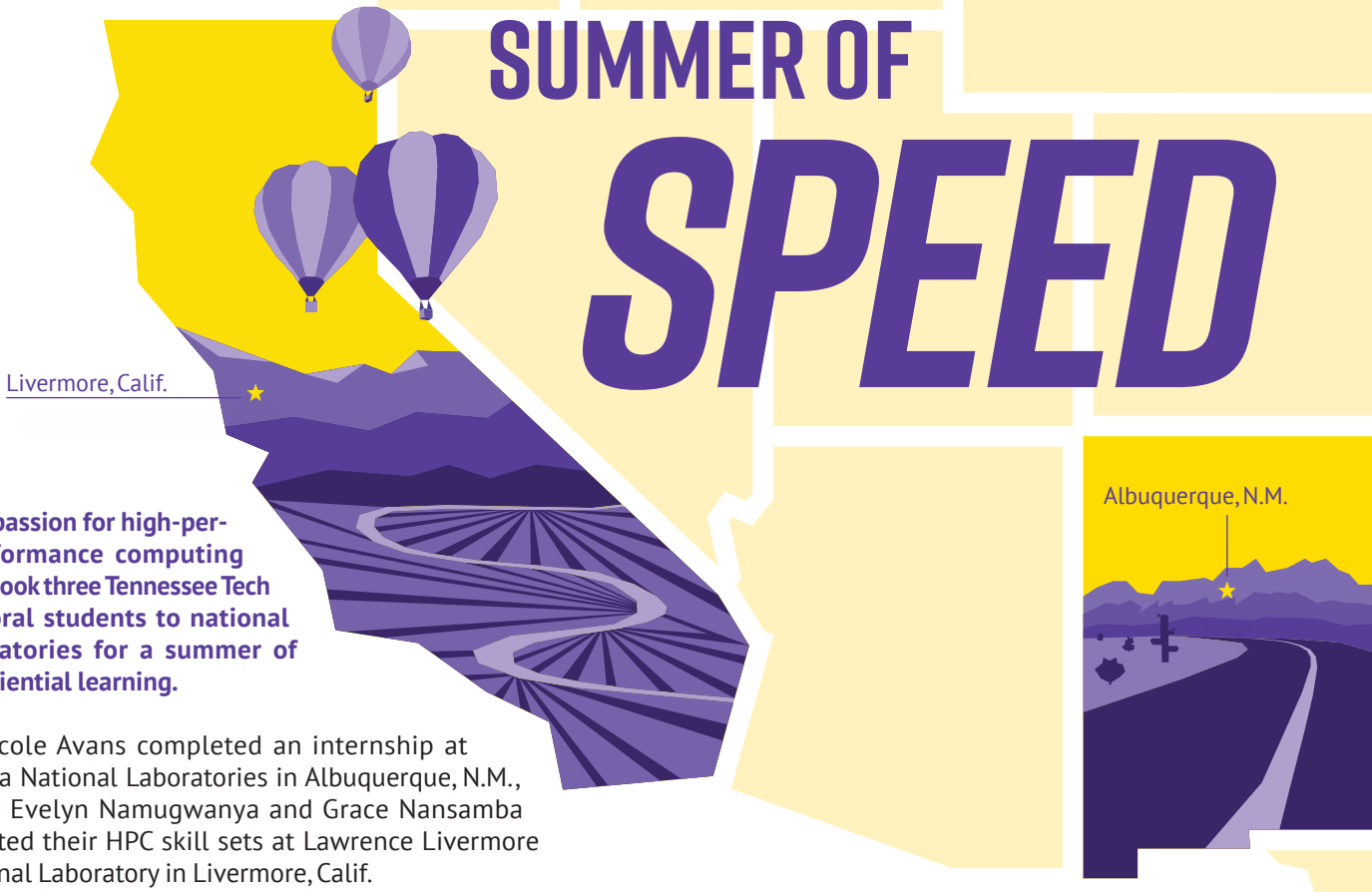
ASCEND

Advanced Scalable Computing, Extreme Networks & Data

Goals of proposed center:

- HPC, AI and quantum research and development
- Workforce development through experiential learning
- Support for MInDS (Machine Intelligence & Data Science) and CEROC (Cybersecurity Education, Research & Outreach Center)
- Supercomputing facility with large-scale HPC infrastructure, data center and quantum network in Crossville

SUMMER OF SPEED



A passion for high-performance computing took three Tennessee Tech doctoral students to national laboratories for a summer of experiential learning.

Nicole Avans completed an internship at Sandia National Laboratories in Albuquerque, N.M., while Evelyn Namugwanya and Grace Nansamba elevated their HPC skill sets at Lawrence Livermore National Laboratory in Livermore, Calif.

WHAT WAS THE BEST PART OF YOUR HPC INTERNSHIP?

"It was incredible to experience the culture of New Mexico while developing my confidence as a computer scientist and research software engineer," Avans said of her time at Sandia National Laboratories. "I met a diverse group of interns and mentors from a variety of places and learned many things in and out of the professional sphere."

As a computer science intern – a position Avans is continuing remotely – she has been involved in research and assisting in the development of the KokkosComm library, a communication framework that optimizes data exchange and parallel processing in distributed computing environments.

"I established a series of performance benchmarks to help illuminate existing issues in this new library and areas for further optimization," she said.

At Lawrence Livermore National Laboratory, Namugwanya and Nansamba were pleased to have made valuable connections with HPC professionals and peers.

"The entire lab experience was incredible," Namugwanya said. "Working in person with collaborators, having hands-on access to advanced resources and meeting students from all over the world made the internship truly memorable."

Namugwanya's internship provided an opportunity for her to work on the back-end development of a Caliper profiling tool, a performance analysis tool used in HPC environments.

"My team and I introduced a new concept of special region annotations within Caliper, which are essential for profiling HPC benchmarks in the Benchmark Suite," she said. "This enhancement allows for advanced performance analysis and helps identify specific areas for optimization in HPC applications."

She said the work was an eye-opener: "Contributing to such a sophisticated HPC tool changed my perspective on the details involved in HPC software and the importance of each component's efficiency."

Nansamba, who also interned at Lawrence Livermore National Laboratory, enjoyed the structured work schedule and said lab employees were supportive to students.

"I worked on performance analysis of the Benchmark Suite for testing HPC systems," she said, referring to an open collaborative repository for reproducible specifications of HPC benchmarks. "It enables cross-site collaboration on benchmarking by providing a mechanism for sharing reproducible, working specifications."

Additional highlights for Nansamba included winning a best poster presentation award and making new friends.

WHAT ARE SOME IMPORTANT THINGS YOU LEARNED?

Avans said she gained a better understanding of what it means to relocate for work while she was at Sandia National Laboratories: "It was an immersive learning experience. I had never moved such a long distance, and it was valuable to see what benefits and drawbacks come with relocating for a career opportunity."

She also valued the numerous educational lectures and presentations.

"The focus was more on continuing education than on production-level software engineering," she said. "However, on the software engineering side, it was beneficial to become aware of some of my blind spots. I learned many new things about collaborative coding, such as intermediate and advanced use cases of Git and GitHub that are critical in most development careers."

Namugwanya said her biggest takeaway from Lawrence Livermore National Laboratory was understanding the critical role of detailed profiling and performance analysis in HPC.

"By implementing special region annotations in Caliper, I learned how precise instrumentation can reveal key insights into computational efficiency within HPC workloads," she said. "I gained valuable skills in performance tuning, developed a deeper knowledge of data collection in parallel computing environments and gained hands-on experience with advanced profiling techniques. These skills will be valuable for future projects, especially those focused on optimizing complex HPC applications such as collective communication patterns."

Nansamba learned about the importance of team collaboration to achieve a common goal.

"We had weekly stand-up meetings to give updates about the work, and this was a motivation to finish tasks," she added. "My team at the lab was pretty fun to work with."

Avans' summer internship led to an opportunity to tour Fugaku, a supercomputer focused on energy efficiency at the RIKEN Center for Computational Science in Kobe, Japan. She also presented her work at the 2024 IEEE International Conference on Cluster Computing.

WHAT ADVICE DO YOU HAVE FOR STUDENTS SEEKING INTERNSHIPS?

"Enjoy the internship experience and stay open to learning. There's something amazing about putting your academic knowledge into practice, and it's **incredibly fulfilling.**"

Evelyn Namugwanya

"It's possible to get an internship. Inquire from professors whether they can recommend you. It paints a good picture of life after school. **It's exciting!**"

Grace Nansamba

"Creating and maintaining connections with people in the field through **collaborative work** and conference attendance will open many doors. If you aren't involved in any projects, I recommend speaking with your advisor about your desire to get involved. There is almost always more work to be done than people to do it. ▪"

Nicole Avans

UPLOADING 4...

FOUR NEW FACULTY MEMBERS ENHANCE TECH'S GROWING COMPUTER SCIENCE COMMUNITY

Innovation is driven by fresh perspectives and expertise.

That's why Tennessee Tech's Department of Computer Science was excited to welcome four new faculty members to its team in 2024 – after having added nine in 2023 – bringing the total to 36 dedicated professors, lecturers and adjuncts to the College of Engineering's second-largest academic program by enrollment.

These educators not only bring bold ideas and extensive knowledge to their classrooms but also serve as passionate mentors, shaping and empowering the next generation of tech leaders.

MEET THE NEW FACULTY

Tennessee Tech's newest computer science faculty members are, from left, assistant professors Jesse Roberts ['14, '17] and Prantar Ghosh and instructors Brandon Vandergriff ['21, '23] and Cristina Radian.

PRANTAR GHOSH, PH.D.

ASSISTANT PROFESSOR

After visiting its welcoming campus, Prantar Ghosh, Ph.D., was eager to bring his passion for theoretical computer science to Tennessee Tech.

"I found the faculty members in the computer science department to be very cordial and supportive, and it seemed to be a great work environment suitable for my research and teaching interests," he said.

Ghosh, who earned his Ph.D. in computer science from Dartmouth College in 2022, is especially interested in the design and analysis of graph algorithms and teaches both graduate and undergraduate courses, including Design of Algorithms, Discrete Structures, Foundations of Computer Science and Advanced Analysis of Algorithms. He is also a graduate of Chennai Mathematical Institute in India, where he received a master's degree in computer science in 2017 and bachelor's degree in mathematics and computer science in 2015.

This assistant professor looks forward to getting to know his students and sharing "the gems in theoretical computer science" with them. Moreover, he aims to work closely with his colleagues to elevate the department to new heights.

Ghosh's advice to CS students: "Take advantage of the fact that you are studying a subject that is ever-growing, rapidly developing, widely applicable and directly impacting the real world, all at the same time."

JESSE ROBERTS, PH.D. ['14, '17]

ASSISTANT PROFESSOR

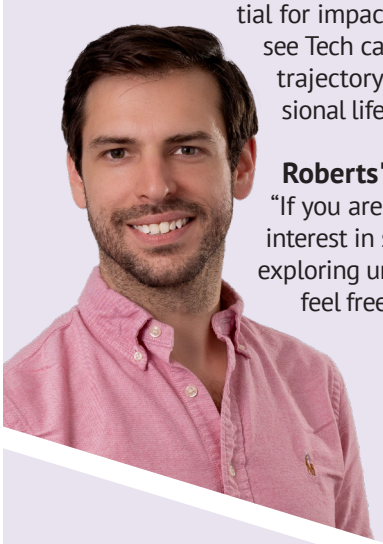
Before joining Tennessee Tech's computer science faculty, Jesse Roberts, Ph.D., began his academic journey at the university as an electrical engineering student. He received his bachelor's and master's degrees in 2014 and 2017 and worked seven years in software and hardware design for industrial automation. He also served as an electrical and computer engineering lecturer at Tech before shifting his focus to computer science.

"I envision a future in which AI is widely accessible to support the goals of individual humans," said Roberts, who earned his Ph.D. in computer science with a focus in artificial intelligence from Vanderbilt University in 2024.

"While there are many ways this might be approached, I focus on developing technology to facilitate natural language collaboration between human and machine. But I'm generally interested in any idea that can positively impact people."

He also uses language model technology to preserve the Cherokee language (Tsalagi), drawing inspiration from Irish (Gaeilge) preservation efforts, in hopes of creating "a dynamic reservoir for the support of future generations of speakers."

Roberts, who teaches a special topics course on large language models, was drawn to Tech because of the potential for impact. "An education at Tennessee Tech can largely set the tone and trajectory of an individual's professional life – as I can attest," he said.



Roberts' advice to CS students: "If you are a curious person with an interest in solving real problems and exploring untrodden paths through AI, feel free to reach out!"

CRISTINA RADIAN, MS
INSTRUCTOR

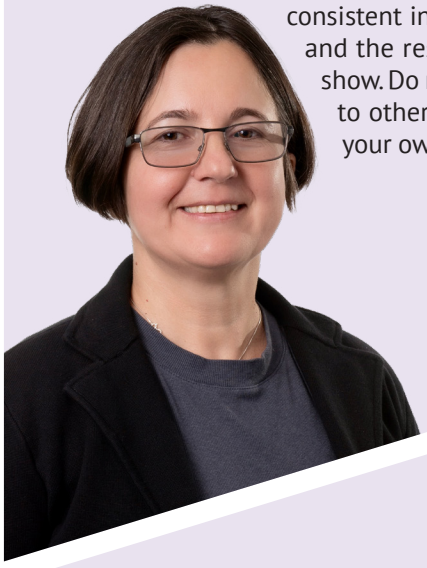
After years of working in the data science industry, Cristina Radian returned to the classroom – initially as a Ph.D. student and later as an instructor while completing her studies at Tennessee Tech.

"Tennessee Tech was attractive to me for graduate school because of its outstanding computer science program and the approachable, supportive faculty who responded promptly to my inquiries," she said. "The university size offers a personalized learning experience, and the beautiful rural setting and impressive architecture create an inspiring environment for academic growth."

Radian – whose research interests include machine learning, artificial intelligence, quantum computing, data science and biocomputing – earned a bachelor's degree in biology from the University of Bucharest in Romania and master's degree in applied statistics from California State University, East Bay. In her new role at Tech, she teaches Design of Algorithms.

"I look forward to helping students maximize their academic potential, improve their problem-solving skills and prepare for the workforce," she said.

She also enjoys participating in competitions and was a Womanium Quantum + AI 2024 technical merit grant winner for her team's Development of Novel Algorithms project.



Radian's advice to CS students: "Be consistent in your learning effort, and the results will eventually show. Do not compare yourself to others, but rather look for your own growth."

BRANDON VANDERGRIFF, MS ['21, '23]
INSTRUCTOR

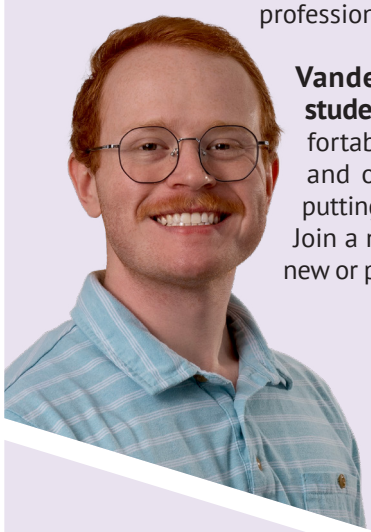
Brandon Vandergriff was a Tennessee Tech computer science student himself before stepping into the role of instructor. Now he teaches Introduction to Programming courses, working alongside colleagues who guided him through his studies just a short time ago.

"Clearly, they've done something right since I'm still hanging around," said Vandergriff, who earned his bachelor's and master's degrees in 2021 and 2023, respectively, and has been part of the faculty since the spring of 2024.

"One of the most enjoyable parts of being at Tech has been the sense of community – whether it be the friends I've made along the way or the professors I've come to work beside. Not to brag, but my coworkers rock."

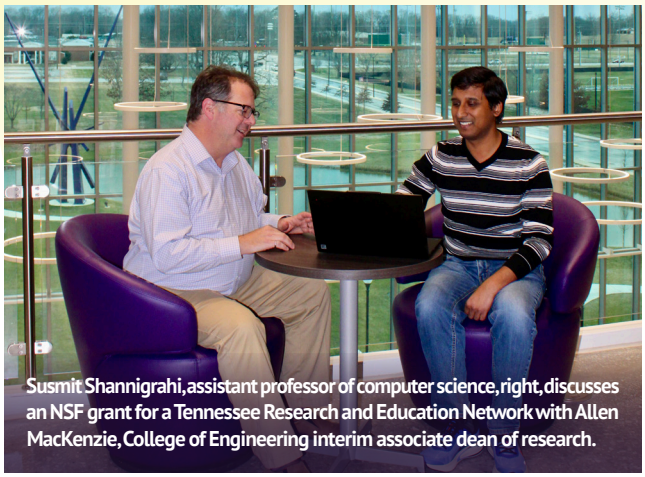
As a graduate student, Vandergriff focused on data science and artificial intelligence and, more recently, he has been interested in high-performance computing – especially virtual machines. He appreciates the opportunity to share his computer science passion with students.

"It feels great being able to influence their academic careers," he said. "I enjoy seeing them grow professionally and personally."



Vandergriff's advice to CS students: "Make yourself uncomfortable. Most personal growth and opportunities come from putting yourself in new situations. Join a new club, talk to someone new or pick up a new hobby."

RESEARCH SPOTLIGHT



Susmit Shannigrahi, assistant professor of computer science, right, discusses an NSF grant for a Tennessee Research and Education Network with Allen MacKenzie, College of Engineering interim associate dean of research.

NSF GRANT AWARDED FOR TN RESEARCH & EDUCATION NETWORK

Tennessee Tech has received a $200K planning grant from the National Science Foundation to develop a research and education network for Tennessee.

"The goal is to build a high-capacity, cutting-edge network that will seamlessly facilitate research and education in Tennessee," said Susmit Shannigrahi, Ph.D., assistant professor of computer science, who served as co-principal investigator on the project with Allen MacKenzie, Ph.D., interim associate dean of research in Tech's College of Engineering, as the PI.

The grant, awarded by NSF's Office of Advanced Cyberinfrastructure, involves three other under-resourced but research-active public university partners: Middle Tennessee State University, Tennessee State University and the University of Tennessee at Chattanooga. This grant will create a comprehensive strategy for the development of a Tennessee Research and Education Network (TREN) as well as a regional cyberinfrastructure plan.

"By connecting these four universities with each other and with larger research organizations in the region, TREN will catalyze and accelerate research for the under-resourced institutions while fostering statewide collaborations," MacKenzie said. "The network connectivity that TREN will provide will elevate Tennessee's capacity for cutting-edge research and facilitate education, thereby contributing to economic development."

Four planning workshops will take place during the two-year grant period, bringing together the four partnering institutions and representatives from major research institutions in the region such as Vanderbilt University, UT Knoxville and Oak Ridge National Laboratory. ■

DOUBLE THE DISTINCTION FOR TWO CS RESEARCHERS

Muhammad Ismail, Ph.D.

Maanak Gupta, Ph.D.

Two Tennessee Tech associate professors of computer science were ranked two consecutive years among the world's top two percent of scientists.

The back-to-back honors came when Stanford University released its "World's Top 2% Scientists" list in the fall of 2024, with Maanak Gupta, Ph.D., and Muhammad Ismail, Ph.D., included as top-cited researchers in various scientific fields for single-year impact for 2023. Both joined Tech's Department of Computer Science in 2019.

Gupta said this recognition highlights the sustained, high-impact research his Applied and Basic Cybersecurity Lab is conducting at Tech: "I am immensely proud of my team, whose commitment to groundbreaking, cutting-edge research continues to advance the converging fields of cybersecurity and AI."

Ismail, who also serves as director of Tech's Cybersecurity Education, Research and Outreach Center, noted the impact he is striving to make through his continued research: "I want to ensure that our graduate students lead in innovation and our undergraduates gain practical, hands-on experience."

This prestigious list, published by Stanford University and Elsevier, is considered a global benchmark for academic achievement, highlighting the world's leading researchers and their contributions to the advancement of science in their respective fields. ■

FISCAL YEAR 2024 RESEARCH

AWARDS: $3.25M and ACTIVATIONS: $4M
Saw 524% increase in grant activations since FY2016.

AWARDED $3M NSF RESEARCH GRANT:
Tech faculty are training graduate students on convergence of energy, artificial intelligence and cybersecurity disciplines.

DOUBLED PUBLISHED RESEARCH:
Saw 134% increase since FY2017.

SENSING SUCCESS WITH PHD

PH.D. GRADS SOAR BEYOND TN TECH TO SHAPE FUTURE OF COMPUTING

These were the moments they **SAVORED**...

The **SOUND** of their names being announced, followed by cheers and applause.

The **SIGHT** of their professors' beaming faces.

The **WEIGHT** of ceremonial hoods on their shoulders and warmth of congratulatory handshakes.

The **SMELL** of new academic regalia and diploma covers.

And – best of all – the **TASTE** of success as Tennessee Tech's newest Ph.D. computer science graduates strode boldly across the commencement stage, ready to change the world.

After all, these innovative scholars carried away more than a degree; they had been equipped with all the knowledge, skills and confidence necessary to soar beyond their alma mater to solve complex problems in rapidly evolving fields ranging from cybersecurity to high-performance computing to data science and artificial intelligence.

Here's how four recent doctoral graduates – Rajesh Manicavasagam, Sushil Poudel, Elmahedi Mahalal and Umair Mughal – are impacting the future of computing.

UMAIR MUGHAL, Ph.D. ['24] serves as an assistant professor at Northwest Missouri State University, where he continues to contribute to the field of cybersecurity and inspire future generations of computer scientists.

At Tennessee Tech, his research focused on cybersecurity for unmanned aerial vehicles, or UAVs. His dissertation explored stealthy false data injection attacks designed to mislead UAVs as well as innovative AI-based solutions to counter such threats.

Mughal, originally from Pakistan, had the opportunity to demonstrate his findings and real-world impact of his research to Tech's Cybersecurity Education, Research and Outreach Center advisory committee. He also participated in the graduate community and served as vice president of the Computer Science Graduate Student Club.

He was drawn to Tech by its "strong cybersecurity program" and found his experience "enriching and rewarding," he said.

"I will always miss Tennessee Tech, the computer science department and the breathtaking nature of Tennessee."

DISSERTATION: AI-Assisted Intrusion Detection System for Swarms of Unmanned Aerial Vehicles

RAJESH MANICAVASAGAM, Ph.D. ['23] is a lead senior engineer at Millennium Software Inc. in Harrisburg, Penn., where he focuses on requirements gathering, analysis, design, development, unit testing, knowledge transfer and database development.

He said Tennessee Tech impacted his educational journey by equipping him with the knowledge needed to understand complex processes and solve intricate development issues. The university also "enabled my communication and public speaking skills," he said.

Before pursuing his doctoral degree at Tech, Manicavasagam received his master's degree in computer science from Western Kentucky University in 2003 and bachelor of engineering in computer science from Mepco Schlenk Engineering College, India, in 1999. He was drawn to Tech, he said, due to its "support for research areas that include high-performance computing, smart grid and cybersecurity."

In addition to his work in the software industry, Manicavasagam taught principles of computing and computer architecture as an instructor in Tennessee Tech's Department of Computer Science.

He said he valued the support he received from his Tech advisor as well as the professors he worked with at the university.

DISSERTATION: Identifying and Detecting Network Indicators of Compromise (IoCs) for Demand Response Programs

ELMAHEDI MAHALAL, Ph.D., ['24] is an assistant professor of electrical and computer engineering and computer science at the University of New Haven, where he specializes in the intersection of next-generation technologies, security and artificial intelligence.

A native of Algiers, Algeria, he earned his B.S. and M.S. degrees from the University of Science and Technology Houari Boumediene in 2017 and 2019 and worked two years as a data scientist and network engineer before enrolling at Tech for his doctoral studies.

"I chose Tennessee Tech for its excellent reputation in computer science and strong emphasis on research and teaching," he said.

Some of his special memories include tackling complex problems and developing innovative solutions through collaborative projects with classmates. He also enjoyed the setting of his studies: "Cookeville is a beautiful town, offering a calm and less-distracting environment that allows you to focus and excel in your studies," he said.

How did Tech make a difference in Mahalal's educational journey?

"Tennessee Tech provided me with a robust foundation in computer science," he said. "In my early career, I learned a lot about mobile technologies from the second generation to 5G and beyond. Joining the computer science program at Tech expanded my knowledge in artificial intelligence and security fundamentals, allowing me to work on AI-assisted security in 5G and beyond networks."

Grateful for the Tech experience, he said, "I would like to extend my heartfelt thanks to my advisor, Dr. Muhammad Ismail, and everyone I had the opportunity to interact with for their unwavering support, time and guidance."

DISSERTATION: AI-Assisted Physical Layer Security in Next Generation Wireless Network

SUSHIL POUDEL, Ph.D. ['23] is a postdoctoral researcher at Indiana University Bloomington, where he contributes to collaborative projects while gaining experience for his future academic career.

"I aspire to become a professor of computer science at a university where I can mentor students in research and help shape the next generation of innovators," he said.

Poudel, who is from Pokhara, Nepal, said Tennessee Tech – which was at the top of his list for graduate studies – played a pivotal role in his educational journey.

"After completing my master's degree in Nepal, I was eager to pursue a Ph.D. in computer science," he said. "A friend recommended Tennessee Tech, and I received a quick admission decision along with a funding opportunity, which was a key factor in my decision. Additionally, my research interests aligned well with a professor at Tech, making it the ideal choice for my academic and research pursuits."

Poudel holds many special memories from his time at Tech. He especially enjoyed serving as a teaching assistant, which "allowed me to help students grasp difficult concepts by sharing my own understanding and approach," he said. "Leading lab sessions was particularly rewarding, as I was able to teach students about industry-level needs and requirements."

Other highlights included his involvement in the Computer Science Graduate Student Club and Data Science League and discussions with faculty on how to improve academic support for students.

DISSERTATION: Securing Front-End Vehicle-to-Grid Communication: Malware Attacks and Defense Strategies in Public EV Charging Stations

INTRODUCING PDC CONCEPTS

TENNESSEE TECH PART OF MULTI-UNIVERSITY PROJECT TO MODERNIZE INTRODUCTORY CS COURSES WITH PARALLEL AND DISTRIBUTED COMPUTING

Parallel and distributed computing is now part of the package for students in introductory computer science courses at Tennessee Tech – and it's giving them a competitive edge in industry readiness.

"Early exposure to PDC prepares students with relevant skills in modern programming models, potentially reducing the industry training gap post-graduation," said senior lecturer April Crockett ['01,'04], who, along with department chair Gerald Gannod, Ph.D., are working with 11 other universities to develop exemplar courses that reflect contemporary computing models and practices.

The project, funded by a National Science Foundation CyberTraining grant under the "Modern Course Exemplars Infused with Parallel and Distributed Computing" initiative, introduces PDC concepts in CSC 1300 (Introduction to Problem Solving and Computer Programming) and 1310 (Data Structures and Algorithms). Through this integration, students cover aspects of data parallelism, distributed computing and event handling, with an emphasis on enhanced computational thinking beyond traditional sequential programming.

Gannod said PDC is closely related to HPC (high-performance computing), with HPC focusing on the use of supercomputers and clusters for computationally intensive tasks while PDC emphasizes the simultaneous use of multiple computing resources to complete a task, regardless of the presence of a supercomputer.

"The current technological landscape is highly driven by the use of artificial intelligence and machine learning," he said. "To use these tools, future graduates will need to create solutions that effectively use distributed computing and data resources. Modernizing the introductory course is the first step toward preparing students to work in a world where HPC and PDC are commonplace."

To kick off the project, Tennessee Tech (using C++) and Knox College (using Java) started making changes in their introductory CS courses in the fall of 2023 and fully deployed them in the spring of 2025. Now, six other institutions – Casper College, Hawaii Pacific University, Montclair State University, University of Nebraska-Lincoln, University of Southern Indiana and Webster University – are serving as a testing and evaluation team, deploying the updated courses in their CS programs and providing feedback. The University of Texas at San Antonio, University of Massachusetts, Louisiana State University and University of Maryland are also involved in the project.

Initial feedback from pilot surveys in 2023 indicated that students were better able to conceptualize parallelism and data distribution. Furthermore, stakeholder discussions highlighted that updated curricula with PDC-focused learning could improve student readiness for industry requirements in concurrent and distributed programming.

Crockett hopes the project will inspire similar updates across CS programs, helping to reduce the transition time for graduates to become productive in the workforce.

"Our goal is that our project will be a catalyst for change in CS programs by providing exemplars that other institutions can adopt to modernize their introductory computing courses," she said. "By creating adaptable, widely applicable course exemplars infused with PDC concepts, the project aims to establish a new standard for introductory CS education." ■

Computer science students Jeny Thomas & Leo Tarusov work on PDC concepts in their CSC 1300 class at Tennessee Tech.

HARRISON SIMPSON STUDENT BODY VICE PRESIDENT

Harrison Simpson's favorite place on campus is the Roaden University Center balcony: "The view feels so alive. You can see most of the pedestrian walkway, the back porch and all the way over to the library. People are walking around and talking everywhere!"

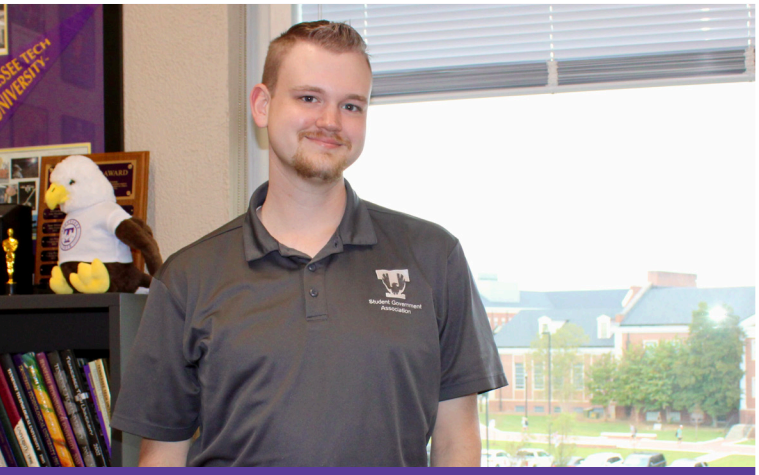
LELA GRACY SUPREME COURT ASSOCIATE JUSTICE

One of Lela Gracy's favorite places on campus is the third floor of Volpe Library: "I love it because it's nice and quiet. I can study and get some work done, and I also love being surrounded by all the wonderful books we have!"

KASHAINA NUCUM COLLEGE OF ENGINEERING SENATOR

Kashaina Nucum enjoys stopping by this popular campus eatery: "Chick-Fil-a is pretty good. There is not one in my hometown."

Computer science majors have opportunities to make an impact at Tennessee Tech – and not just from behind their laptop screens. As officers in the Student Government Association, the five CS students featured in these pages have stepped into prominent leadership roles, combining their technical expertise with their passion for service to help shape campus life in positive ways. Whether supporting student organizations, advocating for academic initiatives or driving campus improvement projects, they are dedicated to empowering both themselves and their peers. Why do they do what they do? And what are their favorite places on campus? Check out their answers to these questions.



BRAXTON WESTBROOK STUDENT BODY SECRETARY

Braxton Westbrook said the SGA office is his favorite place on campus.

SARA OWENS SECRETARY OF INNOVATION & TECHNOLOGY, EXECUTIVE COUNCIL

Sara Owens likes studying by Fearless Falls on Centennial Plaza because of its "nice ambient noise, and I can say hi to friends as they pass by."

4 QUESTIONS

WITH CS STUDENT LEADERS IN SGA

WHAT INSPIRED YOU TO SEEK A POSITION IN STUDENT GOVERNMENT, AND WHAT DO YOU HOPE TO ACHIEVE DURING YOUR TERM?

HARRISON: I was inspired to join SGA after hearing about all the opportunities available for me to benefit my peers and my professional development. I aim to energize our SGA senate and increase its legislative output.

LELA: I wanted to make a positive impact on campus. As a justice on the Supreme Court, my goal was to help legislators interpret the SGA Constitution and establish clear guidelines for future students. By doing so, I aim to help them easily navigate similar questions in the future.

KASHAINA: I joined SGA because I wanted to turn my suggestions around school into actual ideas for administration to hear. Now that it's my second year in SGA, I hope to help new senators write and pass legislation, as well as do the same myself.

BRAXTON: I wanted to be in a place where I could do the greatest good for the greatest number. I have gained invaluable experience in networking, leadership and public speaking, all of which are instrumental for a computer scientist to be successful in the modern world. I hope to bring some of the experience I have gained as a CS major to implement, or at least lay the foundation for, decreasing Wi-Fi congestion on campus, raise awareness of innovative spaces like our VR labs and iMakerSpace and expand grants that fund cutting-edge research and development at Tennessee Tech.

SARA: I saw a need for technology literacy in campus. My goal is to facilitate communication between ITS and the student body and help improve the efficiency of SGA committee work.

WHAT DOES LEADERSHIP MEAN TO YOU PERSONALLY, AND CAN YOU SHARE AN EXAMPLE OF HOW YOUR ACTIONS, WHETHER THROUGH SGA OR ANOTHER STUDENT LEADERSHIP ROLE, HAVE POSITIVELY IMPACTED YOUR PEERS?

HARRISON: To me, leadership is putting your best foot forward to support your team and those they support. "Supporting" can range broadly from being on the ground helping drive awareness to even simple things like setting up meetings. Last year, my support role of setting up meetings between SGA members and administrators led to effective meetings that improved accessibility on campus despite all the construction and got bike racks added to areas that needed more.

LELA: Winning Ms. TTU in 2023 was a massive accomplishment for me and the WiCyS (Women in Cybersecurity) student chapter, but I didn't know I would impact the future of Homecoming as well. In 2023, there were 11 total candidates for Mr. and Ms. TTU, two of which were non-Greek Life. In 2024, after I won, there were 26 candidates, 11 of which were non-Greek Life. This is a huge win for student organization participation at Tech.

KASHAINA: I believe leadership is taking the initiative to accomplish something, no matter how large or small. Last semester, I was inspired to write two bills regarding lists of microwaves on campus and lists of majors for career fairs since I knew students had concerns about these, and I got to see parts of these legislation in action!

BRAXTON: Leadership is the continuous practice of putting others first when you have no personal incentive to do so. It is the active demonstration of your care and regard for the success of the groups you are a part of. A time that stands out to me is when I assisted in the passage of a new constitution for our SGA that is easier to understand yet far more detailed than the previous one. Because of this, I have found that everyone – from senators to justices and executives – are more confident in their positions and far less stressed.

SARA: Leadership means serving others first by being a good steward of the time and position they have given me. In the past, I have demonstrated this through clear communication of expectations and prompt action in response to goals set.

WHAT IS YOUR FAVORITE CS CLASS AND WHY?

HARRISON: My favorite class so far has been IT Security with Eric Brown. The lectures are packed with interesting information about cybersecurity, and the labs are super practical and useful!

LELA: I really enjoyed IT Security with Eric Brown and Networks with Dr. Zulkar Nine. Both classes highlight my niche within cybersecurity.

KASHAINA: My favorite CS class right now is software engineering. I get to apply everything I have learned over the past three years into projects, and I have been learning a lot that would directly apply into real world projects.

BRAXTON: I am not a math guy – it isn't something I generally find enjoyable nor is it something that comes easily to me – but when I took Discrete Structures with Dr. Martha Kosa, I genuinely enjoyed the subject matter and have since gained a much greater appreciation of the field and its applications.

SARA: My favorite computer science class is the capstone class, which brings together everything we've learned throughout this program and applies it to solving a real-world problem for our client.

WHAT ARE YOUR PLANS AFTER GRADUATION?

HARRISON: I hope to work in intrusion detection, digital forensics or information security consulting. I plan to strive for constant improvement and knowledge and hopefully be an industry leader.

LELA: After graduation, I hope to get a job in the intelligence community, where I can combine my unique skills in cybersecurity and foreign language.

KASHAINA: Even though I plan to graduate with my bachelor's in May, I will be sticking around for another year for my master's in CS. My goal is to work in industry for data science or AI.

BRAXTON: After graduating with my master's degree, I plan to move to northern Virginia to work for the Naval Surface Warfare Center Dahlgren Division.

SARA: After graduation, I will stay at Tennessee Tech for one more year to finish my master's degree. I then plan to transition to industry work doing software development.

Tennessee Tech's iconic golden eagle perches on the cupola atop Derryberry Hall.

COMPETITIVE EDGE

TECH STUDENTS ACHIEVE SUCCESS IN COMPETITION TEAMS

Good grades are vital, but student success outside the classroom – like taking the top prize in a competition – is icing on the cake.

Computer science majors on Tennessee Tech's Collegiate Penetration Testing Competition team can attest to that as they finished first in the central region in 2024 to earn their place in the global finals in 2025. Two other Tech teams also tasted victory when they placed first and fourth in the 2024 InfoSec Nashville Capture the Flag cybersecurity competition, marking the second consecutive year that Tech claimed a first-place finish.

But that's not all. The Department of Computer Science, along with the university's Cybersecurity Education, Research and Outreach Center, consistently produces exceptional students for competition teams in regional, national and global events ranging from cybersecurity to programming to robotics.

Competition highlights from 2024

Collegiate Penetration Testing Competition:
1st place in central region; advanced to global finals.

InfoSec Nashville Capture the Flag:
1st place (second consecutive year).

Department of Energy CyberForce:
2nd out of 92 teams (second consecutive year).

Collegiate Cyber Defense Competition:
2nd in qualifier; 4th in regional.

Hivestorm: 10th and 15th out of 413 teams.

CRAM: Finalist in phase 1 of Naval Surface Warfare Center Dahlgren Division Cyber Resiliency and Measurement Challenge; advanced to phases 2 and 3.

VEX Robotics World Championship:
11th out of 55 teams in VEX U SPIRIT division.

MORE WAYS TO GAIN SKILLS AND FIND SUCCESS OUTSIDE THE CLASSROOM

CS student organizations:

Computer Science House System: Borg, Dijkstra, Lovelace, Turing, Hopper, von Neumann

Association for Computing Machinery (ACM & ACM-W)

Women in Cybersecurity (WiCyS)

Game Development Club

Cyber Interest Groups: Offense, Defense, Capture the Flag

Software Development Club

Autonomous Robotics Club

Computer Science Graduate Student Club

Society of Hispanic Professional Engineers

National Society of Black Engineers

Data Science League

CyberEagles

Computer science majors Lance Young, Addison Goforth, Landon Crabtree, Nate Dunlap and Landon Byrge, from left, hold their first-place trophy at the 2024 InfoSec Nashville capture the flag competition. This team is just one example of how Tech students are excelling outside the classroom as part of a competition team.

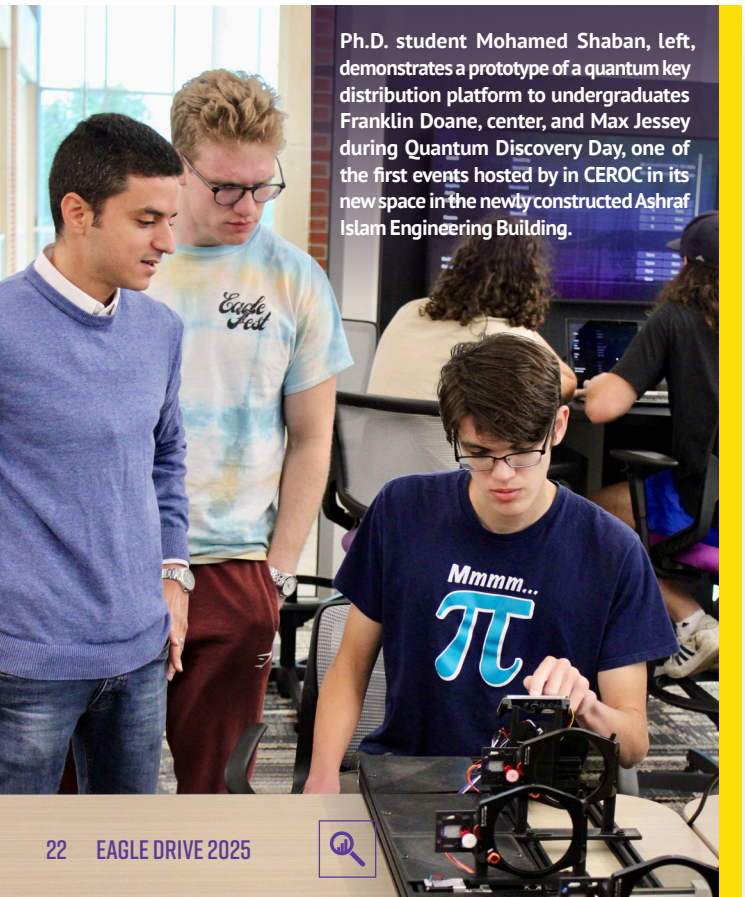
CEROC: NEW HOME, NEW DIRECTOR, NEW CHAPTER

A page was turned in fall 2024, starting a new chapter for Tennessee Tech's Cybersecurity Education, Research and Outreach Center.

At the helm is newly appointed director Muhammad Ismail, Ph.D., who, from CEROC's new home in the just-completed Ashraf Islam Engineering Building, anticipates an exciting era of cybersecurity innovation and student success.

Muhammad Ismail, Ph.D., new director of CEROC

"Since its launch in 2015, CEROC has built strong foundations in cybersecurity education, research and outreach, earning a national reputation in the field," Ismail said. "Now, with a new and much-needed expanded space, CEROC is well-positioned to prepare the next generation of cybersecurity professionals and empower them to shape the future of the field."



Ph.D. student Mohamed Shaban, left, demonstrates a prototype of a quantum key distribution platform to undergraduates Franklin Doane, center, and Max Jessey during Quantum Discovery Day, one of the first events hosted by in CEROC in its new space in the newly constructed Ashraf Islam Engineering Building.

Ismail, an associate professor of computer science, joined Tech's Department of Computer Science in 2019, bringing extensive research and teaching experience from Texas A&M University at Qatar, where he was a research scientist and postdoctoral fellow, and University of Waterloo, Canada, where he earned his Ph.D. in electrical and computer engineering and served as a postdoctoral fellow and research assistant. He also holds master's and bachelor's degrees in electrical engineering from Ain Shams University, Cairo, Egypt.

A leading researcher in his field, Ismail has secured more than $10M in grants for his work in artificial intelligence and quantum information science in cybersecurity. He is the recipient of multiple best paper awards at prestigious conferences and was recently recognized for the second consecutive year on the "World's Top 2% Scientists" list released by Stanford University and Elsevier.

In his new role at CEROC, Ismail is eager to build on the center's reputation as a hub for cutting-edge workforce development technologies and ensure it continues to supply highly trained graduates to address the nation's cybersecurity needs. He will provide leadership as CEROC continues its goals of advancing research in emerging areas of cybersecurity; increasing public awareness of information assurance; promoting and sharing cybersecurity educational and research resources within the academic community; and collaborating with partners on initiatives in cybersecurity workforce development and research.

"CEROC aims to ensure our students are equipped with a strong foundation in core cybersecurity skills, while also expanding their formal and informal learning and research opportunities in advanced areas such as AI-assisted cybersecurity and quantum-enhanced security," Ismail said. "Our goal is to equip them with the skills to thrive in the job market while ensuring they remain at the forefront of technological advancements in this rapidly evolving field."

Furthermore, CEROC is committed to supporting faculty affiliates in core and advanced cybersecurity areas, offering more scholarships and establishing essential infrastructure and connections for continued growth.

"Additionally, we aim to strengthen multidisciplinary collaboration, recognizing that cybersecurity plays a critical role across sectors such as nuclear facilities, power systems, water systems, smart manufacturing and beyond, benefiting from tools such as AI, HPC and quantum and intersecting with numerous fields," Ismail said. "Through its continued

efforts, CEROC will be building bridges and growth opportunities for every Tennessee Tech faculty and student interested in cybersecurity."

CEROC's new home within AIEB features state-of-the-art amenities:

- **Administrative suite:** Office spaces for Ismail and his team: Eric Brown ['93,'06], associate director for workforce development and senior lecturer of computer science; Stacy Prowell, Ph.D., associate director of research; Megan Cooper ['13,'21], cyber outreach coordinator; Sara Howard, project manager; Travis Lee ['19,'23] and Jeremy Potts ['20, '24], Cyber Range engineers; and Molly Risley, GenCyber on Wheels mobile classroom instructor.
- **Cyber training lab:** Eight team workstations, conference tables and 75-inch mobile display to facilitate remote sessions, training area for competition teams and meeting space for cyber community organizations.
- **Cyber range:** 10-node system that simulates training environments for CEROC's education, outreach and research missions.
- **Cyber innovation lab:** Laboratory space for cyber-physical research (including operational technology and quantum application simulations), smart manufacturing experiments and projects such as drone swarm experiments.
- **Undergraduate lab:** Spaces for project collaboration.
- **Graduate lab:** Cubical spaces and conference table to support advanced research and projects by master's and Ph.D. students.
- **Lounge:** Welcoming space for refreshments during workshops and outreach events.

Ismail noted that CEROC's new space, which it acquired in September, has been essential in accommodating its rapidly expanding activities – including several events that would have been difficult to host in its former location in Prescott Hall.

"We held a Quantum Discovery Day, welcoming 50 students who fit comfortably in our new cyber training lab, and just days later hosted the regional Collegiate Penetration Testing Competition with multiple teams, where our own team took first place, advancing to the global competition," Ismail said.

CEROC is also excited to host a demonstration of its newly developed AI-assisted cybersecurity competition and use its new Cyber Innovation Lab for student experiments with AI-assisted cybersecurity in drone swarms.

"While this new space has been a game-changer," Ismail said, "I can see our needs growing further as we continue expanding our programs and infrastructure." ■

Computer science majors Laurae Thaete, Joshua Demeter ['24] and Julian Trujillo chat inside Tennessee Tech's new Ashraf Islam Engineering Building, which now houses CEROC.

FIRST-YEAR SUCCESS:

MInDS center fuels AI innovation & partnerships

The first year of Tennessee Tech's MInDS (Machine Intelligence and Data Science) Center was marked by advancements in the role of artificial intelligence on campus and beyond.

Since its launch in the fall of 2023, the center, led by co-directing computer science professors Doug Talbert, Ph.D., ['91] and Bill Eberle, Ph.D., has united faculty, students and researchers from diverse disciplines to collaborate on research and educational opportunities across a broad range of applications while also addressing the national need for workforce development in emerging AI technologies. Here are some first-year highlights:

- **AI4A COLLABORATION:** Hosted event with Vanderbilt University to kick off multi-university partnership through Mid-TN AI for Interdisciplinary Imaging Interpretation Alliance. *October 2023*
- **AI CORPS:** Piloted workforce development scholarship program to address national demand for highly trained AI professionals. Student scholars led outreach events throughout the year at area schools, introducing various AI activities.
- **MINDS KICKOFF:** Shared updates on AI education, workforce development and campus-wide research with Tech community. *April 2024*
- **FLAIRS:** Attended Florida Artificial Intelligence Research Society conference, where 20+ Tech students and faculty engaged with researchers on latest AI advancements. MInDS also hosted 12 students from all over the country through a National Science Foundation grant. *May 2024*
- **AI ACROSS TENNESSEE SYMPOSIUM:** Hosted 60+ attendees (in-person and virtually) from University of Tennessee at Knoxville, Middle Tennessee State University, University of Memphis, East Tennessee State University, Tennessee State University and Austin Peay State University to jumpstart NSF proposal to support AI research and collaborations among public universities in Tennessee. *July 2024*
- **AI SUMMER SCHOOL:** Supported travel for Tech students to attend Vanderbilt University program. *August 2024*
- **MINDS EXTERNAL ADVISORY BOARD:** Discussed the state of MInDS and potential directions with representatives from industry (Microsoft, NVidia, Oxy, SAS), defense (SAIC, U.S. government) and academia (University of Hartford). *October 2024*
- **CENTER APPROVAL:** MInDS was fully approved as a university center by President Phil Oldham. *November 2024*
- **NEW LAB:** Moved into new lab, co-located with iCube in Volpe Library. *January 2025*

MInDS kickoff at Tech

Members of the Tennessee Tech campus community gather as MInDS co-director Bill Eberle, Ph.D., discusses MInDS initiatives in April 2024. "Every major is being exposed to AI in one way or another," he said. The event included AI education and workforce development updates and details about AI research across campus.

MInDS
MACHINE INTELLIGENCE AND DATA SCIENCE CENTER

AI Across Tennessee Symposium

AI Across Tennessee panelists discuss artificial intelligence initiatives and future directions on their campuses and across the state during a symposium hosted by Tennessee Tech's MInDS center in July 2024. They are, from left, Dan Harder, University of Tennessee, Knoxville; Doug Talbert ['91], Tennessee Tech; Joshua Phillips, Middle Tennessee State University; and Vinhthuy Phan, University of Memphis. The hybrid event, which aimed to establish a collaborative network among Tennessee public universities, brought together experts, researchers and educators to discuss the future of AI in academia and beyond.

Researchers gather at Tennessee Tech for the AI Across Tennessee Symposium. The event consisted of a panel discussion on the importance of and how to improve AI collaboration across Tennessee, especially for large-scale AI projects; presentations about AI activities on campus by each participating university; and breakout discussions to develop ideas for a National Science Foundation grant proposal.

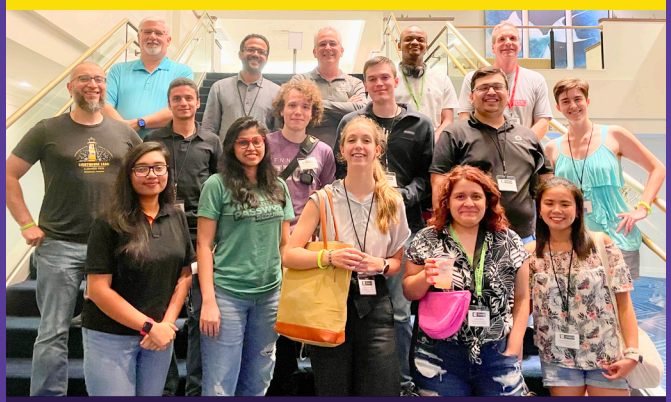
"We are happy that MInDS and the College of Engineering were able to host, along with UTK, this statewide symposium, and we are excited about the opportunity for Tennessee Tech, through MInDS, to contribute to and benefit from this collaboration. The symposium provided a forum for AI and technology leaders from public universities to share ideas about how to increase AI educational and research opportunities for students and faculty across Tennessee – especially for large-scale AI collaborations."

- Doug Talbert, MInDS co-director

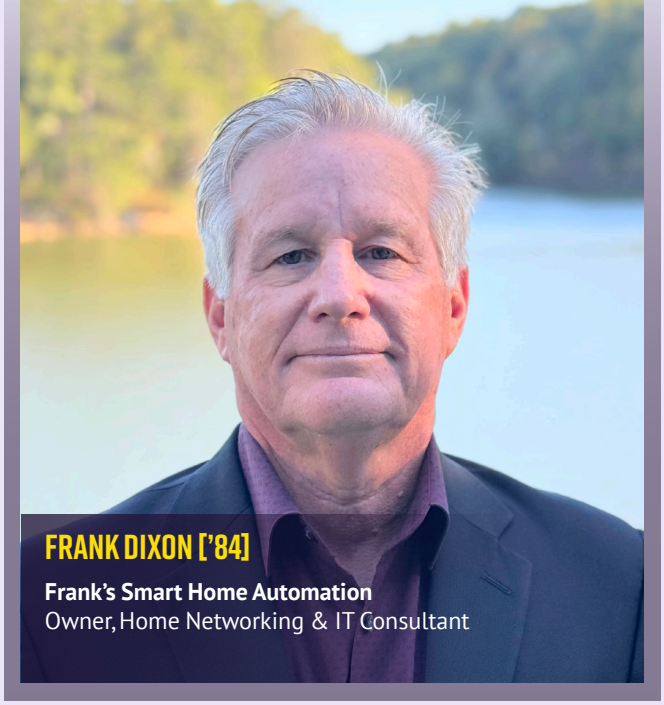
AI Corps outreach

AI Corps scholars Ethan Owens ['23] and Kashaina Nucum lead an AI activity with high school students on a field trip at Tech. It was one of several outreach initiatives they and other AI Corps members participated in over the past year.

FLAIRS



Tennessee Tech computer science students and faculty gather at the Florida Artificial Intelligence Research Society (FLAIRS) conference in May 2024. They are, in front, from left, Farhat Lamia Barsha, Moumita Kamal ['20], Riley Grimaud, Jamie Boyd, Kashaina Nucum; in middle, Amr Hilal, Ph.D.; Mohamed Shaban, Ethan Owens ['23], Jared Scott, Carlos Escudero ['24], Kate Phillips ['23]; and, in back, Eric Brown ['93, '06], Muhammad Ismail, Ph.D., Bill Eberle, Ph.D., Anthony Ekle and Doug Talbert, Ph.D. ['91].



FRANK DIXON ['84]

Frank's Smart Home Automation
Owner, Home Networking & IT Consultant

JILL BRODIE

Netflix
Head of Products in US Partnerships, Partner Engagements

INDUSTRY CONNECTIONS

NEW EXTERNAL ADVISORY BOARD MEMBERS BRING DIVERSE INDUSTRY VOICES TO TECH'S COMPUTER SCIENCE DEPARTMENT

Tennessee Tech's Department of Computer Science external advisory board is two-members stronger with the addition of industry leaders Frank Dixon ['84] and Jill Brodie.

Dixon, a Tech computer science alumnus, is a home networking and IT consultant with Frank's Smart Home Automation, a business he started in Soddy-Daisy, Tenn., after 35 years of managing healthcare information technology and hardware. Brodie, who resides in Los Gatos, Calif., serves as senior manager of partner solutions and U.S. partnerships at Netflix. She holds a bachelor's degree in computer science and engineering from Arizona State University.

"We are excited to add both Jill and Frank to the advisory board," Gerald Gannod, Ph.D., department chair, said. "They each bring unique perspectives, experiences and expertise to the board as the department looks to address the challenges of fulfilling our workforce development and research missions."

Dixon's affection for Tennessee Tech and the computer science department has grown significantly in recent years, especially since 2020 as he increased his involvement as a donor, rallied at homecoming games and engaged in alumni events – including the computer science department's Celebrate CS event, to which all Tech computer science alumni are invited each spring to reconnect, see student projects and interact with new graduates.

As a member of the external advisory board, Dixon is eager to leverage his extensive experience in healthcare IT and smart home consultation to make a meaningful impact among computer science students and faculty.

"During my first year I will learn and grow with the role and strive to make a difference," he said.

Brodie expressed her excitement about joining the CS external advisory board, noting the opportunity it gives her to serve as a bridge between academia and industry while assisting students in navigating the next steps in their journey.

"I believe that an academic problem-solving acumen, paired with intentional preparation, can cultivate fresh talent capable of driving transformative innovation in the industry," she said. "As we enter an era of accelerated change, the need for responsible and well-equipped next-generation leaders is more critical than ever."

Brodie brings a unique perspective shaped by her experiences as a trailblazer in her career.

"I was often the first woman leader and the first female VP, which conditioned me to navigate through waves of biases and build a robust toolkit of skills," she said.

She described her background as a "superpower" that fuels her advocacy for diversity and inclusion and enables her to empower others: "I am committed to helping students

embrace their differences and backgrounds, identify their strengths and become more confident in their potential," she said.

Dixon launched his career as a COBOL (common business-oriented language) programmer at a Florida hospital after graduating from Tech in 1984.

"My interest in technology led me to experiencing and managing all aspects of technology and hardware," he said. "I moved around as my career blossomed and worked at several hospitals and then on the vendor side, selling and supporting hospitals, clinics and doctors' practices."

Brodie, after graduating from Arizona State University in 2005, started her professional journey at 41st Parameter, an anti-fraud startup later acquired by Experian, where she built and led its first consulting team. She went on to manage multiple technical consulting teams and served as vice president of global solutions engineering at [24]/7.ai, a company that leverages artificial intelligence for customer engagement solutions, where she oversaw a team of 24 data analysts and directors across three continents.

In 2014, she transitioned to the streaming entertainment service Netflix, where she has established a track record of impactful results such as the 2023 promotional bundle Netflix & Max Perk with Verizon, which she designed, launched and optimized.

"It has been a career highlight, benefiting Netflix, Verizon and end users alike," she said, adding that the projects she has launched over the years are used by most U.S. households daily.

Dixon – outside of his professional life – enjoys playing pickleball with his wife, Karen, a retired nurse, as well as "lake life" activities such as water skiing, surfing and fishing. He volunteers annually to help people with different abilities have an opportunity to ski. The Dixons have two daughters: Samantha, a pediatric audiologist at the University of Chicago Medical Center, and Ally, an actress in Los Angeles, who recently voiced Nikki Narwhal in the animated Netflix film "Thelma the Unicorn."

He offered this advice to Tech computer science students: "Base skills are essential, but many careers in IT, whether at startups or mature companies, value critical thinkers who are willing to engage and collaborate effectively with others. Teamwork in problem-solving not only enhances your skills but also strengthens your resume."

Brodie – who has two children, Ethan, 9, and Katie, 7 – enjoys cooking, hosting dinner parties for friends, going on long hikes and bike rides, visiting family in Ooltewah, Tenn., and skiing in Tahoe when the California snow arrives.

Her advice to students pursing a degree in computer science is to "cultivate a long-term growth mindset and maintain a humble willingness to learn, especially when you encounter something outside your wheelhouse," she said. "The tech industry is constantly evolving, and employers value candidates who recognize what they don't know, can identify the right questions to ask and can navigate ambiguity with a creative approach."

She added that preparation is vital to landing that first dream job: "Prepare for interviews by writing, refining and reciting – out loud – your answers to the 10 most common interview questions so that your performance appears effortless. Nothing demonstrates your mastery of fundamentals like coding and algorithms better than the stories you tell about your achievements and even your blunders. Bring your whole self and diverse background to the forefront to give hiring managers one more reason to take a chance on you."

Brodie and Dixon join fellow advisory board members Jill Moffitt of SAIC, Mark Rigney ['86] of Equitus.ai, Chris Smith ['81] of Cognizant, Edward Smith ['93] of eviCore Healthcare and Andrea Brackett ['93] (retired) of Tennessee Valley Authority. ■

EDWARD SMITH

eviCore Healthcare
Manager, Engineering Talent Management
Tennessee Tech ['93]

JILL MOFFITT

SAIC
Cloud Computing Engineer Director

ANDREA BRACKETT

Tennessee Valley Authority
Retired: Vice President, Cybersecurity & Chief Information Security Officer
Tennessee Tech ['93]

MARK RIGNEY

Equitus.ai
Chief Revenue Officer
Tennessee Tech ['86]

CHRIS SMITH

Cognizant (Workday Practice)
National Senior Client Partner Director,
Tennessee Tech ['81]

TOP OF THE CLASS

4.0 COMPUTER SCIENCE GRADS HONORED WITH PRESTIGIOUS W.A. HOWARD AWARD

BRENDAN JACKSON ['24]

One letter stood out at the end of every semester for Brendan Jackson – A.

The same was true his final semester in December 2024, when he completed his bachelor's degree in computer science at Tennessee Tech and joined the university's most distinguished group of graduates as a recipient of the W.A. Howard Award for achieving straight A's throughout college.

"It felt amazing to be able to end my undergraduate degree with a 4.0 GPA," he said following commencement. "I could not have asked for a better outcome."

What does it take to earn a 4.0? Jackson credited his success to self-discipline and support from good friends. His approach varied from year to year: "With the freshman and sophomore classes, it is important to do the work yourself without too much help," he said. "A lot of times, the homework was the way I studied in those classes. In the junior and senior classes, there is a lot more self-discipline needed to take time and go over notes and slides. Everyone is different in their method of learning, but being able to adapt and learn how to study will help immensely."

Jackson, a Memphis native, graduated from Christian Brothers High School in May 2021. With a long-standing passion for computers – especially coding – he was drawn to Tech for its renowned cybersecurity program, extensive resources and the scholarships offered to computer science students.

While at Tech, Jackson was involved in the CyberEagles and Esports clubs, participating in various competition teams. He also helped lead the Offensive Cyber Interest Group and served as an ambassador for Tech's Cybersecurity Education, Research and Outreach Center, visiting local schools to educate students about cybersecurity.

"My best memory at Tennessee Tech was sitting in my object-oriented programming class and meeting the people who are now my friends," he said. "Without them, there's no way I would have been able to get a 4.0 in my degree."

He emphasized the value of connections.

"The kinds of friends you make in college are so important," he said. "They not only can affect your college experience but your life after college as well."

Jackson is continuing his computer science education as a graduate student at Tennessee Tech.

MEGAN HENDRICKSON ('24) began pursuing a master's degree in computer science at Tennessee Tech after graduating with a bachelor's degree in the spring of 2024. The Spring Hill native was pleased to have received the prestigious W.A. Howard Award: "It was already such a high note being able to say I earned my degree in just three years, but knowing I did it with a 4.0 GPA was the icing on top of the cake. It feels surreal, but it's incredible for sure."

VINCENT LIN ('24) returned home to Nashville after graduating from Tennessee Tech in the spring of 2024 with his bachelor's degree in computer science and is pursuing career opportunities in software and web development. Regarding his academic achievements at Tech, he said, "I didn't aim for a 4.0; it was simply the outcome of doing my best in my studies. I focused on understanding the ideas rather than just memorizing what was taught. Being open to asking for help also played a big role."

W.A. HOWARD AWARD WINNERS: WHERE ARE THEY NOW?

From academic perfection to professional success, here's how some past computer science W.A. Howard recipients are making an impact:

DAVID FRANKLIN ['14]

Asurion
Director of DevOps Engineering

"I lead a DevOps team that supports our data platform around the world as well as a global development team that builds and supports corporate applications and automations," Franklin, who resides in Lebanon, said. He was hired as an entry level database administrator at Asurion via a career fair at Tennessee Tech. "I've worked in the data space at Asurion since and have a lot of great colleagues that also graduated from Tech."

CHELSEY LONG ['18]

Antage Inc.
Project Manager and Software Development Team Lead

"I work directly with clients to provide full stack development and consulting. The two main technologies I use are C# and SQL (Structured Query Language)." Long resides in Brentwood.

KENDALL LAND ['20, '21]

SpaceX
Security Engineer

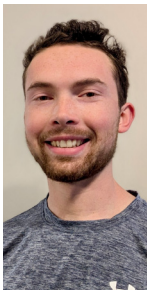
"I build alerts and tooling that aid in detecting any potential malicious activity on our network," said Land, who graduated with his bachelor's degree from Tech in 2020 and master's degree in 2021. He resides in Los Angeles.

SHAUN GUYETTE ['21]

Leidos
Data Scientist

"My team uses AI and machine learning techniques for network intrusion detection and anomaly detection as part of a cybersecurity software group," Guyette, who lives in Huntsville, Ala., said. "I am a lead developer for our team. My role involves developing, deploying and analyzing AI/ML models using Python and C++."

W.A. HOWARD AWARD WINNERS: WHERE ARE THEY NOW?



DANIEL ROBERTS ['21]

Cadre5
Software Engineer

"I work as a front-end and middle-tier web developer using React and .Net," said Roberts, who resides in Knoxville, Tennessee.

DANIEL STEINMEYER ['22]

Farm Bureau Insurance of TN
Security Analyst II

"I work to design and implement security measures that will further protect the company's computer systems and networks," said Steinmeyer, who lives in Arrington. "I hunt for threats, identify vulnerabilities and risks and respond to and investigate alerts from the company's security systems. Among other things, I also develop training programs and conduct phishing simulations to bolster the company's security culture."

EVYN PRICE ['23]

Tennessee Valley Authority
Real-Time Operations
Systems Administrator

"My primary job is to lead the design and development of infrastructure automation tools for control center systems that manage the bulk electric power grid," said Price, who resides in Chattanooga. "I also support our Linux environments in Transmission – setting standards on deployments, security and maintenance and ensuring that we're in compliance with reliability standards such as NERC CIP (North American Electric Reliability Corporation Critical Infrastructure Protection). I work on an incredibly motivated team that provides 24/7, 365-day support to make sure that the power grid is safe, reliable and secure."

PRESTON NICHOLSON ['23]

CGI
Software Developer | Consultant

"I build and maintain data pipelines for a client of CGI to give them access to their data via reporting tools so that they have more insight into their business and are able to make important data-driven decisions faster," Nicholson, who resides near Nashville, said. "More specifically, I'm a database administrator on a team of seven, where I'm responsible for monitoring cost, run-times, optimizing query performance and managing security. We converse with the client regularly to ensure we are meeting their requirements and are delivering the highest quality work. It's fulfilling to know I'm helping others while also improving my own skill set as a software engineer and trusted advisor."

ASA RENTSCHLER ['23]

Oak Ridge National Laboratory
HPC Engineer

"I build open-source software for the supercomputers at ORNL, home to some of the fastest and most powerful computing systems in the world. In this capacity, I also recently developed Velocity, a tool designed to simplify the process of building and maintaining containers in high-performance computing (HPC) environments," Rentschler said. "Velocity was created to address the unique challenges of containerizing complex software stacks for supercomputing platforms. By automating container lifecycle management, Velocity makes it easier for researchers and engineers to deploy, update and maintain containers across ORNL's cutting-edge systems, ensuring optimal performance, scalability and compatibility. With its focus on streamlining container workflows, Velocity helps accelerate scientific research and high-performance simulations on some of the world's fastest machines."

More W.A. Howard Award recipients through the years:
William Greenway ['09], Brooklyn Shirah ['14], Jeffery Dodson ['15], Ryan Tate ['17], Nathan Martindale ['18], Joseph Bivens ['18], Susan Jeziorowski Ward ['18], Brian Ledbetter ['18], Brendan Roberts ['20], Zachariah Threet ['21], Cherokee Parker ['22]

ALUMNI:

CONNECT WITH YOUR TECH CS COMMUNITY!

We want to hear about your journey since graduation! Share your career updates, achievements and exciting milestones – your story could inspire the next generation of CS leaders.

Email updates to csc@tntech.edu

- Name, graduation year, current company and role, photo
- How has your CS degree from Tech impacted your career?
- What's your favorite memory from your time in the CS department?
- What advice would you give current students or recent grads?
- What else would you like to share?

WAYS TO ENGAGE WITH CS AT TECH

- Come to "Celebrate CS" event (tentatively scheduled May 1)
- See capstone projects at College of Engineering Senior Design Expo
- Be a guest speaker for a CS student organization
- Participate in an alumni conference (details TBA)
- Give to the Boshart Kosa Academic Excellence Scholarship online at tntech.edu/giving (Select "other" and enter name of scholarship.)

TENNESSEE TECH UNIVERSITY DEPARTMENT OF COMPUTER SCIENCE

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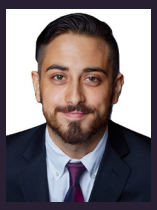
CS ALUMNI UPDATES

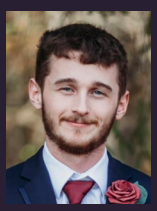
CHRISTOPHER AUGUSTUS ['90] has served 23 years with the U.S. Department of Energy's Office of Scientific and Technical Information (OSTI) in Oak Ridge. In his current role as a data specialist, he is part of a team that is developing a replacement for a 26-year-old ingest system known as E-Link. A Knoxville resident, he was named "Employee of the Second Quarter" in 2024.

JAMES PETTY ['12] is the director of information technology at Text Request, a cloud-based business texting software company. He is also a five-time Microsoft Azure MVP and author of two PowerShell books. He resides in Chattanooga.

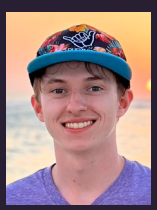
MAJED BAHAWI ['15] works in data analysis and reporting in the aviation sector. He resides in Riyadh, Saudi Arabia.



CURTIS BHAVESH PATEL ['18] is an AI writing evaluator at Outlier, based in Oakland, Calif. He connects with his team remotely from Nashville. Patel's projects require unique evaluation of prompts and model responses.



WILLIAM TURNER III ['23] is a systems developer for Y-12 National Security Complex in Oak Ridge. As the lead analyst and developer of multiple large systems, he enjoys working for the benefit of his customers.



BENJAMIN WHITAKER ['23] started his role as a quality engineer at DENSO in Maryville. The company is one of the world's largest automotive suppliers of technology and components found in vehicles around the globe.

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