



ENGINEERING IMPACT 2024



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is our Habit!



**COLLEGE OF ENGINEERING
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A MESSAGE FROM THE DEAN

On behalf of the faculty of the College of Engineering at Tennessee State University, I welcome you back to Academic Year 2024-2025. The College of Engineering has attracted double research funding in 2024. A majority of the faculty are involved in research grants from federal agencies, state agencies, and industrial partners. The College has added six new tenure-track faculty, two staff, two research professors, and a postdoc research associate to enhance research capacity.

Civil engineering, architectural engineering, electrical engineering, mechanical engineering, computer science, and industrial technologies are among the fastest-growing disciplines with high employability rates and post-completion career opportunities. Successful graduates of the five departments are employed within a short period with attractive salaries. CS has the highest student enrollment and graduation. Most engineering graduates have multiple job offers. The demand of these graduates is strong in middle Tennessee and nationwide. BS Biomedical Engineering has been proposed for approval. The Construction Management Minor was approved in Spring 2024 and offered in Fall 2024. The Mining Engineering Minor and Environmental Management Minor are being developed.

The College has provided nearly one million scholarships to returning students and incoming freshmen in the past academic year. The College has attracted a dozen new industrial partners and their support. With the corporate days and engineering weeks, many industrial partners participated and are being involved in student projects, student competitions, classroom lectures, field trips, career advising, and financial support.

Students have attended various conferences and chapter competitions, including BEYA, AMIE, NSBE, TRB, NFPA, AEI, etc. Our students won Judges' Choice for Teamwork and 2nd Place in Exemplary Performance: Efficiency Race in the NFPA 2024 Fluid Power Vehicle Challenge.

As the Interim Dean, I look forward to continuously developing and implementing strategic initiatives to expand ACCESS for incoming students via preparation and recruitment, providing support to make it more AFFORDABLE to pursue degrees, and enhancing the ACADEMIC QUALITY of our programs, instruction, and student learning while supporting the road map of the TSU Strategic and Academic Master Plan.

Sincerely,



Dr. Lin Li, PhD, PE, Fellow of ASCE
Interim Dean, College of Engineering



ASSOCIATE DEAN OF RESEARCH AND GRADUATE STUDIES



Dr. Armwood is an Associate Professor of Architectural Engineering. She received her PhD in Architectural Engineering from University of Nebraska-Lincoln in 2014. Her technical expertise is structural engineering, with research interest in the study of the behavior of structural materials and structural performance of existing structures and structures subjected to natural disasters. She also conducts research in faculty development and engineering education. She was appointed as Associate Dean of Research and Graduate Studies in June 2023. She is also serving as College Director of Development to build industrial connections. She is promoting faculty collaboration among the college and managing the research centers across the college. She provides support to graduate students and PhD students in the four master's programs, and one PhD program in the college. She is also helping applicants for the graduate program in the college. She is also co-leading the research institute at the College of Engineering: TIGER Institute, to promote interdisciplinary graduate engineering research in the College of Engineering. She is a TSU Alumnus.



Let's protect Together we'll find your next mission

The road isn't always easy, and challenges can feel like mountains. But remember this: every step, every stumble, and every comeback is building something unstoppable within you. You have the strength to rise, the courage to grow, and the power to excel. Keep pushing, keep dreaming, and don't stop until you're proud. The world's waiting to see what only you can bring!

NEW ENGINEERING BUILDING

The State of Tennessee has proposed a new engineering building that will replace the existing Torrence Hall. The new building is in the early design stage and will provide state-of-the-art teaching, research, and service spaces for five departments in the College: Department of Computer Science, Department of Civil and Architectural Engineering, Department of Mechanical and Manufacturing Engineering, Department of Electrical and Computer Engineering, Department of Applied and Industrial Technologies. It also provides space for future growth of new engineering programs in the college. Partial funding has been allocated for the project, and industrial partners and individuals are welcomed to contribute to the building funds.

TSU is a coeducational, land-grant university located in Nashville, Tennessee, the state capital and known as "Music City USA." It is an urban institution that offers comprehensive education to its students.



PHASE I - VIEW OF ENTRY



COE DEGREE PROGRAMS

- BS in Architectural Engineering
- BS in Civil Engineering
- BS in Electrical Engineering
 - o Computer Engineering Concentration
- BS in Mechanical Engineering
- BS in Computer Science
 - o Data Science Concentration
 - o Cybersecurity and Networking Concentration
 - o Bioinformatics Concentration and High Performance Computing
- BS in Applied & Industrial Technologies
 - o Mechatronics Technology Concentration
 - o Aviation Management Concentration
- Master of Engineering
 - o Biomedical | Civil | Electrical | Environmental
 - o Manufacturing | Mechanical Engineering
- Master of Science in Computer Science
 - o Bioinformatics | Cybersecurity | Data Science
- Master of Science in Data Science (online)
- Master of Science in Computer & Information Systems Engineering (MS-CISE)
- Doctor of Philosophy in Engineering & Computational Sciences (PhD-ENCS)
 - o Computational Sciences
 - o Engineering Systems

WHY TSU?

TSU is a comprehensive, urban, coeducational, land-grant university in the state capital Nashville, "Music City USA," Tennessee



ABET



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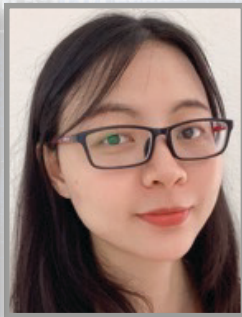
2024 COLLEGE OF ENGINEERING EXCELLENCE AWARDS

On April 19, 2024, the College of Engineering students, faculty, staff, alumni, industrial partners, and visitors met to celebrate the end of year and excellence awards in the 2023-2024 academic year. Congratulations to the Excellence in Teaching Awardees (Dr. Bodruzzaman, Dr. Erdemir, Dr. Hayes, Dr. Hamidzadeh, and Dr. Nathan), Excellence in Research Awardee (Dr. Shirkhodaie), Excellence in Service Awardee (Dr. Wang), Excellent Staff Awardee (Mr. Resch), and Industrial Support Awardees (Turner and Southern Company).

EXCELLENCE IN TEACHING AWARD



EXCELLENCE IN RESEARCH, SERVICES & STAFF AWARDS



WELCOME NEW FACULTY/STAFF TO THE COLLEGE

DR. PHYLLIS HAYES, AVIATION Management, Assistant Professor



Dr. Hayes received her PhD in Higher Education from TSU in 2023. She received her MS in Aerospace Systems and Safety at Embry Riddle Aeronautical University in 2002, and BS in AIT at TSU in 2016. Dr. Hayes served in the United States Navy as an Air Traffic Controller for 24 years. She served as instructor for pilot/air traffic control ground school. She has received four Navy Commendations Medals, five Navy and Marine Corp Achievement Medals and seven Navy Good Conduct Medals. Her expertise in the Aviation Industry coupled with her experience working with the military and Federal Aviation Administration will contribute greatly to our department's mission of preparing the next generation of Aviation Managers at TSU.

MR. LEE ISENBERG

Department of Mechanical and Manufacturing Engineering, Mechanical Engineering Technician



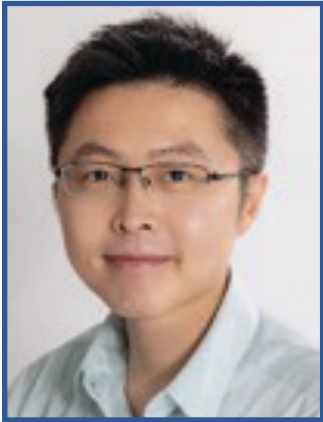
Mr. Lee Isenberg is the Mechanical Engineering Technician in the Department of Mechanical and Manufacturing Engineering. His background is in mechanical and electrical. He was educated in Nashville, Franklin, and Murfreesboro, TN. His training includes an electrician's apprenticeship through the International Brotherhood of Electrical Workers (IBEW) electricians labor union and trade school for Machine Tool Technology at Tennessee Colleges of Applied Technology (TCAT). He uses three computer numerical control (CNC) machines at TSU: mini lathe, mini mill, & full-size Fadall CNC vertical milling machines. He taught at a smaller technical college and a trade school before coming to TSU. His research interests include biodiesel & waste oil diesel fuel/s, industrial motor controls, all electric motors, variable frequency drives (VFD) for motors, automotive machine shop processes that can be considered

a lost art, friction forming/welding in machine shops, automotive fine-tuning, and performance upgrades both in power and efficiency through miles per gallon (mpg's). We are grateful for the technical experience and research opportunities for students that he brings to TSU.



DR. LIJIAN MA

Architectural Engineering, Assistant Professor



Dr Ma earned his Ph.D. in Architecture with a specialization in Technologies of the Built Environment from the Illinois Institute of Technology in 2022. His educational journey also includes a Master's degree in Sustainable Architecture Design and a Bachelor's degree in Architecture Design, both from the Polytechnic University of Turin, Italy. Dr. Ma's international educational background, spanning Italy and the United States, provides him with a global perspective on architectural engineering. This diverse experience will be invaluable in preparing students for the increasingly globalized field of architecture and engineering. His industry experience includes roles as an Architect at Tilton Kelly+Bell (TKB) in Chicago, as a Project Manager at Gerkan, Marg and Partners Architects (GMP) in Shanghai, as an Architectural Designer at CSCEC in Beijing. Dr. Ma is passionate about Life Cycle Assessment and Embodied Carbon Efficiency for Buildings, Prefabricated and Advanced Building Construction Technology, and Multidisciplinary

Integrated Technology on Sustainable Architectural Design. His commitment to interdisciplinary collaboration and continuous learning makes him an excellent addition to our faculty, and we look forward to the fresh perspectives and research opportunities he will bring to TSU.

DR. AUNG MYAT

Mechanical Engineering, Assistant Professor



Dr Myat received a Ph.D. in Mechanical Engineering from the National University of Singapore in 2012. He received his MS and BS degrees in mechanical engineering from the National University of Singapore and Yangon Technological University, respectively. His specializing area is in Thermal Fluid Sciences, with a focus on Thermodynamics and Heat Transfer. Dr. Myat's research experience is deeply rooted in the development and optimization of advanced thermal systems, particularly within the context of energy efficiency and sustainable technologies. His work encompasses a broad range of applications, from HVAC systems to renewable energy integration, all aimed at addressing the challenges of modern energy demands. Dr. Myat has led research on the application of artificial intelligence to optimize HVAC systems, including the creation of a synchronous AI-based algorithm to enhance airside efficiency and resolve low delta-T syndrome in chilled water systems. His research on micro-grid digital twin development

for effective energy management also underscores his focus on integrating cutting-edge technology with traditional thermal systems to create more efficient energy solutions. Dr. Myat has a robust background in industry, having worked as a scientist and research engineer at the Institute of Chemical Engineering and Sciences (ICES) and the National University of Singapore (NUS). His industry experience includes designing and constructing a waste-heat-fired absorption chiller, developing intelligent building energy management systems, and integrating renewable energy components into building systems. We are confident that Dr. Myat' will prepare the next generation of mechanical engineers. His dedication and commitment to make him an outstanding addition to our faculty.

DR. SHAZZAD RASSEL

Electrical Engineering, Assistant Professor



Dr. Shazzad Rassel earned his Ph.D. from the University of Oklahoma, Oklahoma, in 2018. After completing his Ph.D., he worked as a postdoctoral researcher at the University of Waterloo, Canada, for five years. He was a recipient of the Mitacs Research Fellowship, a prestigious Canadian research award. Dr. Rassel previously served as an Assistant Professor at Fairmont State University, West Virginia. Before pursuing his Ph.D., he worked as a Lecturer at the Islamic University of Technology, Bangladesh, for two years, and as a Telecommunications Engineer at Robi Axiata, Bangladesh, for six years. Dr. Rassel has extensive research experience in the field of semiconductors. He has expertise in fabricating mid-infrared Interband and Quantum Cascade Lasers, Photodetectors, and light-emitting diodes (LEDs) in a 1000-level cleanroom. He possesses state-of-the-art knowledge in photolithography, wet and dry etching, deposition, packaging, and failure analysis, and has primarily worked with silicon and III-V optoelectronic devices. In addition to fabricating III-V devices, he has researched blood sugar level detection through photoacoustic spectroscopy using near and mid-infrared lasers and has two patents. Currently, he is focused on integrating various spectroscopic techniques to enhance the performance of blood sugar level detection systems. His current research interests include III-V material devices, lasers, sensors, biomedical spectroscopy, and optoelectronics and their applications. We look forward to the extensive experience and expertise that Dr. Rassel will bring to TSU and his interdisciplinary impact on the medical field.

MS. ASHLEY ROBINSON

Department of Civil and Architectural Engineering, Senior Office Assistant



Ms. Ashley Robinson is a Nashville native and the Civil and Architectural Engineering Senior Office Assistant at Tennessee State University. She graduated from Antioch High School, and attended Nashville State until her brother was stricken with traumatic brain injury after a horrible car accident and her father became ill with a brain aneurism; she refused to send them to a nursing home. While caring for her family with her mother, she explored many career fields such as a deck hand on the General Jackson Showboat, a Nursing assistant, and even owning her own natural herbs and remedy business. She is passionate about connecting with colleagues and students to assist and guide them toward achieving their goals while fostering a positive, diverse, and thriving university environment. She is located at Torrence Hall 108 and can be contacted by phone at (615) 963-2978, or by email at arobin96@tnstate.edu. We are grateful for her tireless advocacy for students, staff, and faculty in the college and university.

DR. AMBER SPEARS

Civil Engineering, Research Assistant Professor



Dr. Spears recently became the first Black Woman to earn her PhD in Civil Engineering from Jackson State University (JSU) in 2024. Before earning her PhD, Dr. Spears earned her BSE and MSE in Civil Engineering from the University of Michigan and the University of Texas at Austin, respectively. Following obtaining her master's, she worked in the civil engineering consulting industry. She also received her PE license in Civil/Geotechnical Engineering from the state of Michigan. She performed a series of civil engineering services including landfill design, site characterization, instrumentation monitoring, construction materials testing, and quality assurance/control. This work included leading field investigations at the Department of Energy's ORNL and the Y-12. She has performed slope stability analyses for the Tennessee

Valley Authority. Dr. Spears' exposure to multiple solid waste projects at CTI shifted her focus from Geotechnical to Geoenvironmental. Dr. Spears' research remains in Geoenvironmental Engineering, focusing on understanding the impacts of climate change on earthen infrastructure to determine sustainable solutions. Dr. Spears' commitment to academia and service holds promise for her ability to engage our campus and the community. We are excited about the continued thoughts, works, and service in academia, industry, and the community that Dr. Spears plans to contribute to Tennessee State University.

DR. CALEB VATRAL

Computer Science, Assistant Professor



Dr. Vutral earned their PhD in Computer Science in 2024 with a specialization in applied intelligent systems from Vanderbilt University. Prior to attending Vanderbilt, Dr. Vutral received BS in Computer Science and Mathematics from Eastern Nazarene College in Quincy, Massachusetts. Dr. Vutral's research interests are artificial intelligence and data science. They are particularly passionate about building the next generation of advanced educational technologies that will enrich students' learning experiences by leveraging the latest technological innovations – including accessible eye-tracking, eXtended Reality environments, multimodal data collection and analysis, and more – combined with strong theoretical and empirical foundations in the learning sciences through a human-centered design approach. Their work

in these areas has already resulted in several publications in high-impact venues and has been recognized by peers for its merit through several best-paper awards. We are confident that Dr. Vutral's interdisciplinary perspective and expertise in applied intelligent systems will enhance our department's strengths and greatly contribute to our mission to prepare our students to be the next generation of Computer Science professionals in an increasingly digital world. Dr. Vutral's commitments and passion for interdisciplinary research and rigorous research-informed teaching makes them an outstanding addition to our faculty, and we look forward to the fresh perspectives and research opportunities that they will bring to Tennessee State University.

DR. JING YAN

**College of Engineering, Research Associate Professor,
Director of Grant Services**



Dr. Yan has joined the College of Engineering as Research Associate Professor and Director of Grant Services. In this role, she will manage and develop research initiatives aimed at enhancing STEM education and securing major research grants. Dr. Yan will also lead efforts to integrate innovative pedagogical approaches and advance research within engineering disciplines. Dr. Yan earned her Ph.D. in Educational Administration and Supervision from Jackson State University in 2018. Before her current position, she served as an Assistant and Associate Professor at Nanjing Forestry University from 2008 to 2023, where she focused on advancing STEM education, developing innovative teaching methods, and enhancing research integration in engineering. She is pursuing her MS degree in AI at Georgia Tech. Since joining TSU, she has helped to develop several multi-million research proposals across the college. Her research interests encompass engineering education, the development of underrepresented students in STEM, data analysis, discourse analysis, artificial intelligence, and human-computer interaction. Dr. Yan's work is dedicated to advancing STEM education through innovative methods and leveraging artificial intelligence to improve educational outcomes. She has published 20 peer-reviewed papers and has served as a principal or co-principal investigator on over 17 major research grants. TSU is grateful for the vision she brings to make our students future-ready.

MRS. YUANWEN YE

**Department of Mechanical and Manufacturing Engineering, Administrative
Assistant**



Mrs. Yuanwen Ye is Administrative Assistant in the Department of Mechanical and Manufacturing Engineering. Mrs. Yuanwen Ye was born and raised in Shanghai, China. She graduated from Donghua University with a Bachelor's degree in Chemical Engineering. After working at an international trading company for five years, she moved to the United States with her husband in 2017. With a high level of proficiency in using Microsoft Office Suite and extensive working experience, Mrs. Ye joined the Mechanical and Manufacturing Engineering Department in April 2024. She is excited to continue learning and growing her professional skills and gain experience at Tennessee State University.

TSU looks forward to her assistance in achieving greater efficiency at TSU.

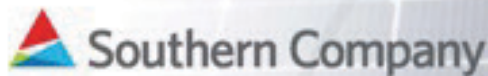


DR. JUNKE ZHANG

Environmental Engineering, Postdoctoral Fellow



Dr. Zhang is currently a Postdoctoral Fellow in the Department of Civil and Architectural Engineering at Tennessee State University. She received her Ph.D. in Environmental Engineering from Jackson State University (2020), M.S. in Environmental Science and Engineering from China University of Mining and Technology (Beijing) (2016), and a B.S. in Environmental Engineering from Zhongyuan University of Technology (2013). Prior to joining the faculty at Tennessee State University, Dr. Zhang worked for the Research Center for Eco-environmental Sciences, Chinese Academy of Sciences as a Research assistant fellow in Key laboratory of Environmental Nanotechnology and Health Effects. Her professional areas include the fate and transport of emerging contaminants in soil, the treatment of solid waste, and electrochemical disinfection of the pathogens in wastewater and drinking water. Till now she has over 40 peer-reviewed publications which earned 629 citations, and the h-index is 15. Dr. Zhang's current research is in the Fate and transport of emerging PFAS-Genx and F-53b in soil, and the interaction of Mercury and Concrete.



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recruiting opportunities.



Dr. Mu Wins NSF Prem Grant Advancing Materials Research



Dr. Richard Mu, a Research Professor at the TSU Interdisciplinary Graduate Engineering Research (TIGER) Institute, has been instrumental in establishing an advanced materials research program. Before joining TSU in 2016, Dr. Mu served as a full professor and Associate Director of the Center for Physics and Chemistry of Materials (CPCM) at Fisk University. He was also the Group Leader of the Nanoscale Materials and Sensors Group (NMSG). His extensive research focuses on the innovative fabrication and characterization of nanostructures, with a primary goal of understanding the physics of materials at the nanoscale. His fundamental work is to explore how energy is absorbed, transported, and converted within nanomaterials and how these physical processes can be purposefully controlled and tailored for specific

applications.

With well over 250 scientific publications, Dr. Mu's research spans a broad range of materials, from hard to soft nanostructures. During his time at Fisk, he was well-funded and secured tens of millions of dollars in research funding as Principal Investigator (PI) or Co-PI from agencies such as the NSF, DOE, DOD, and NASA. At TSU, Dr. Mu's main responsibility has been to develop an Advanced Materials Research Program. Under the leadership of Dr. Hargrove (former Dean) and Dr. Williams (former AVP), Dr. Mu helped secure NSF HBCU-RISE and PREM seed programs. He has also fostered extensive research collaborations with academic institutions and national laboratories.

Recently, with the continued support of Dr. Quick, AVP RSP, and Dean Li, Dr. Mu led a team of faculty at TSU and Fisk to win a \$4.2 million NSF grant through the Division of Materials Research (DMR) Partnerships for Research and Education in Materials (PREM). This program, the TSU-Fisk-I-MRSEC (TSUFI) PREM, is among only four awarded to HBCUs nationwide and is foundational to expanding materials research at TIGER.

The long-term goal of the Advanced Materials Research Program is to build cutting-edge research capabilities in areas such as Quantum Materials and Technologies, Sustainable and Green Materials, Multifunctional Polymers, 2D Materials and Nanostructures, and AI-Driven Materials Discovery. This effort will equip TSU's College of Engineering to produce a highly skilled future workforce, fostering critical thinking, lifelong learning, and community advancement.

Dr. Mu is a firm believer in teamwork and personal sacrifice. As he approaches retirement, he is committed to mentoring and identifying the next generation of leadership to ensure the continued success of the materials science program at TSU, with strong support from RSP and the CoE.



A group of TSUFI Graduate and undergraduate PREM scholars attending 2023 MRS summit meeting.



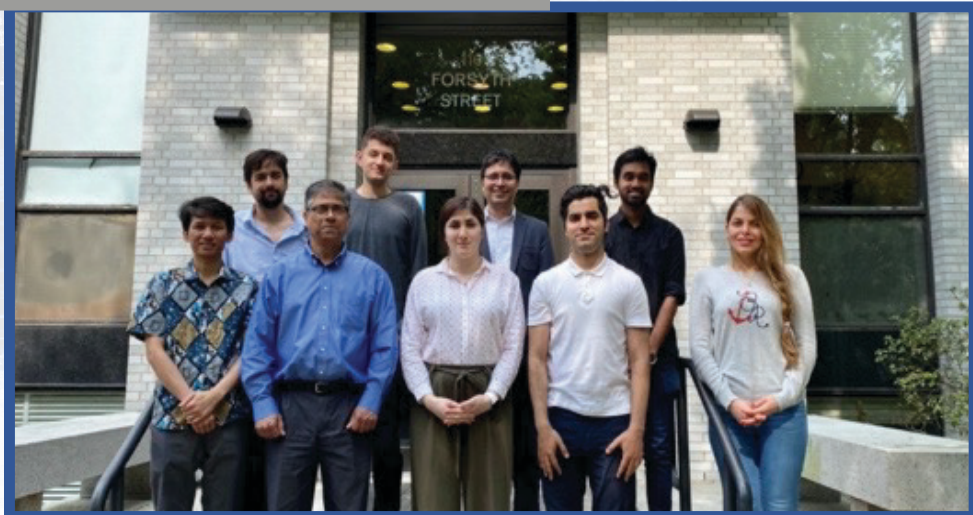
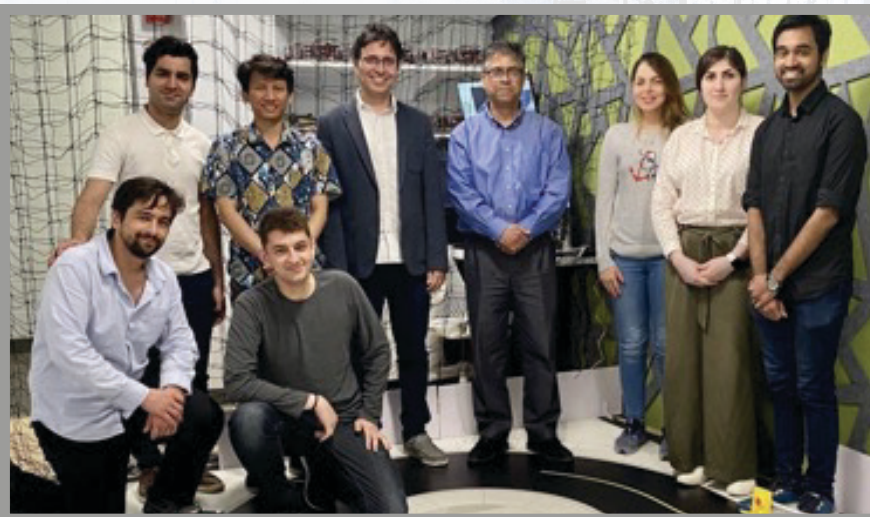
University leaders meet at TIGER from Fisk, UIUC, and TSU with TSUFI-PREM team.

DHS S&T Awards Dr. Habibi to further SRT program in collaboration with DHS S&T Centers of Excellence at Minority Serving Institutions



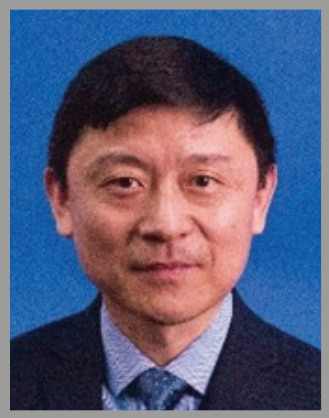
Dr. Mohammad Habibi is an assistant professor in the Mechanical and Manufacturing Engineering (MME) Department. His research interests include network control systems, quantization and stochastic control, predictive modeling for crowd and event control, and modeling material degradation. He was awarded \$100,000 in follow-on funding for continuing research and contributing to homeland security from Minority Serving Institutions (MSIs). The TSU project team was chosen based on its excellence in research, innovative ideas, leadership qualities, and dedication to advancing homeland security-focused research. This funding supports the Summer Research Team (SRT) investigations at TSU, extending its 2023 SRT Program projects, which operate in collaboration with DHS S&T Northeastern University's SENTRY Centers of Excellence

(COE). In cooperation with Oak Ridge Institute for Science and Education (ORISE) at Northeastern University, he is examining the theoretical investigations of quantization error modeling and prevention, including Computational Fluid Dynamics in relation to crowd movement, creating new frameworks for modeling behavior in Soft Targets and Crowded Places with the DHS Center of Excellence for Soft target Engineering to Neutralize the Threat Reality (SENTRY).



DR. LIANG HONG

Enabling Future Wireless Communications and Promoting Intelligent and Secured Engineering Systems



Dr. Liang Hong is a Professor of the ECE Department. He conducted extensive research in Wireless Communications, including classifying modulation schemes for intelligent communications, developing spectrum sharing and cooperative techniques to increase the efficiency of spectrum utilization for wireless systems, and investigating enablers such as holographic radio and quantum communications for the forthcoming mobile systems. His research interests were expanded to include cybersecurity for engineering systems and science-informed AI/ML. He has authored and coauthored about 80 technical refereed papers. He also served as publication chair and session chair for several academic conferences. Throughout his academic career, Dr. Hong has received research grants from the NSF, DoD, ONR, AFRL, TDO, etc..

One of Dr. Hong's key projects, Exploring Antenna Diversity for Reliable Communication and System Optimality in Contested Spectrum Environments, addresses the technical barriers in developing next generation communication in contested spectrum environments by exploring the antenna diversity existing in the antenna array to achieve reliable communications and system optimality in power, the number of the serviced users, and the transmit rate. He is currently investigating technologies, algorithms, and testbeds for quantum native communication that can offer high quality, data throughput, reliability, mobility, intelligence, confidential information services, and ubiquitous coverage in integrated space, air, ground, and sea networks to support immersive, intelligent, and multi-domain operations in future communication systems for the applications such as ubiquitous high speed Internet, smart city, immersive extended reality (XR), autonomous vehicles, digital twin, and intelligent industry. Another notable project, Analytically-based Frameworks for AI Model Verification and Improvement in Cyber-Physical Systems, studies how existing scientific knowledge, in the form of theoretical and analytical models from physics and other disciplines, can be used to improve the data driven AI-based models. By deeper coupling of domain models with data-driven AI-based models, his team develops a set of novel techniques and tools to certify the effectiveness of AI-based models to meet desired performance metrics in a given operational environment and ensure Cyber-Physical Systems (CPS) operations in a range of environments under limited training data and dynamic and uncertain conditions. During his 2024 DoD HBCU/MI Summer Faculty Fellowship, Dr. Hong developed and tested an efficient and robust fiducial marker-free camera self-alignment approach and a machine learning based scheme to predict the historical quaternion observations obtained from the camera. This research provides a foundation for online calibration of Visual-Inertial measurement unit (IMU) sensor fusion that dynamically tracks and adjusts parameters such as bias, scaling factor, and misalignment between IMU and rigid body in real-time, allowing the Position, Navigation, and Timing (PNT) system to maintain optimal performance. Currently, Dr. Hong continues his research in wireless communications, AI/ML, and cybersecurity through the following funded research: 1) Tri-State consortium for Resilient

Automation and Cybersecurity System, funded by NNSA; 2) Estimate Annual Average Daily Truck Traffic on TN Roadways without Permanent Count Stations, funded by TDOT; 3) Deep Clustering of Unlabeled Tabular Data for Transfer Learning in Heterogeneous Feature Space, funded by NSF; and 4) Intelligent Cyber-Physical Systems Lab for Assured and Secure Operations (ICPSLASO), funded by DoD. Also, as a faculty member of Apple's New Silicon Initiative (NSI), Dr. Hong is developing a curriculum in partnership with Apple's experts and faculty members from other universities to prepare students for careers in hardware technology, computer architecture, and silicon chip design.



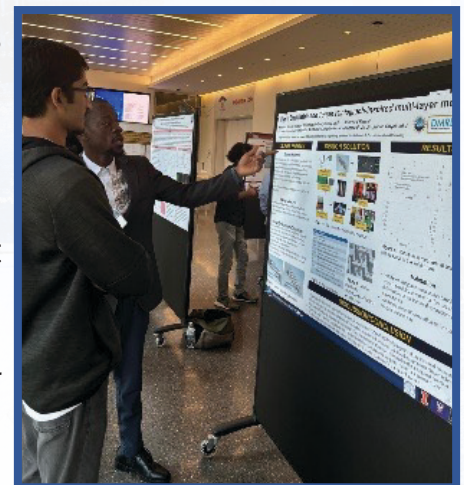
Dr. Ranganathan receives NSF RIA Award



Dr. Ranganathan Parthasarathy is an Assistant Professor in the CAE Department and started in Fall 2019. Dr. Parthasarathy is leading research at the intersection of mechanics, structural engineering and materials science. His current research, funded by NSF, contributes to extending the lifespan of commercial plastics in various engineering applications, creation of highly stretchable architected materials for stretchable electronics, biomedical scaffolds and other applications, energy harvesting and rapid actuation using tensegrity structures, and the interpretation of molecular scale simulations for a variety of applications such as strain engineering.

Dr. Ranganathan's NSF RIA project titled "Deciphering multi-scale mechanisms governing the chemo-mechanical behavior of crosslinked polymers" seeks to discover the underlying mechanism behind the premature cracking or distortion of polymers in contact with specific fluids including solvents, oils, release agents, detergents, and lubricants. The research results are expected to aid in synthesis of new materials resistant to such failure, thus cutting down losses in time and money, and alleviating safety concerns associated with the use of commercial plastics in major engineering applications including medical devices, biomedical adhesives, packaging, wire jacketing, and automobile interiors. This research trains graduate and undergraduate students in the areas of polymer mechanics and material characterization, opens new career pathways, and contributes to the initiation of a materials science program at the home institution. This project will involve considerable collaboration with the Institute for Bioengineering Research (IBER) at the University of Kansas, particularly for multi-modal experiments combining time-based Fourier transform infrared spectroscopy with micro-tensile testing and sorption. The project will provide research opportunities to one PhD student and two undergraduate students in the areas of theoretical, experimental and numerical mechanics of polymers. In another project "TSU- Fisk - Illinois Partnership for Research and Education in Materials." Dr. Nathan is working as a research lead for machine learning assisted computational design of smart and nanoscale lattice materials. He is developing a new class of architected materials which can increase the stretchability and toughness of any base material by reshaping it into a specific lattice. This research will aid stretchable electronics, for example. Ranganathan's graduate student presented this research at a recent conference. Nathan is also working on computation of strains at atomic scales using a new algorithm. Researchers at University of Illinois will use this algorithm for strain engineering applications for 2D materials such as graphene and molybdenum.

Dr. Nathan is a strong proponent of collaborative research, and is collaborating with Florida International University, Oakridge National Laboratory, Los Alamos National Laboratory, Southern University and A&M College, North Carolina A&T, University of Sassari, Indian Institute of Technology Madras, and other institutions for his research. In addition to the research projects, Dr. Nathan is also advising the ASCE student chapter at TSU, which won two prizes in the mid-south symposium concrete canoe competition this year. He is also working as a Global Faculty Fellow at TSU and conducts a 3D printing summer workshop for middle and high school students.



DR. HASAN

Empowering the Next Generation of Minorities in Data-driven Cybersecurity of Critical Infrastructures

Courtesy of Research Horizons:2024 Annual Report

Dr. Kamrul Hasan is an assistant professor in the ECE Department at TSU and joined in Spring 2021. Dr. Hasan is a leading Cyber-Physical Systems (CPS) researcher, focusing on enhancing critical infrastructure security, resilience, and efficiency. His current projects, funded by NSF and USDOT, significantly contribute to transportation, telecommunications, power grids, and more. As of recent estimates, the shortfall of cybersecurity professionals in North America is approximately 522,000, reflecting a 19.7% increase from the previous year. This gap is attributed to the increasing digitalization of industries and the rising frequency and sophistication of cyber threats. The workforce shortfall is even higher in underprivileged communities.

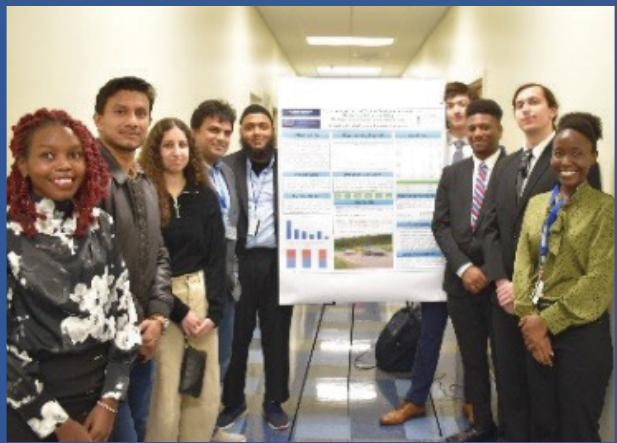


One of Dr. Hasan's key projects, Cloud-Edge Artificial Intelligence in Cyber-physical Systems, addresses the challenges of securing CPS in critical infrastructure sectors such as transportation and power grids. This project utilizes edge computing to enhance these systems' real-time processing capabilities and cybersecurity. By aligning with the directives of the National Security Memorandum (NSM-22), which emphasizes the importance of securing critical infrastructure, Dr. Hasan's work ensures that these vital systems are robust against cyber threats and resilient in the face of disruptions. Two of four graduate students from historically black communities are working on the project.

In another groundbreaking project, Leveraging Advanced Data to Deliver Multimodal Safety and Security (LADDMSS), Dr. Hasan focuses on developing intelligent transportation systems (ITS) that are both secure and privacy-preserving. This initiative is part of the National Strategy to Advance Privacy-Preserving Data Sharing and Analytics, reflecting a commitment to safeguarding sensitive data while enabling advanced data analytics for transportation safety and efficiency, which is crucial for developing autonomous vehicles and smart city applications. Two of three graduate students from historically black communities are also working on the project. By implementing innovative safety models, such as near-miss analysis, Dr. Hasan's work is paving the way for safer, more efficient transportation networks.

Dr. Hasan's work on the project Zero Trust Security Architecture for Industrial Internet of Things (IIoT) further underscores his dedication to security in CPS. This project explores Zero Trust Security frameworks and secure slicing techniques for industrial Internet of Things (IIoT) applications. This research enhances industrial systems' overall security and reliability by predicting network resource requirements and ensuring secure communication slices within CPS. One of the two graduate students is a woman working on the project. A strong proponent of collaborative research, Dr. Hasan believes that internal and external partnerships are crucial to the success of research projects. He advocates for a research-oriented pedagogy, emphasizing that such an approach fosters societal positivity and technological advancements. Through his innovative projects and collaborative efforts, Dr. Hasan continues to lead the way in securing and enhancing the nation's critical infrastructure.

At 46th Annual University-wide Research Symposium



DR. SAGNIKA GHOSH

Advanced Energy Systems and Clean Energy Academy



Dr. Ghosh, an Assistant Professor of Electrical and Computer Engineering, is making significant strides in the fields of renewable energy, smart grids, and cybersecurity. Her research and leadership are contributing to the development of advanced energy systems and preparing the next generation of engineers to tackle future challenges in clean energy and power distribution. Through her commitment to innovation and education, Dr. Ghosh has secured several competitive grants that support her research while ensuring that students are deeply involved in hands-on, cutting-edge projects.

One of Dr. Ghosh's most recent accomplishments is leading the Tennessee State University Clean Energy Academy, funded by a \$100,000 grant from the HBCU Clean Energy Education Prize. This initiative focuses on preparing students for leadership roles in the clean energy sector by providing them with in-depth knowledge and practical experience in renewable energy systems. Through this program, students gain the skills needed to contribute to the transition toward sustainable energy solutions. This project highlights Dr. Ghosh's dedication to fostering diversity and inclusion in STEM fields while simultaneously addressing global energy challenges.

In addition to the Clean Energy Academy, Dr. Ghosh is involved in several other impactful research projects. For instance, she is a co-principal investigator on a \$400,000 NSF grant titled "Orchestration of Network Slicing for 5G-Enabled IoT Devices Using Reinforcement Learning." This project aims to optimize the integration of IoT devices into smart grids, improving efficiency and communication between devices using reinforcement learning. The research is particularly timely, given the increasing demand for more secure, reliable, and efficient energy systems in the era of 5G and smart technologies.

One of Dr. Ghosh's most ambitious projects is her work on "Cyber Resilient 5G Enabled Virtual Power System for Growing Power Demand," a \$600,000 NSF-funded initiative. This project addresses the critical need for resilient and secure power systems in a world increasingly reliant on digital infrastructure. By integrating 5G technologies into the power grid, the research ensures that energy systems can efficiently meet growing demands while remaining secure from cyber threats. This work underscores Dr. Ghosh's expertise in combining cybersecurity with modern energy systems to create solutions that are both scalable and resilient.

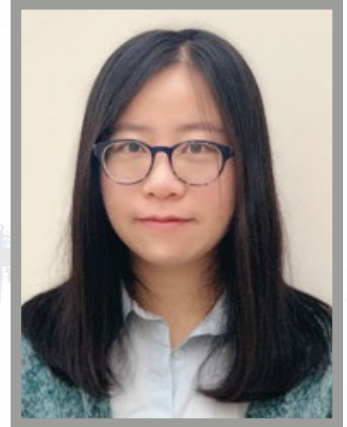
Moreover, Dr. Ghosh's collaborative efforts with the Pacific Northwest National Laboratory (PNNL) have further advanced her impact on clean energy innovation. In the joint effort titled "University, PNNL Advance New Concepts for Clean Energy Workforce," the focus is on developing educational programs that will prepare the future workforce to meet the demands of the evolving clean energy sector. This initiative aligns with Dr. Ghosh's broader mission to bridge the gap between cutting-edge research and workforce development, ensuring that students are equipped to contribute meaningfully to the global energy transition.

Through her leadership in various NSF-funded projects and collaborations, Dr. Ghosh is pushing the boundaries of what is possible in the fields of smart grids, cybersecurity, and renewable energy. Her work not only contributes to the academic understanding of these technologies but also ensures that real-world solutions are developed to address pressing challenges in the energy sector. Her research, teaching, and advocacy are shaping the future of clean energy and ensuring that both the technology and the workforce are ready to meet the demands of a rapidly changing world.

DR. CINDY LIU

Using AR/VR Technology in CDIO

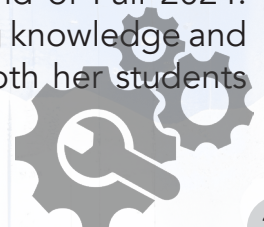
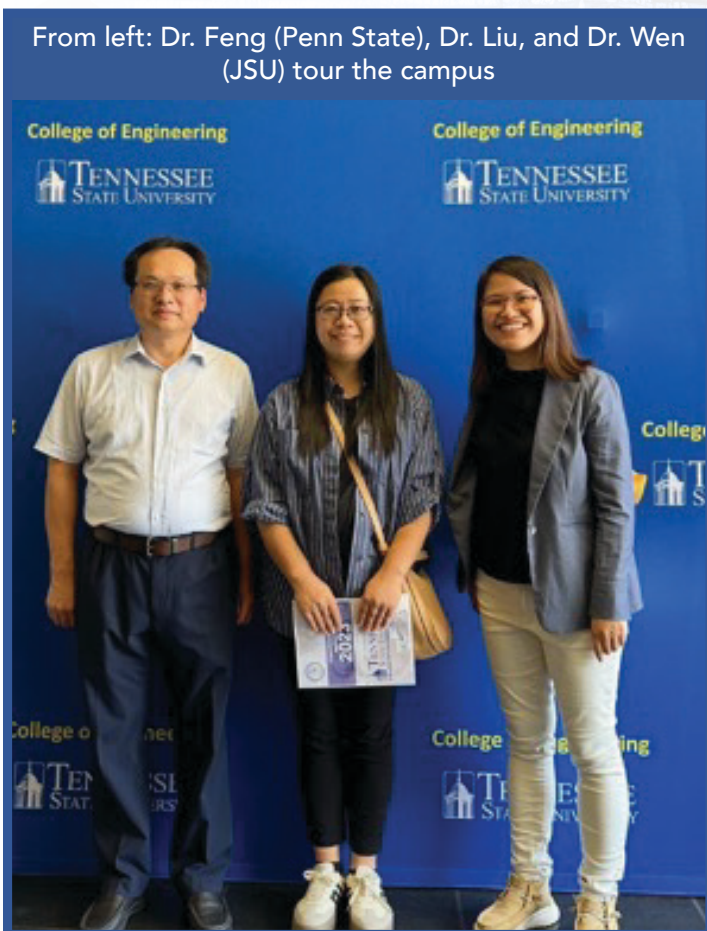
Dr. Shihui Liu is an Assistant Professor of Civil Engineering. Dr. Liu has made significant contributions to both the department and the College of Engineering since joining in Fall 2022. Her research interests encompass bio-inspired building materials, energy harvesting and storage, and smart buildings and cities. She has served as PI on three projects and as a co-PI on one additional project, funded by NSF, HUD, Amazon and AMIE. At the beginning of her third academic year, Dr. Liu secured a notable education research grant: a two-year, \$175,000 award from the NSF for the project titled "Catalyst Research on Broadening Participation in STEM: Application of AR/VR Technology Based on a Project-Oriented CDIO Approach to Enhance STEM Education in HBCUs."



Dr. Liu is focusing her career on advancing energy storage technologies, with a particular emphasis on rechargeable concrete batteries. This innovative research aims to offer a sustainable solution for energy storage. Dr. Liu's research group has developed and tested these rechargeable concrete batteries, evaluating their mechanical and electrical properties. This work represents a unique approach to energy storage. Currently, two PhD students and one master's student are involved in this research. One master's student graduated in Spring 2023 with a thesis on this topic. To date, the research has resulted in one published journal paper, with two additional papers currently under peer review. Dr. Liu is a strong advocate

for collaboration as a key factor in successful research. She actively seeks opportunities to work with researchers from other institutions and has established productive partnerships with Dr. Kejun Wen at Jackson State University (JSU) and Dr. Feng Qian at Pennsylvania State University (Penn State). These collaborations were facilitated through an Excellence in Research Planning grant funded by the NSF in 2023. In Summer 2024, Dr. Liu organized a workshop at TSU to further strengthen the collaboration among these three faculty members. Through these joint efforts, Dr. Liu is committed to advancing her research areas and making valuable contributions to TSU. Dr. Liu is currently leading the soil lab, where she supervises seven master's students and four PhD students. Five of her master's students are expected to graduate at the end of Fall 2024. Dr. Liu is dedicated to advancing knowledge and making a positive impact on both her students and the broader community

From left: Dr. Feng (Penn State), Dr. Liu, and Dr. Wen (JSU) tour the campus



DR. SHIRKHODAIE

Distinguished Navy Fellows explores AI/ML in Defense Research



Dr. Amir Shirkhodaie, Professor of Mechanical and Manufacturing Engineering at TSU, is a distinguished faculty member of the College of Engineering. He is the director of Center of Excellence for Battlefield Sensor Fusion and has been honored with the Distinguished Fellowship Award from the Department of Navy (DoN), a prestigious accolade recognizing his significant research contributions to physics-based synthetic multi-modal imagery data generation for AI/ML classifier training. This award supports his research and enhances his laboratory over a three-year period. Dr.

Shirkhodaie is currently engaged in a two-year project sponsored by the Air Force Research Laboratory (AFRL) focused on AI/ML Assurance, which aims to develop techniques for testing, verification, and validation of AI/ML datasets to ensure their reliability. He is also collaborating with major universities on a NASA-funded, three-year project under the University Research Initiative program, which targets secure urban air mobility systems using AI/ML and involves student training in this cutting-edge field. Additionally, Dr. Shirkhodaie has secured two-year funding from the US Space Force for a project on characterizing and tracking space-borne objects based on their radar signatures, in collaboration with the University of Colorado. His dynamic research team includes Ph.D., master's, and undergraduate students. Interested students can contact Dr. Shirkhodaie at ashirkhodaie@tnstate.edu.

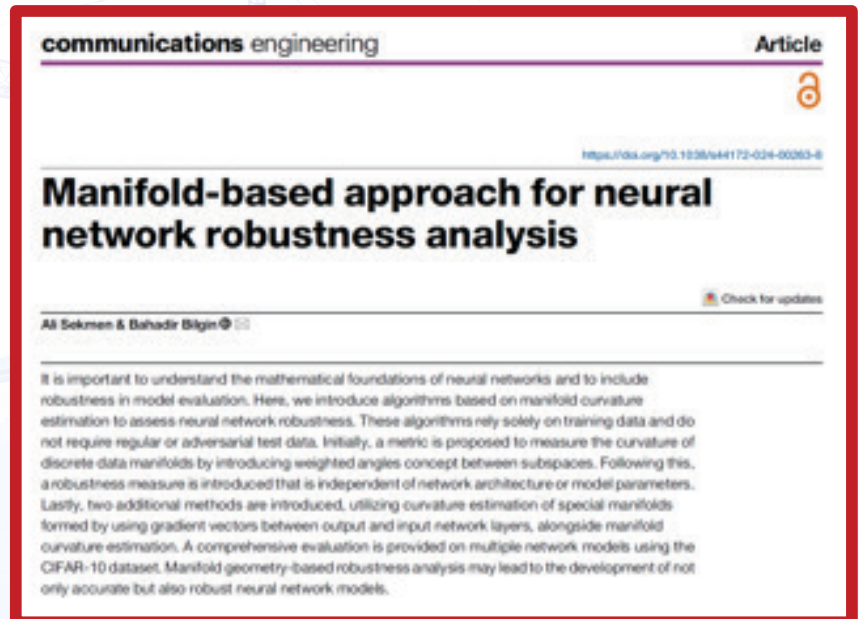
DR. SEKMEN'S TEAM WINS

NSF CREST-RISE Grant to study theoretical AI

Dr. Ali Sekmen is full professor of CS. He and Dr. Kamal Al Nasr (CS), Dr. Erdem Erdemir (CS), Dr. Kamrul Hasan (ECE), Dr. Anjin Chang (Agricultural Sciences), and Dr. Noel Bourne (Mathematics) won NSF RISE grant (\$1.2 M in 2024). This is the third RISE grant won by College of Engineering faculty. The goal of this research to improve the theoretical Artificial Intelligence (AI) infrastructure and use it to address important data science challenges in cybersecurity, bioinformatics, and agriculture. The overarching aim is to advance research capabilities in emerging AI areas and develop a comprehensive approach to educate and train Ph.D. students in collaboration with three TSU colleges: Engineering, Life and Physical Sciences, and Agriculture. The research will develop mathematical theory and practical algorithms for

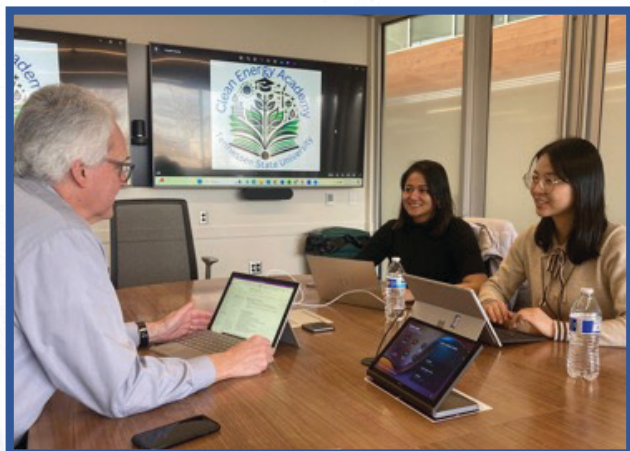


accurate and robust machine learning that can be applied for advancing research in private AI, protein structure modeling with enhanced cryo-EM imaging, and optimal feature selection for precision agriculture. We will implement a coherent curricula across three colleges for AI education, which includes developing educational materials, organizing professional development activities for students, providing Ph.D. student mentoring, and procuring research equipment to support the proposed research. Dr. Sekmen and his students have built their research foundation in this area. One of his prior works was just published in one of the top-rated journal articles for their neural network robustness analysis.



University, PNNL Advance New Concepts for Clean Energy Workforce

Courtesy of Tim Ledbetter, PNNL



CoE at TSU with assistance from Pacific Northwest National Laboratory (PNNL), has garnered federal funding for an academy to help prepare the future clean energy workforce. As envisioned, the TSU Clean Energy Academy (CEA) initially will serve the university's students who are interested in course work and practical field experience related to clean energy systems. "The academy's goal is to support a knowledgeable, skilled, diverse workforce for the clean energy industry in the United States," said Dr. Sagnika Ghosh. "Through the prism of clean energy," she added, "the academy will address disciplines that include power

generation, transmission and distribution, energy-efficient building systems, and the human and societal dimensions." The university eventually hopes to broaden the CEA program to embrace professionals who already work in traditional power system settings—such as utilities and the electrical power grid—but want to gain more expertise in clean energy systems. This target audience would also include the energy-efficient buildings workforce and workers engaged in public policy and related clean energy areas.

The CEA funding—\$500,000 to start—was awarded by DOE HBCU Clean Energy Education Prize program. The academy intends to include a level of flexibility in terms of costs and requirements for participating students. Ghosh noted that not everyone needs a four-year degree, or any degree necessarily, to participate in the clean energy workforce, and the goal is to structure the academy with those realities in mind. The CEA also hopes to feature real-life, hands-on learning opportunities through collaborations with utilities, national laboratories, and others. Ghosh and her colleague, Dr. Zufen Wang are leading the CEA endeavor, with assistance from Bob Davis, chief lighting research engineer at PNNL. Bin Shui, a research professor at TSU, is advising on the human and societal aspects of clean energy systems.

Additional organizations plan to serve as advisory resources to the CEA effort. They include the Center for Energy Workforce Development, EVNoire, the Nashville Electric Service, Oak Ridge National Laboratory, P2S Inc., SESCO Lighting, and the Tennessee Valley Authority.

PNNL leadership championed the joint appointment approach as the best way to partner with the university in areas of building efficiency and power grid research, benefiting both institutions. This is in addition to Bob Davis's assistance, which includes teaching a two-course sequence in architectural engineering at TSU.



TSU Engineering Team wins 1st place in the Structural Section of Student Competitions at the 2024 TN Engineers' Conference

A group of 4 students from TSU Department of Civil and Architectural Engineering: Amoree Alexander, Bryanna Bissainthe, Zaria Bullard and Joshua Jones came together as a team on September 30th to take the first place out of 9 different universities in the Tennessee Engineers Conference (TNEC) Student Competition. The students were accompanied by Dr. Ranganathan Parthasarathy, TSU ASCE faculty advisor, while Dr. Andrea Gardiner gave a talk on permitting and siting for electric vehicle battery recycling facilities. The conference took place at the Franklin Marriott Hotel in Cool Springs and was organized by the Tennessee Society of Professional Engineers (TSPE). The student competition was organized by Wesley Goodnight (EnSafe, Inc.) and Ashley Smith (CDM Smith). The structural round required the students to build a bridge in 30 minutes using 11 wooden blocks spanning between two fixed abutments on a shake table across a model river. The bridges were ranked by the time for which they could sustain dynamic lateral loading applied by the shake table. TSU took first place in this competition. The second competition was on geotechnical engineering requiring the students to build the steepest possible slope using wet sand within a time limit of 15 minutes, and without changing the orientation of the supporting walls. TSU took sixth place in this competition, bringing them to an overall standing of 4th place. University of Memphis took first place, followed by UT Martin and UT Chattanooga. Following the competition, the students actively engaged in networking with various companies at the competition including Smith Seckman Reid, Tennessee Concrete Association, Gresham Smith, S&ME and others. The students received praise from the TNEC organizer, Kasey Anderson for the energy and enthusiasm they brought to the conference. TSU CoE Dean Dr. Lin Li encouraged the students and advisor to prepare for the competition, while TSU ASCE president, Zachary Archer, and staff members, Camron McKinney, Amoree Alexander, Bryanna Bissainthe, and Marcisha Bradley helped to plan for the conference.



Dr. Keel Receives Emeritus Professor Honor



As the first emeritus professor for the College of Engineering, Dr. Keel served for 38 years at TSU and retired in 2024. He began his journey in academia at TSU in 1986 after earning his Ph.D. in electrical engineering from Texas A&M University. Over the course of his 38-year tenure at TSU, Dr. Keel became known for his dedication to teaching and research, earning him a reputation as a leading educator and scholar in his field.

Dr. Keel's contributions to both teaching and research are extensive. He has been recognized with several prestigious awards, including the Distinguished Research Award in 1996 and the Excellence in Teaching Award from the College of Engineering in 2022. His influence on students is evident, as he has supervised seven Ph.D. candidates who have since secured prominent positions in industry and academia. Dr. Keel authored or co-authored five widely recognized textbooks in his discipline and published over 200 technical papers in leading journals and conferences, contributing significantly to the body of knowledge in electrical and computer engineering. His research efforts were supported by 28 externally funded grants, exceeding \$30M from agencies such as the National Science Foundation (NSF), the National Aeronautics and Space Association (NASA), the Department of Defense (DoD), the Department of Energy (DoE), and the Army Research Office (ARO).

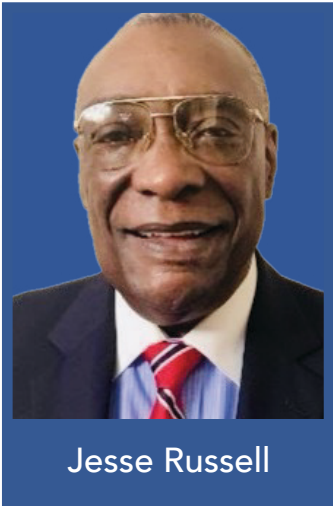
Dr. Keel remains actively involved in research, currently leading in funded projects with the Department of Defense (DoD) and the National Nuclear Security Administration (NNSA).

Intelligent Cyber-Physical Systems Lab for Assured and Secure Operations (ICPSLASO): Dr. Keel, in collaboration with Drs. Hong, Hasan, and Zein-Sabatto, received \$340,000 in equipment funding from the DoD. This \$340,000 equipment funding will establish an Intelligent Cyber-Physical Systems Lab at TSU to conduct advanced research in cyber-physical systems, focusing on areas of modeling, operation, performance, constrained resource management, reliability, and system and network security.

TM-STATE consortium for Resilient Automation and Cybersecurity System: As part of a consortium involving North Carolina A&T State University, Tennessee State University, and South Carolina State University, along with partners Savannah River National Laboratory and Y12, Dr. Keel and Dr. Hong lead a \$5 million grant project (\$1.3 million for TSU). This initiative, funded by the NNSA, aims to develop resilient infrastructure through modern information technology and cybersecurity solutions, protecting critical assets and ensuring operational continuity in line with NNSA's strategic goals.



Proposed ICPSLASO facility



Jesse Russell

TSU College of Engineering Hidden Figure

Remembering Jesse Russell – Digital Cellular Technology Pioneer

Mr. Russell received his BS in Electrical Engineering from TSU in 1972 and his MS in Electrical Engineering from Stanford University in 1973 and received an Honorary Doctor of Science Degree from Morgan State University in 2019 for his work in Digital Cellular Communications Technology. Mr. Russell became the first Black person to be hired directly from an HBCU institution by AT&T Bell Laboratories. He has helped to shape the wireless communications industry direction through his leadership and perspectives for standards, technologies and new wireless service concepts. His innovations in wireless communication systems, architectures and technology related to radio access networks, end-user devices and in-building wireless communications systems have fundamentally changed

the wireless communications industry. He pioneered the field of digital cellular communications in the 1980s using high-power linear amplification and low bit-rate voice encoding technologies and received a patent in 1992 for his work in digital cellular base station design.

He has over 100 patents granted, such as the invention of the first digital cellular base station and fiber optic microcell utilizing high-power linear amplifier technology and digital modulation techniques. Mr. Russell is serving as Chairman/CEO of incCOMMUNICATIONS Services Inc., which is a 5G Ultrawideband Hybrid Fiber-Wireless Communications Solutions Company focus on 5G Enterprise Cellular Communications Network Solutions and 5G Infrastructure-Centric Smart Pervasive Sensing Technologies for Smart-Buildings as well as 6G Human-Centric Smart Devices Fractal Networks for the Healthcare Industry focused on internetworking with 5G Ultra-Wideband Digital Cellular Secure-Communications™ Networks. In addition, Mr. Russell also serves as the Chairman/CEO of incNETWORKS Inc., which is a 5G "Small Cell" wireless communications network platform development and wireless technology innovation company. incNETWORKS® currently holds some of the seminal 5G "Small Cell" and key Spectrum Optimization Technology Patents for Smart-Homes, Smart-Buildings, Smart-Campuses, and Smart-Cities. Mr. Russell has over forty years of professional experience in directing Research and Development of pioneering technologies, products and services related to the communications industry within Lucent Bell Labs, AT&T Labs, incNETWORKS® and incCOMMUNICATIONS Services. He has served as a member of the Federal Communications Commission (FCC) Technological Advisory Council (TAC), which advises the FCC on important areas of communications technology innovation and policies supporting America's competitiveness and job creation in the global economy. Mr. Russell also serves on the United States Commerce Spectrum Management Advisory Committee (CSMAC), which advises the Assistant Secretary for Communications and Information at NTIA on a broad range of spectrum policy matters. Mr. Russell is a Member of the National Academy of Engineering, a Fellow of the IEEE, and a Fellow of the International Engineering Consortium (IEC). In 1980, Mr. Russell was selected by Eta Kappa Nu as "The Most Outstanding Young Electrical Engineer of the Year."



Davenport and Dr. Armwood Serve as Panelists



Deondre Davenport, Coordinator of Student Services and Recruitment for the College of Engineering, was invited to serve as panel at the 2nd Annual RECESS Summit by TSU alumna Carla Walker-Miller on September 15, 2024. Alongside industry leaders, community advocates, and CEOs, he discussed the advantages and future of clean energy and explored ways to better prepare the younger generation for the workforce through mentorship and training opportunities.

Dr. Armwood served as a panelist at IEEE WIE ILS (Richland, WA) in August 2024 for an extraordinary panel discussion: "Amplify Research Impact

through STEM Education." The panel of trailblazing women in STEM, including Evangelina Galvan Shreeve, Catherine Armwood, Mariel Lavieri, Cassidy

Eassa, and Celia Shahnaz, delved into how strategic education initiatives can significantly enhance the reach and influence of your research, particularly in empowering women in scientific leadership roles. Led by the inspiring Karma Sawyer, this conversation explored how fostering inclusive learning environments can drive innovation and positive change. This compelling conversation provided actionable strategies to maximize the impact of your research at the intersection of education, research, and female leadership!

Amplify Research Impact through STEM Education		
 Karma Sawyer (moderator) Director of the Electricity Infrastructure and Buildings Division Pacific Northwest National Laboratory	 Catherine Armwood-Gordon Associate Professor and Associate Dean for the Department of Civil and Architectural Engineering Tennessee State University	 Cassidy Eassa Science Educator Laser Interferometer Gravitational-wave Observatory (LIGO)
 Mariel Lavieri Associate Professor in the Department of Industrial and Operations Engineering University of Michigan	 Celia Shahnaz 2024 IEEE WIE Committee Chair, Professor, Department of Electrical and Electronic Engineering Bangladesh University of Engineering & Technology	 Evangelina Galvan Shreeve Chief Diversity Officer and Director of STEM Education Pacific Northwest National Laboratory

2024 BEYA Conference and AMIE Design challenge

Dr. Charles McCurry and Mr. Davenport led 49 College of Engineering students to attend the 38th BEYA Conference at Baltimore in February 2024. Over 12,000 students, corporations, governments, businesses, military professionals, and industry employers joined the three days of learning, networking, celebrating excellence, and showcasing STEM career opportunities. TSU also sent one team to attend the AMIE student design challenge in AI. Dr. Erdemir served as the faculty coach for this team.



CS faculty Dr/ Erdemir led six engineering students D. Noah, M. Lewis, M. Kangogo, D. Moulden, and D. Birungi to attend the 2024 AMIE Design Challenge during the 38th BEYA Conference at Baltimore, MD on February 16, 2024. They developed a design solution for AI. They presented their design in front of 16 other design teams from HB-CUs and an audience. Their design project was evaluated by 7 judges from industries. They did excellent in their design and oral presentation.



NEW ACADEMIC PROGRAM

College of Engineering has developed new academic program proposals in BS Biomedical Engineering, Mining Engineering Minor, Construction Management Minor. The Construction Management Minor has been approved by Academic Affairs and starts in Fall 2024 by the Department of Civil and Architectural Engineering. The BS Biomedical Engineering is waiting for Board of Trustee approval.



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PHD STUDENT HIGHLIGHT

<https://www.vanderbilt.edu/vinse/2024/09/19/researcher-highlight-karla-robles/>

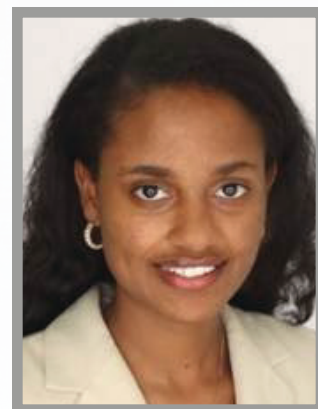


Karla Robles is a 2nd year PhD student in Engineering and Computational Science at TSU. Her current research is funded by the Partnerships for Research and Education in Materials (PREM) at TSU-Fisk-University of Illinois at Urbana-Champaign and by the U54 Pilot Grant through the Meharry-Vanderbilt-TSU Cancer Partnership to end health disparities. She develops biomaterials for cancer immunotherapy under the guidance of Dr. Richard Wu at TSU. Dr. Todd Giorgio at Vanderbilt, and Dr. Anil Shanker at Meharry Medical College also advised her to conduct her research.

Karla is developing innovative polymers to make sustained-release microcapsules containing such macromolecules. At their largest, these microcapsules should be one-tenth the diameter of a human hair. They should also be non-toxic, biodegradable, and have tunable sustained-release technology which allows for controlled protein drug-delivery over a dose-appropriate period. She specializes in developing one of the many possible techniques to achieve this, called electro-hydrodynamic atomization or electrospray. Her research focus is on how the fabrication process of these microcapsules can be eco-friendly and void of any toxic organic solvents. Karla is a recipient of the National Science Foundation's Graduate Research Fellowship (NSF GRFP Fellow), an SMDP MedTech Scholar, and Code2040 Fellow.

As a scientist and engineer, she plans to continue to investigate health disparities and to design therapeutics for women's diseases. In her career, she wants to build up inclusive communities where immigrants, people of color, members of the queer community, neurodivergent people, people with disabilities, and anyone with a journey is celebrated. While working towards achieving two Bachelor of Science degrees in Computer Science and Biochemistry at MTSU, she participated in two REU programs funded by the NSF. Her first summer, she simulated the behavior of the serotonin-reuptake transporter, a protein involved in depression, anxiety, and addiction. The next summer, she worked on simulations of wound healing through computational models of cell migration at MIT. During her time in graduate school at Dr. Richard Mu research group at TSU, she has received the NSF Graduate Research Fellowship and has been selected as a Scientist Mentoring Diversity Program Scholar, where she has found even more mentors and champions for herself and peer mentors with big dreams like herself. During this time, she has also had the honor of meeting the person she believes will be her life-long partner, of finding a spiritual path, and has learned to love life for the journey it is.

Mercy Sammy is currently pursuing her Ph.D. in ENCS under advising by Dr. Zufeng Wang in Architectural Engineering. Her master's research specialized in Rechargeable Cement-Based Batteries, specifically focusing on Electrochemical Impedance Spectroscopy (EIS) testing for the anode and cathode, electroplating, and the charging and discharging cycle of the cement-based battery under advising by Dr. Shihui Liu in Civil Engineering. Furthermore, Mercy has actively contributed to an augmented reality project aimed at analyzing and comprehending complex building HVAC equipment types. Her previous research topics also include geothermal heat pumps and the design of HVAC systems. Mercy is an active member of the ASME, SWE, and the Deloitte Mentorship Program. Moreover, she is the ASHRAE student president at TSU. Mercy joined ORNL's Building Envelope Materials Research Group as a Graduate Student Researcher on January 16, 2024. In her new role at ORNL, Mercy is mentored by Philip Boudreaux while she contributes to the refraction-based air leak detector (ALD) and microwave moisture detector (MMD) projects. The ALD locates air leaks through the building envelope and measures their flow rates using off-the-shelf cameras and advanced algorithms. The MMD measures the moisture content of materials within the building envelope without removing any of the envelope components. Mercy's role will be to validate the performance of MMD prototypes.



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CoE provides over \$1M in Scholarships to 150 students

The College of Engineering has provided over \$1,000,000 in scholarships to 150 students based on their academic performance and financial need. Industrial partners have provided strong support to some students, such as Boeing, Stantec, Southern Company, Oracle, SSOE, Turner, HCA, Ascend Federal Credit Union, Benesch, Enbridge, ViViD1 Architecture and ViViD1 Builders, AWWA etc.

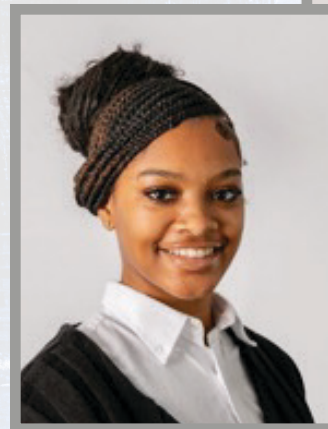


EE students Ja'Mya Brown and Darian Moulden received the Oracle Scholarship

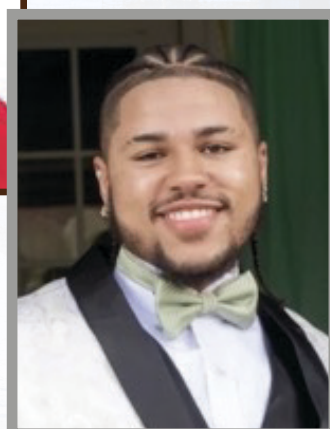


CE students Mercy Kangogo and Cescar Kangogo received the J&L Presidential Scholarship

AE student Sanaiya Choute and CS student Azeez Folorunsho won the 2024 Enbridge Scholarship



AE Ciera Wheeler received SSOE Scholarship



CS student Dimitrius Ausby received Ascend Federal Credit Union Scholarship



AE student Makiah Brown, ME students Maleia Ali and Rohan Loubser won Stantec's Scholarship

2024 Mohan Malkani Prize for Excellence in Graduate Research

To honor the excellent service and legacy of former Associate Dean Dr. Mohan Malkani, the College of Engineering established the Mohan Malkani Prize for Excellence in Graduate Research for graduate students in 2024. The first prize winners are Brannndon Jones (advisor Dr. Amir Shirkhodaie) and Richard Wiencek (advisor Dr. Sagnika Ghosh). The prize was generously contributed by Dr. Ali Sekmen and CoE. Congratulations to Brannndon and Richard!

Dr. Malkani was born in 1933 in India. After graduating from the University of Baroda with a bachelor's in Physics and Math, and a master's in Physics, he became a Professor at two prominent colleges in Mumbai. These opportunities led him to further his education, and at 26 he moved to the United States to obtain a master's in Electrical Engineering from Mississippi State University. With his unquenched desire to teach, he became a Lecturer at Tuskegee University before returning to graduate school to complete his Ph.D in Electrical Engineering at Vanderbilt University, which ultimately led him to TSU.

Dr. Malkani worked at TSU for decades in the Department of Electrical and Computer Engineering. He served as the Department Chair until 1973 and then was promoted to Associate Dean of CoE until 2017, when he retired at 82. While at TSU, he was awarded numerous grants, include those from the Air Force Research Laboratory (AFRL), the Department of Defense (DoD), the National Aeronautics and Space Association (NASA), and Oak Ridge National Lab (ORNL). He was inducted into the inaugural Million Dollar Research Club, an honor from TSU's Office of Sponsored Research, for securing research projects summing to \$1M or more. He was also an active member of the Sri Ganesha Temple while in Nashville. He retired to Fort Myers, Florida, where he lived until 2023.



Brannndon Jones is a PhD Student. His research is in the field of AI Assurance, specifically using modeling and simulation software for dataset generation and training of custom DL models. Brannndon has done academic research for multiple DoD agencies including ARL, GTRI, ONR, and AFRL. Through these studies, Brannndon has submitted over a dozen research and journal articles to peer reviewed publications. While presenting at the Info Symbiotics DDDAS 2020, Brannndon won 1st place for the best paper presentation, and 3rd place for the best student paper. These awards were won against members of the AFRL and other DoD agencies.

Richard Wiencek finished his MS in CISE in May 2024 and started as a PhD student in ENCS in Fall 2024 in Dr. Ghosh's research group. He has published numerous works in IEEE conferences with a focus on the optimal design of Wireless Power Transmission Systems for Electric Vehicle charging, designing Intelligent Control Systems utilizing Artificial Intelligence and Machine Learning for Smart-Grid and Microgrid Control, and designing Cyber-Resilient 5G and Beyond Computer Communication Systems prone to different cyber-attacks, all with a focus on Deep Reinforcement Learning. He is a role model to his peers and an inspiration to undergraduates as he helps them with projects, coursework, and labs.



CoE provides over \$1M in Scholarships to 150 students

- Ascend Credit Union: \$5000 to 1 student
- Boeing Inc.: \$25,000 to 5 students (Mentor-Mentee Pairs)
- COE General Scholarship: \$84,850 to 24 students
- COE Emergency Scholarship: \$25,186 to 11 students
- Enbridge Inc.: \$5000 to 2 students
- Engineering Alumni Foundation Scholarship: \$60,000 to 30 students
- Federal Grants Scholarships: \$682,248 to 139 students (USDA/NSF CUREs/ NSF S-STEM/USDOT Eisenhower)
- HCA CS Scholarship: 3 students with \$100,000
- Oracle Inc Scholarships: 2 students \$10,000
- SSOE Scholarship: 2 students \$10,000
- Stantec scholarships: 3 students \$15,000
- Southern Company Scholarships: 5 students \$50,000
- Turner Construction Scholarships: 5 students \$50,000
- ViViD1 Architecture and ViViD1 Builders: 10 students \$5,000

Family's Engineering Legacy A Part Of TSU Upcoming Commencement

Courtesy of Alexis Clark, TSU Media



When it comes to earning an engineering degree from TSU, the Buford family isn't settling for just one—they are aiming for three. Shawn Buford proudly graduated with her master's, while her son, Joshua Buford, received his undergraduate degree, accounting for two of the degrees in May 2024. "It feels incredible," Shawn said, as she prepared to receive her master's degree in data science with a 4.0 GPA. "It shows that you never get too old to go back to school. This is a family affair. Don't ever let fear or insecurity keep you from what you're doing because you'll be missing out on your blessing." Shawn started her collegiate journey with a degree in chemistry nearly 30 years ago from Hampton University. The Brooklyn, New York, native and mom decided to go back to school after discovering that TSU had launched a new

data science program in 2022. Joshua, who received his undergraduate degree in electrical engineering on May 4th with a 3.7 GPA, picked up his cap and gown alongside his mother, both graduating with honors. He stated that the duo graduating together wasn't planned. "I'm really proud of her," Joshua said. "I know school has been something that she has enjoyed, and just getting to see her dream fulfilled is exciting. I'm happy to witness her live out her dream and walk across the stage, and then I get to walk the next day. It's an opportunity that a lot of people don't get to have."

Meanwhile, the Bufords' eldest son, Christopher Buford II, prepares to join the ranks in December 2024 when he obtains his master's in engineering. He and his mother Shawn began their journey together in 2022 when the pair both started the master's program. "We've been very supportive of each other, and we just go home and get to talk about our experiences after classes," Christopher said. "And then we just do work together because we need that support. So, it's been an amazing experience." Christopher, who previously earned his undergraduate degree from TSU, is set to receive his master's in mechanical engineering this semester. He shared that witnessing his mother's return to school, alongside his younger brother, has inspired him to consider pursuing his Ph.D. at TSU soon.

"It's been very motivating because I look at what my mom and Josh are doing, and it's the fact that we're getting our education from an HBCU," Christopher said. "TSU has so many great opportunities here." The trio were all also inducted into the Golden Key International Honour Society at TSU. Both of Shawn's sons gravitated to STEM due to her chemistry background, but with their father, Christopher Sr., being a 1992 TSU alumnus, it was an obvious decision to attend the school that was right in their backyard.

According to Zipa there are currently over 228,900 engineers employed in the United States and only 3 percent of engineers identify as African American. Shawn said she looks forward to walking the stage and turning around to watch her sons follow suit to all be a part of increasing that 3.3 percent. "We helped each other, encouraged each other, and supported one another during this journey," Shawn said. "And as a non-traditional student, I didn't know how the students in this generation were going to receive me. But the TSU students are incredibly smart, polite, and embrace me. So, it's been such an incredible experience."

Dr. Lin Li, the dean of engineering, praised the family's dedication to education, stating, "The Buford family's commitment to academic excellence is truly inspiring and reflects the values of TSU's engineering program. Congratulations to the Buford family as we look forward to their return for yet another engineering degree."



TSU Mechanical and Manufacturing Engineering Team wins 2 awards in 2024 National Fluid Power Association's Vehicle Challenge Championship

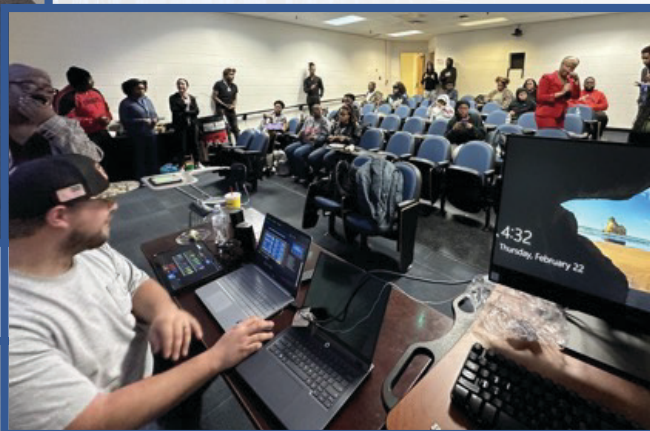
Dr. Mohammad Habibi with a group of students from the Department of Mechanical and Manufacturing Engineering, including Anthony Wheeler, Kaylen Essix, Avraz Tovi, Donovan Davis, and Havilah Akachukwu represented the College of Engineering at the National Fluid Power Association Vehicle Challenge (NFPA-VC) competition in Denver, CO in April 2024. They were declared Teamwork Champions and won 2nd place in the Efficiency Race. The competition was organized by the National Fluid Power Association and featured 12 universities from across the USA. The championship required students to design and develop a fluid powered vehicle prototype and were judged in the Sprint, Regenerative Energy, Efficiency, and Endurance race categories. It took a complete two semesters for students to develop a prototype and connect with fluid power industry leaders such as IFP Motion Solutions, Parker Hannifin, Southern Fluid, Norgren, SunSource, and Hydac, among others. The College of Engineering is also home to the National Fluid Power Association Club (NFPA-C), which includes over 20 active members, comprised of Freshman to Senior students. The NFPA Club meets once every month throughout the year and organizes guest lectures from NFPA industry partners. Through the NFPA Club, we strive to prepare engineers and create a more educated workforce, through funding student outreach and education programs designed to create a pathway into the fluid power industry and by funding research, designed to better engage academic faculty in the teaching of fluid power. Both NFPA-VC and NFPA-C support the activities with annual grants and have awarded several thousand dollars to the College of Engineering to work independently on the stated objectives in the past couple of years and are continuing to do so in the current year.



Celebration of Engineers Week 2024

Engineers Week (Feb. 18-24, 2024) was hosted by student chapters in the college. On Feb. 18, 2024, Engineers Week started with its annual "Battle of the Departments". All departments participated in a Volleyball Tournament. The tournament winners were the Civil & Architectural Engineering Department. On Monday, Feb. 19, 2024, Electrical Engineering & Computer Science presented on new technology using a robotic arm to stack objects & to discover motion detection. On Tuesday, Feb. 20, 2024, Mechanical Engineering & Applied/Industrial Technology created a game centered around a 4-year college plan in engineering. If scholars answered the question correctly, they could throw a dart a balloons to earn points for their department. On Wednesday, Feb. 21, 2024, Cummins and Atmus presented to the student body about their companies. The session ended with a game of Kahoot where the top three students were awarded scholarships. On Thursday Feb. 22, 2024, Civil & Architectural Engineering used the Family Feud game theme to showcase information on career paths. On Friday, Feb. 23, 2024, The National Society

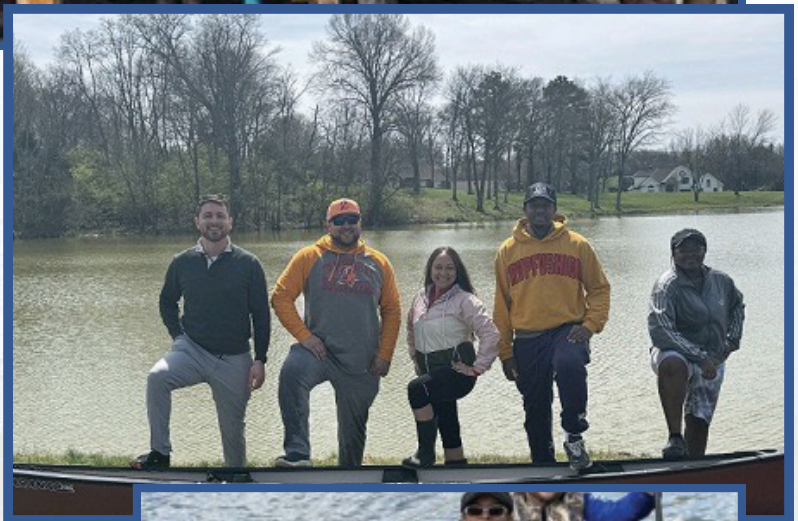
of Black Engineers & Society of Women Engineers hosted a Student Organization Fair to get more students in involved within the College of Engineering.



2024 ASCE Concrete Canoe Competition



The 2024 TSU ASCE Concrete Canoe team performed admirably at the 2024 ASCE Mid-South Student Symposium at University of Tennessee at Martin on April 5th, 2024. Their team, "Blue Furballs" was able to successfully pass the submergence test, and competed in all 5 races, with the canoe fully intact. Their athletic team, comprised of Denise Borja, Kyla Beddingfield, Zach Lanier, and Camron McKinney, walked away with two awards: 2nd place in the 200m Men's Slalom and 3rd place in the 200m Women's Slalom. The team are truly grateful of these supporters, Turner Construction, Gresham Smith, Je Dunn Construction, Nashville Ready Mix, and Arcosa Lightweight. The team was led by Team Captains, Denise Borja and Zachary Archer, and academic advisor, Dr. Ranganathan Parthasarathy. The Team Members: Denise Borja - Team Captain, Zachary Archer - Co-Captain and Project Manager, Zachary Lanier - Construction Captain, Camron McKinney - Writing Captain, Tenille Cochran - Writing Team, Kyla Beddingfield - Athletic Team, Muhannad Aljamal - Mix Design Captain, John Amann - CAD Design Captain, Zackee Dosky - Mix team.



DR. CHIMBA AND 10 TSU ENGINEERING STUDENTS PRESENT AT TRB 2024

Transportation Engineering Professor Dr. Deo Chimba led 10 TSU engineering students to the 2024 Transportation Research Board (TRB) Annual Meeting to present research papers. These engineering students were sponsored by FHWA under Dwight David Eisenhower Transportation Fellowship Program (DDETFP) and TRB Minority Student Fellows Program.



2024 ADVANCED CLEAN ENERGY SUMMIT (ACES) HBCU (2ND PLACE)



ME students Zackee Dosky, Elijah Rachell, Marques Lewis, and Darian Moulden attended the 2024 Advanced Clean Energy Summit event and won 2nd place in the ACES Case Study.

ALUMNI SPOTLIGHT



Terrence Southern is a Robotics, Automation & Artificial Intelligence Specialist, Entrepreneur, Inventor, Author, Philanthropist and Keynote Speaker. After earning his BS in CS at TSU in 2003, his passion for robotics rapidly grew and furthermore propelled him into a nationally recognized leader in the field of Robotics Engineering. As an influencer of innovation and a recognized leader in Robotics & Artificial Intelligence, Mr. Southern continues to implement strategies to deploy robotic solutions and machine learning technology across the globe. Over the course of his 25-year career, he has installed more than 2000 robots on projects across the world for multiple Fortune 500 companies. Mr. Southern has been the recipient of numerous awards for service to the manufacturing

industry and community at large. He is the CEO of Robotopia which is an Industrial Advanced Automation Systems Integrator and Workforce Development company (www.robo-topia.com). He is the Leader & Podcast Host of the BlerdOut® Movement where intelligence meets cool and celebrates how the creative minded individuals run the world. He is also the founder of 501c3 Illuminate STEM where the mission is to "illuminate the world" with under-resourced youthful talent in the areas of Science, Technology, Engineering and Math. He is constantly looking for new means by which to stimulate minds and to cultivate our new generation of leader.



TSU ALUMNI SPOTLIGHT

SHERRILL TORAN



Investing in Students by Empowering Future Engineers

Sherrill Toran is President of the Tennessee State University Engineering Alumni Association.

She also serves the University in the College of Engineering Dean's Office as coordinator of corporate engagement and partnerships. Ms. Toran completed her Bachelor of Science in Electrical Engineering from Tennessee State University, as well as her Master of Arts in Teaching and Learning Curriculum and Instruction.

Toran got word of students needing tuition assistance and sprung into action. She along with the EAA board created a merit-based scholarship. The Alumni Association was able to award 30 students scholarships totaling \$60,000 over two months. Students received these scholarship funds through the TSU Foundation.

Can you share one or two ways, or experiences from Tennessee State that led to your success?

Somebody loved me enough that even in my best of times, and even in my worst of times, somebody loved me enough that they invested in me to ensure my success. So it's very, very important that I give back because someone invested in me.

Why do you feel it's important to be a member of the President's Society?

It's important to be a member of the President's Society because it's a part of giving back to the very institution that gave you opportunities in your career. Oftentimes, when people say the President's Society, it's a little dismissive. It's not about being a "Who's Who." It's about just being a good steward. And giving back to the University and investing in students, because that is part of our mantra—to support the college, support its students, and support alumni with job opportunities, and career.

Are there specific funds or efforts you support through the-TSU Foundation? Where is your money going?

The Engineering Alumni Association has three funds, the ASC, which is the Alumni Scholarship Endowment, Summer Pre-Engineering Readiness Fund (SPERF), and the Engineering New Building Fund. We must give back because we have to pay it forward. We pay it forward to the next generation so that they can continue to pay it forward becoming perpetual. It doesn't matter where you support the TSU Foundation We must give.

How would you like to inspire those reading this interview? How would you ask them to support the students?

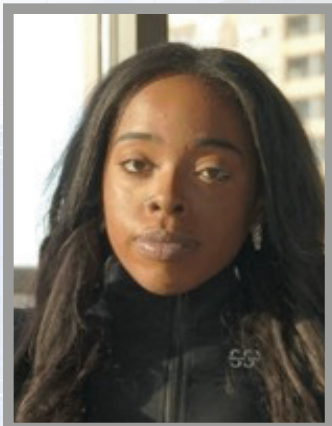
Give of your time, give of your resources. We have students who need help with their resumes. We have students who need help with interviewing techniques, branding themselves and building confidence, all of these kinds of things. It's not just about the money, but we have to be able to bring our resources and our skill sets back to the table so that we can invest in our college, [and ultimately] in our students.

ALUMNI SPOTLIGHT



Alfreda Lowery-Jackson is the President of Lowery-Jackson Consulting Services, a business process management and continuous improvement consulting firm based in Atlanta, GA. Her professional career encompasses more than 30 years of experience in project, process, and program management at companies such as The General Electric Company, The Coca-Cola Company and Philips International. Alfreda has a change-agent mindset and proven history of developing creative solutions and implementing sustainable change in Financial Services, Manufacturing, Engineering, Shared Services, Operations, Marketing, Supplier Management, and Internal Audit. She is Lean Six Sigma Black Belt, Project Management and Process Management certified.

Alfreda received the Replication Award in The Coca-Cola Company's Inaugural Six Sigma Competition and is an international speaker on integrating Sarbanes Oxley (SOX). Alfreda has a passion for building diverse and inclusive teams and, while at Philips, earned the title of the other CFO, the Chief Fun Office, for her ability to create healthy competitive environments by promoting individuality and active engagement to achieve business results. Alfreda holds a Master of Business Administration from Emory University, a Master of Science in Electrical Engineering from the Georgia Institute of Technology, and a Bachelor of Science in Electrical Engineering from TSU.



Amiya D. Ingram has been at the forefront of Machine Learning Technology. Since graduation in 2022 Ingram has worked for Microsoft, under Microsoft AI. During this time, she has managed Deployment Processes, Revenue Budget and Forecasting, Product Machine Learning Models, and how they are integrated into systems to drive great user experience and revenue through Ad Technology across Co Pilot, Bing, Netflix, and many more platforms. During her time at Microsoft, she has been an advocate for Diversity and Inclusion by Representing Microsoft at NSBE 2023 in Kansas City, as well as being a Panelist for the Code Path conference, answering questions relating to early career challenges. She also served as the University Outreach Chair in 2023 for the Seattle NSBE Professionals Chapter where she worked closely with students from the University

of Washington for event planning and preparation. Alongside this Ingram served as the Leadership Speaker Series Lead for the Intern Celebration Week last summer showing her commitment to development of new talent and lifting as she climbs. Outside of Tech Ingram has created the brand ShapeShareWear, an athleisure community that bridges the gap between where individuals are physically and where they are mentally through stylish and quality clothing. Through this business Ingram has had 3 free community events and has donated over 10% of every sale back to the community. Ingram says, "No matter how far I go, or the number of accomplishments I obtain I will always have TSU to thank for acting as a catapult for life changing opportunities and greatness."

COE STUDENT ORGANIZATIONS

- Alpha Eta Rho, Tau Sigma Chapter (AHP)
- American Society of Civil Engineers (ASCE)
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- Architectural Engineering Institute (ASCE-AEI)
- Association of Computing Machinery (ACM)
- Association of Technology , Management and Applied Engineering (ATMAE)
- Construct Management Association of America (CMAA)
- Epsilon Gamma Iota, Inc. (EGI)
- Epsilon Pi Tau International Honorary Society (EPT)
- Institute of Electrical & Electronics Engineers (IEEE)
- Institute of Transportation Engineers (ITE)
- National Society of Black Engineers (NSBE)
- Society of Women Engineers (SWE)

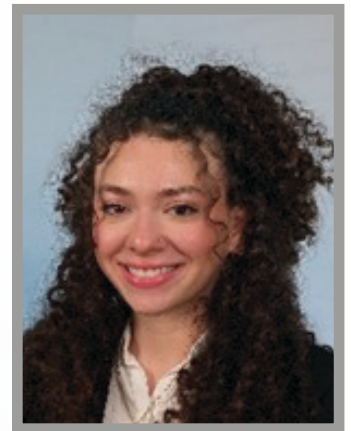


STUDENT CHAPTERS HIGHLIGHTS



Add First & Last Name]’s goals for the TSU Chapter of the Institute of Electronic and Electrical Engineers (IEEE) are to help her members learn and grow through hands-on experiences, connect with industry professionals, and make a positive impact on their community. The chapter, with member’s active participation, will focus on organizing technical workshops, building practical and soft skills, and participating in community service projects. They take advantage of these chances to help members launch their careers and give them experience and knowledge outside their industry. Following IEEE’s innovation and excellence mission, she aims to benefit campus and the wider community with invaluable contributions.

As President of the Society of Women Engineers (SWE), Rimaz Albrahim’s primary goal is to create a supportive and empowering environment for women in engineering. She plans to expand professional development opportunities by organizing workshops, networking events, and industry collaborations that enhance our members’ skills and career prospects. Additionally, she aims to increase community outreach to inspire the next generation of female engineers, while also advocating for greater representation and inclusion within their fields. Through these efforts, she hopes to strengthen our chapter, foster a sense of belonging, and ensure that our members are well-equipped to excel in their careers.



The American Society of Civil Engineers (ASCE) Student Chapter at TSU is larger and stronger than ever for the 2024-2025 academic year. Coming away from the 2024 ASCE Mid-South Symposium at UT Martin with two trophies (2nd place in Men’s Slalom, and 3rd place in Women’s Slalom) for the concrete canoe competition and proving themselves as formidable foes, Zachary Archer’s aim is to claim the 1st place prize this year! Additionally, they are expanding into the other prestigious competitions such as Steel Bridge and Sustainable Solutions. With your help, TSU will bring home first place this year!



STUDENT CHAPTERS HIGHLIGHTS

As President of the Architectural Engineering Institute (AEI), Kyra Harmon-Presswood is committed to taking their organization to new heights. Her focus will be on driving innovation in Architectural Engineering and strengthening their connections within the industry. She plans to prioritize groundbreaking research, create more opportunities for collaboration among members, and champion sustainable building practices. By organizing engaging events, supporting professional development, and building strong partnerships, she aims to ensure AEI plays a key role in shaping the future of their field and tackling the challenges they face in the built environment.

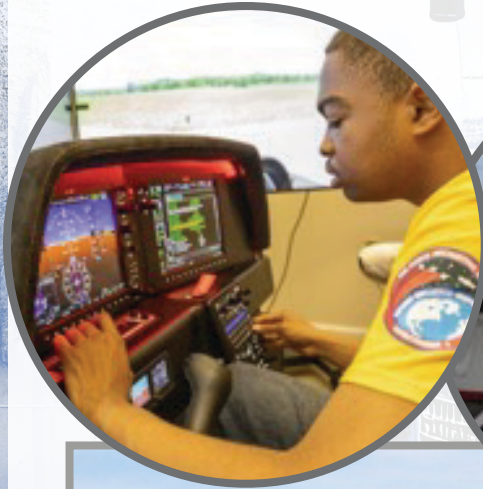


As President of the National Society of Black Engineers (NSBE) chapter, [Add First and Last Name]'s primary goal this year is to elevate their organization's impact both on campus and within the broader engineering community. He aims to foster an environment where members excel academically, grow professionally, and give back through meaningful service initiatives. By strengthening our partnerships with industry professionals and expanding academic support resources, they are committed to ensuring that every member has the tools and opportunities to thrive. Their chapter's focus will be on building a strong, supportive community that not only helps each other succeed but also leaves a lasting positive impact on the engineering field.

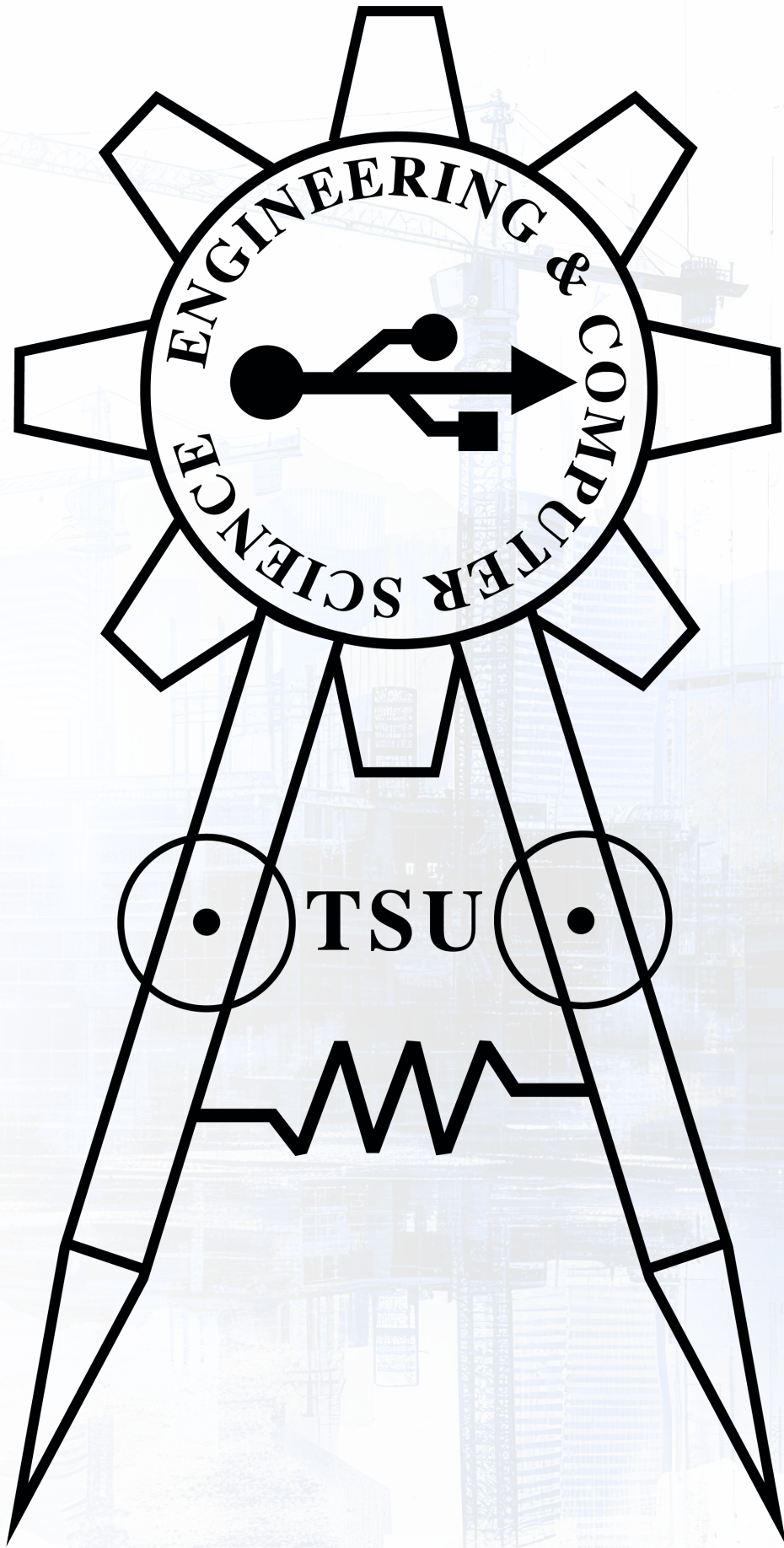


SUMMER PROGRAMS

- ❑ US Air Force Aim High Flight Academy for high school students
- ❑ Engineering Concept Institute for incoming freshmen
- ❑ Engineering Exploration Camps for high school students
- ❑ Energy Exploration Camps for high school students
- ❑ National Summer Transportation Institute for high school students
- ❑ 3D Printing camp for middle school students
- ❑ Verizon coding camp for middle school students



Photos: from top left—Two attendees from the first-ever Aim High Flight Academy at Tennessee State University. Every day students went to the John C. Tune Airport to complete flight hours guided by certified pilots from Harmony Air Aviation Charter Services and Pilot Training; top right—The 2024 National Summer Transportation Institute (NSTI) field trip to Nissan Smyrna Assembly Plant. Professor Du hosted the 2024 NSTI summer camp at TSU. Twenty high school students from five states participated this year. The objectives of NSTI are to improve STEM skills, provide awareness to high school students about transportation careers, and to encourage them to consider transportation-related courses of study in their higher education pursuits; middle left—Mr. Preston Jones practicing his flight skills on a flight simulator with Harmony Air; bottom—The 2024 Energy Exploration Summer Camp was invited to Nashville’s first solar plant by Nashville Electric Services. Here students learned the function, benefits & future plans of solar panels in Nashville.





TENNESSEE STATE UNIVERSITY ENGINEERING LEADERS

ABOUT TENNESSEE STATE UNIVERSITY:

Tennessee State University (TSU) is a comprehensive, urban, coeducational land-grant university, founded in 1912. The 500-acre campus is in Nashville, Tennessee. TSU has nine academic colleges and offers 83 comprehensive degree programs from the baccalaureate through doctorate degrees. It has been designated as "R2 Doctoral/Research University" by the Carnegie Foundation. The College of Engineering has four EAC ABET-accredited undergraduate programs in Architectural, Civil, Electrical, and Mechanical Engineering, as well as a CAC ABET-accredited program in Computer Science and an ATMAE-accredited program in Applied & Industrial Technologies. The college hosts and M.S. in Computer Science, M.S. in Data Science, M.S. in Computer & Information Systems Engineering, Master of Engineering, and Ph.D. in Engineering & Computational Sciences. The college has TIGER Institute to focus on interdisciplinary graduate engineering research in advanced materials, clean energy, and AI.



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