

# TENNESSEE STATE UNIVERSITY COLLEGE OF ENGINEERING

Comprace

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#### TENNESSEE State University

#### **COLLEGE OF ENGINEERING**

MAGAZINE VOL. 2023

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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 the new academic year. The College of Engineering has attracted double research funding (\$6M) in 2023. The majority of faculty are involved in research grants from federal agencies, state agencies, and industrial partners. The College is recruiting seven faculty, three staff, three research professors, and postdoc research associates to enhance research capacity.

Civil engineering, architectural engineering, electrical engineering, mechanical engineering, computer science, and applied 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 of time with attractive salaries. Computer Science has the highest student enrollment and graduation. Most engineering graduates have multiple job offers. The demand for these graduates is strong in Middle Tennessee and nationwide.

The College has made significant strides in the past academic year. It has successfully hired an Associate Dean of Research and Graduate Studies and a Coordinator of Recruitment and Student Services. The College has also provided over \$500,000 in scholarships to returning students and incoming freshmen. Furthermore, it has attracted 12 new industrial partners and their support. The first industrial symposium and Engineering Week were a great success, with many industrial partners participating in student projects, student competitions, classroom lectures, field trips, career advising, and financial support.

Students from our college have participated in multiple conferences and chapter competitions. In 2023, our students won first place in the WERC Environmental Design Contest and second place in the TN Engineers' Conference. The college plans to double its research funding in the next year and encourage up to 85% of its faculty to engage in active research. Additionally, the total enrollment of students and the number of graduates is expected to increase by over 10%.

As Dean, I am excited to continuously develop and implement strategic initiatives that will expand **ACCESS** for incoming students through preparation and recruitment, provide support to make it more **AFFORDABLE** to pursue degrees, and enhance the **ACADEMIC QUALITY** of our programs, instruction, and student learning while supporting the roadmap of the **Tennessee State University (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-Gordon is an Associate Professor of Architectural Engineering at Tennessee State University. She earned her PhD in Architectural Engineering from the University of Nebraska-Lincoln in 2014. Her technical expertise lies in structural engineering, with a research focus on the behavior of structural materials and the structural performance of existing structures and structures subjected to natural disasters. She also conducts research in faculty development and engineering education. In June 2023, she was appointed as the Associate Dean of Research and Graduate Studies. She is also serving as the Director of Development for the

college to build industrial connections, promote faculty collaboration, and manage the research centers across the college. She provides support to graduate students and PhD students in the four master programs and one PhD program in the college. She is also helping applicants for the graduate program in the college. Dr. Armwood-Gordon is a TSU Alumnus and co-leads the TIGER Institute, a research institute at the College of Engineering that promotes interdisciplinary graduate engineering research.

Karla Robles is a 2nd year PhD student in Engineering and Computational Science at TSU. She is a recipient of the National Science Foundation's Graduate Research Fellowship (NSF GRFP Fellow), an SMDP MedTech Scholar, and Code2040 Fellow. Her research focuses on developing and characterizing sustainedrelease microcapsules for the immunotherapy of ovarian cancer using electrohydrodynamic atomization (EHDA). This work is particularly impactful for patients who have difficulty accessing healthcare, as a sustained-release therapeutic can reduce the number of dose administrations. Karla is passionate about



investigating health disparities and designing therapeutics for women's diseases. She aspires to build inclusive communities where immigrants, people of color, members of the queer community, neurodivergent people, people with disabilities, and anyone with a journey is celebrated. Karla is an Ecuadorian immigrant and a first-generation student. In her free time, she enjoys writing, crocheting amigurumi, and serving as a volunteer English instructor for adult Latinx students.

# **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 Manufactural 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.



Existing Torrence Hall

# **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

For more information, visit https://www.tnstate.edu/engineering/ Apply: http://go.tnstate.edu/inquiryform

#### WHY TSU?

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.

ΑΒΕΤ

#### TSU'S COLLEGE OF ENGINEERING RECEIVES \$2.25 MILLION GRANT FOR INCOMING FIRST YEAR STUDENTS

#### JULY 26, 2023 ALEXIS CLARK https://tnstatenewsroom.com/archives/32104

College of Engineering is committed to fostering a community of budding first year engineer students and has received a monetary boost to continue this endeavor. This year the college has been awarded a \$2.25 million grant from the NSF that will go into effect fall 2023. The grant will create a five-year pilot engineering curriculum that includes a pre-engineering program and an immersive engineering studio based on CUREs, aiming to focus on student retention and graduation at TSU. A STEM Enhancement Institute will also be established this fall as part of the grant to provide support to students who struggle with their STEM courses in their pre-engineering program.

Dean Li, PI of the grant, said the grant will support more than 80 students a year. "For year one students, we want to prepare them with stronger math and physics," Li said. "So, we proposed a pre-engineering program. This way, we help the students so they can move on to their second year for their engineering career." The overall goal is to enhance the retention and success of students in engineering programs at TSU through innovative practices and interdisciplinary research.

Dr. Catherine Armwood-Gordon, Dr. Charles McCurry, and Dr. Nolan McMurray are co-principal investigators for the grant. Dr. Armwood-Gordon echoed the efforts of the grant in helping the university better understand the needs of freshmen engineering students. "It allows us to better understand what our retention rates are for the incoming freshmen that are not taking calculus one, to getting them through calculus one and retaining them to graduation."

Dean McMurray emphasized that the program's significant grant will propel the university to the forefront of HBCU engineering programs. "This award will go a long way in preparing our students at TSU to become stronger engineering students."



A group of graduate and undergraduate engineering students working together during a 2023 summer camp.



Elijah Rachell, Christopher Buford and Akiya Harris, Mechanical and Manufacturing Engineering students during a summer camp.

# 2023 COLLEGE OF ENGINEERING EXCELLENCE AWARDS

On April 28, 2023, the College of Engineering held an end-of-year celebration for students, faculty, staff, alumni, industrial partners, and visitors to recognize the outstanding achievements of the 2022-2023 academic year. The following individuals were honored with awards:

- Excellence in Teaching Award: Dr. Beane, Dr. Ghosh, Dr. Habibi, Prof. Du, Mr. Jones
- Excellence in Research Award: Dr. L. Chen
- Excellence in-Service Award: Dr. McCurry
- Excellence Staff Award: Ms. Yang
- CoE Appreciation Awards: Dr. Rogers, Dr. Akbar, Dr. Shirkhodaie
- **TSU T.I.G.E.R. Research Awards:** Dr. Li, Dr. Chimba, Dr. Gardiner, Dr. Ghosh, Dr. Samad, Dr. Shirkhodaie
- Industrial Support Award: HCA, Gresham Smith

Congratulations to all the award recipients for their hard work and dedication!



#### WELCOME NEW FACULTY/STAFF TO THE COLLEGE

#### **DR. CHENCHUTTA JACKSON**

#### **Assistant Professor Computer Science**



Dr. Jackson has spent many years working in the federal government. During her tenure at the United States Department of Agriculture, she served as an Information Technology Specialist and developed software for virtual reality. She also worked in the state government in Health Informatics, where she developed applications for analyzing and processing data. Dr. Jackson has extensive experience in systems and software development, web applications, database management systems, data mining, data science, robotics, image and data processing, computer animation, graphics, 3D modeling, and data/ image enhancement for virtual and augmented reality environments. Dr. Jackson has been a faculty member at various academic institutions for over 13 years. She received her BS in Information Systems from

Mississippi Valley State University and her Ph.D. in Engineering Science from the School of Engineering at the University of Mississippi. Dr. Jackson's areas of interest include robotics, Artificial Intelligence, Machine Learning, Smart city connectivity, Human Computing Interaction, Health Informatics, Web Application Development, Image Processing, Data Visualization, and Computer Science Education. Dr. Jackson has been recognized with a State of Tennessee Service Award and has received SASI grant, Big Data Analytics, and Data Visualization certifications. She has also been honored as a keynote speaker at the Women in Science and Technology Conferences (WIST).

#### **DEONDRE DAVENPORT**

#### **Coordinator of Recruitment and Student Services**



Deondre Davenport has joined the College as the Coordinator of Recruitment and Student Services. He will be responsible for leading the college's efforts in student recruitment, visiting high schools and community colleges, coordinating with university recruitment offices to attend recruitment fairs across the state and country wide. He will also lead the coordination of student services, including college tutors, ambassador programs, student chapters, student scholarship application and selection committees, summer programs (Engineering Concept Institute, Engineering Exploration Camp), Science Olympiad, BEYA, AMIE, and NSBE conference. His office is located at Torrence Hall 222. You can reach him at (615) 963-5389 or ddaventp@tnstate. edu. Please visit him to introduce yourself.

# **DR. YOUNGJAE CHOI**

#### Assistant ProfessorArchitectural Engineering

Before joining TSU, he was a Postdoctoral Scholar in the Department of Civil and Environmental Engineering at University of California, Irvine. He holds a B.S. and M.S. in Architectural Engineering, as well as a Ph.D. in Civil Engineering. After obtaining his Ph.D., he spent two semesters as an adjunct professor at the University of Texas, Arlington. Prior to pursuing his Ph.D. study, he worked as a structural engineer in Busan, South Korea for three years.

Dr. Choi's research interests include structural engineering, infrastructure materials, 3D printing concrete, and their application in the design and construction of civil infrastructure to improve constructability, durability, resilience, and sustainability. He was awarded the Mete A. Sozen Award for Excellence in Structural Research from the American Concrete Institute (ACI) and the Excellent Research in Earthquake Engineering Award from the Earthquake Engineering Society of Korea (EESK). In addition, Dr. Choi mentored many graduate students to help them succeed in their research work and many undergraduate students through NSF's Research Experiences for Undergraduates (REU) Program.

Dr. Choi's research aims to improve current infrastructure construction by utilizing an innovative approach that integrates materials design with structures design. This approach can effectively achieve targeted structural

performance that was not feasible before to address the challenges in current infrastructure construction and to show the future of structural engineering for the next generation of structural engineers. Dr. Choi has applied this integrated materials and structures design approach and significantly improved the structural performance of nearly all commonly used reinforced concrete (RC) structures that include full-scale RC, ECC, and UHPFRC columns, full-scale RC and HPFRC beam-column-slab sub-assemblages, full-scale RC coupling beams, the world's first large-scale experiment on 3D-printed full-scale RC columns

#### Dr. Tamara Rogers appointed as Amazon Endowed Professorship Chair



Dr. Tamara Rogers, who has been a faculty member at TSU since 2003, was recently appointed as the Amazon Endowed Professorship Chair by President Glover. She received her BS, MS, and PhD in Electrical Engineering from Vanderbilt University. Currently, she is an Associate Professor and interim Chair of Computer Science at TSU. Dr. Rogers is a member of ACM, ASEE, IEEE, and SWE. Her research interests include Cybersecurity and networking, cloud auditing and mobile device security, robotics research to mobile robot platforms, recognition in environments with dynamic conditions, human factors with motion trackers and automatic target recognition. She teaches courses such as Data Communications, Network Management, Software Engineering, Mobile Robotics, Cryptography and Computer Security, and Ethics and Professionalism in Computing. As the Amazon Endowed Chair,

Dr. Rogers will teach a 12–16-week course developed by Amazon for computer science students in their junior or senior year each semester. She will also review the current computer science curriculum, develop innovative education programs and curriculum, foster collaborations across TSU and relevant industries, continue the recruitment and supervision of high-quality students, recruit and mentor new faculty members, and outreach to the broader community. Congratulations to Dr. Rogers!

#### Dr. Lin Li was selected as Faculty Spotlight in the first Newsletter of RESEARCH HORIZONS January 2023

Dr. Lin Li is the Interim Dean of the College of Engineering at Tennessee State University. He is also a Professor of Civil Engineering, a Professional Engineer, and a Fellow of the American Society of Civil Engineers (ASCE). Since joining TSU in 2018, he has secured more than \$5,500,000 in research grants from NSF, DOE, and other funding agencies. Dr. Li's research interests include bio-inspired infrastructure materials and geo-environmental engineering. He is the Principal Investigator (PI) of an active \$300,000 HUD project to develop a concrete battery. This project would be the first of its kind that uses a systematic and comprehensive approach to develop rechargeable cementbased batteries. Besides his material research, Dr. Li is also interested in engineering education. He has served as PI of three NSF education grants with the promise of increasing the number of students enrolling in and graduating from Engineering and Computer Science at TSU.



#### Dr. Deo Chimba: A Luminary in Transportation Engineering Research



Dr. Chimba is a distinguished Professor of Transportation Engineering at Tennessee State University. His research interests include traffic analysis, highway safety studies, traffic incidents, railroad, freight, non-motorized to intelligent transportation systems embedded with microsimulation, statistical modeling, data analytics, machine learning, and computer vision. He has a substantial track record in securing grants and interdisciplinary collaborations. Dr. Chimba has spearheaded cutting-edge projects ranging from predicting traffic volumes to highway safety modeling. He has secured over \$4.8 million in external research grants through TDOT, DHS, USDOT, FRA, NSF, and FHWA over the last decade1. His symbiotic relationship with TDOT serves as an exemplary model of academic-industry partnership. This

longstanding relationship with TDOT brings both prestige and financial support to TSU1. Dr. Chimba's TEPS-Lab (Transportation Engineering, Planning and Safety Lab) exemplifies a groundbreaking fusion of traditional engineering and intelligence applications. TEPS-Lab is shared with Cyber Security Lab at Tiger Institute. This allows the lab to cover an extraordinarily wide array of research domains: from complex traffic analysis and simulations to highway safety modeling; from sustainable growth management to the use of machine learning and artificial intelligence in transportation systems. With more than 100 publications in journals and conference proceedings, his work has been cited more than 800 times as of August 2023 based on Google Scholar citations.



Dr. Chimba with students: Innocent Macha, Al Amin, Bryson Mgani, Emmanuel Samson, Dr. Chimba, Irene Akyoo, Jeannine Mbabazi, Aaron Lamson and Subash Gupta.

#### Dr. Shihui (Cindy) Liu: Geotechnical Engineering Research Rising Star

Dr. Liu is an Assistant Professor of Civil Engineering at TSU. She has made significant contributions to the field of innovative building and construction materials. During her first academic year at TSU, Dr. Liu won three research grants, including an Amazon grant titled "Energy-harvesting Concrete Batteries for Smart and Sustainable Warehouses," a funding from AMIE, and her first NSF grant, titled "Energy-harvesting and Rechargeable Concrete Batteries for Smart Buildings and Cities." The goal of this planning project is to develop



new collaborative relationships. Dr. Liu is dedicated to fostering the next generation of scholars and professionals in the civil engineering field. She has designed and



taught a range of courses, including Soil Mechanics and Foundation Engineering, where she inspired and engaged students through innovative teaching methods and real-world applications. Dr. Liu holds a Ph.D. in Civil Engineering from Jackson State University and has published numerous journal articles with over 400 citations in Google Scholars.



Dr. Liu's geo-material engineering research group includes Dr. Yin, five PhD students (Mercy, Beatrice, Yongfei, Xinyu, Dandan), four master students (Dorcas, Kathy, Jose, Mahad).

#### Dr. Hong: Scientific Machine Learning for Assured Cyber Physical System Operations



iang Hong is a professor in the Department of Electrical and Computer Engineering at Tennessee State University. He is leading an NSF project to improve data-driven Al-based models by coupling domain models with data-driven Al-based models. Dr. Hong has conducted extensive research in wireless communications and cybersecurity, including spectrum sharing and cooperative techniques to increase the efficiency of spectrum utilization for future wireless systems1. He has also researched detection and countermeasure techniques to secure wireless systems, cloud, GPS, and Internet of Things under availability and integrity attacks1. Dr. Hong has served as PIs for over \$4 million external research grants awarded by NSF, DoD, ONR, AFRL, TDOT, etc..

Dr. Hong with students

#### NASA Awarded Dr. Muhammad Akbar for CLEAN Aircraft Design and Optimization

Dr. Akbar, Mechanical Engineering Associate Professor, is working on aerodynamic design and optimization of the CarbonLess Electric AviatioN (CLEAN) aircraft, funded by NASA. His team is trying to solve one of aviation's key challenges for the future of commercial air travel: Zero-emission aircraft by 2050. With the \$8 Million support, Dr. Akbar works with TTU, OSU, UW, Boeing and Ratheyon, etc. to explore a preliminary design for an electrified, 150-passenger aircraft that uses an ammonia-based integrated propulsion, power, and thermal management system.



As the fuel changes, it changes the propulsion, power distribution, and aircraft design. Aircraft design configurations will be explored and optimized for the need. Three graduate students and three undergraduate students are participating in the project for research and capstone design tasks.

#### Dr. Kamrul Hasan in Security, Communication, and Intelligent Transportation Systems

Dr. Hasan is an Assistant Professor in the Electrical and Computer Engineering (ECE) Department Dat Tennessee State University. He has received research funding of \$2 million from the National Science Foundation (NSF), Federal Railway Authority (FRA), and Nevada Department of Transportation (NDOT) for his pioneering efforts in 5G/Beyond 5G communication, counteracting adversarial attacks, redefining road and railway intersection safety and security, and multimodal road traffic safety and security. Dr. Hasan is committed to providing high-quality engineering education and introducing state-of-the-art teaching techniques through experimental learning. His

contribution has been recognized through an NSF grant from the Director of STEM education. Dr. Hasan was actively involved in the establishment of a new Cyber Physical Systems (CPS) concentration for the BS in Electrical Engineering (BSEE) program. He is currently supervising and supporting one Ph.D. student, four master's students, and two undergraduate students.



Dr. Hasan and his team at the Cybersecurity Lab of Tiger Institute: Emmanuel, Al Amin, Ekramul, Dr. Hason, Tupac, Atiqur



Dr. Charles McCurry joined the Electrical & Computer Engineering Department in 2015 after working from 2011 - 2015, as a system and control engineering consultant employed by Booz Allen Hamilton with the Air Force Research Laboratory (AFRL). In 2017, Dr. McCurry developed his own version of the Multi-Attribute Task Battery (MATB) called TSU-MATB1. The United States Army Aeromedical Research Laboratory (USAARL) utilized TSU-MATB in two research projects and has since expanded it to USAARL-MATB, which provides a new benchmark in experimentation and analysis of human performance and cognitive workload assessments. Dr. McCurry continues to work with USAARL in the development of USAARL-MATB and the investigations

of AI in related USAARL studies.

#### Dr. Zufen Wang: Pioneering Innovations in Architectural Engineering for Sustainable Built Environments



Dr. Wang is an Assistant Professor In Architectural Engineering at TSU. She holds a PhD degree from the University of Miami. Her research focuses on developing innovative solutions to enhance building energy efficiency and reduce greenhouse gas emissions while providing valuable grid services. Dr. Wang has received research grants from NSF, DoD, and DOE in her first year at TSU. She is currently developing cutting-edge local control strategies for supply fans and cooling coil valves that can effectively navigate the intricacies and challenges posed by nonlinearities and disturbances. Dr. Wang pioneered the development and validation of an efficiency-based virtual airflow meter for electronically commutated motor fan systems in Air Handling Units (AHUs). This innovation relies on

energy models to overcome the prohibitive cost and installation challenges associated with physical meters. Her work in this area significantly advances the application of data science and machine learning in the field of building engineering. Dr. Wang also serves as an advisor for the ASHRAE chapter, and her guidance in 2023 led students to the AEI conference in Denver for the AEI design competition.

#### Dr. Sagnika Ghosh: Director of the Renewable Energy Systems Laboratory



Dr. Sagnika Ghosh is an Assistant Professor of Electrical and Computer Engineering at Tennessee State University. She earned her Ph.D. in Electrical Engineering from the University of Memphis. Her research interests include smart and microgrids, electric vehicles, cybersecurity issues and solutions for power grids, 5G communication, and applications of Al/ ML in electric power grid. Dr. Ghosh is the Faculty Advisor for IEEE Chapter at TSU and actively works to recruit more students from marginalized and underrepresented communities. She also advocates for women in STEM. She is a Senior member of IEEE and has received funding support from NSF, DOE, EPRI with a total of \$1,353,000. Dr. Ghosh received T.I.G.E.R. Research Award for research efforts and achievements and Excellence in Teaching

Award in 2023. She also coached student chapters to win the First Place in WERC Environmental Design Contest at NMSU Bench Scale Demonstration, Las Cruces, NM in April 2023.

#### Dr. Manar Samad: Director of the Computational Intelligence and Data Analytics (CIDA) lab



Dr. Manar Samad is the director of the Computational Intelligence and Data Analytics (CIDA) lab in the Computer Science department at Tennessee State University. He has extensive experience in mining realworld image, text, tabular, and graph data to provide machine-learning solutions to various domains, including health science and humancomputer interactions. Dr. Samad's research interests include unsupervised representation learning of unlabeled data, learning from limited data samples, domain adaptation to learn from multi-source datasets, and missing value problems in real-world tabular data. He has advised one postdoctoral scholar, three doctoral students, four master's thesis students, and

more than thirty undergraduate students in senior projects. Dr. Samad has authored more than 40 research articles that were published in high-impact factor journals such as Neural Networks, Knowledge-based Systems, IEEE Transactions on Affective Computing, and Neurocomputing. His research has been cited around 700 times in the literature. Dr. Samad is a reviewer on the National Institute of Health study sections and an associate editor of the Optical Engineering journal. He has been awarded over \$1.3 million in extramural research grants as principal investigator.

#### Environmental Engineering Research Highlight



Dr. Painter, Dr. Gardiner, Dr. Li and graduate students (Mercy, Amairanny, Doris, Richard) are working on their NSF neonicotinoid insecticides in water environment at Environmental Engineering Lab. They are using the LC/MS to detect photodegradation and hydrolysis of seven neonicotinoid insecticides and their daughter products at various temperatures, pH, surface water and groundwater. The project is one of NSF Excellence in Research grants

for TSU. Five graduate students Rebecca, Amani, Emily, Sylvia, and Sanaz have graduated from this project.

#### **TSU College of Engineering Hidden Figure**

#### College Remembers "TSUs First Lady of Engineering" Yvonne Y. Clark

he Society of Women Engineers (SWE) student chapter at Tennessee State University is dedicated to empowering women to achieve

their full potential in the field of engineering and science. Professor Yvonne Y. Clark was a trailblazer for African American and women engineers. She was the first woman to earn a BS degree in mechanical engineering at Howard University, the first woman to earn a master's degree in engineering management from Vanderbilt University, and the first woman to serve as a faculty member in the College of Engineering at Tennessee State University. Professor Clark was a lifelong scientist and researcher who published numerous papers on topics ranging from heat



Professor Yvonne Y. Clark

transfer to engineering education. She was also a champion of diversity and inclusion in engineering education, working tirelessly to increase the representation of women and people of color in STEM fields. Her pioneering work has been a great source of inspiration for many people, and her legacy continues to inspire generations of engineers.

The Society of Women Engineers (SWE) African American Affinity Group celebrates Professor Clark's life during Black History Month every year, sharing her story and achievements with others. Her contributions to the field have motivated many aspiring engineers to pursue a career in engineering. In addition to her teaching and mentoring work, Professor Clark was a prolific contributor to STEM education. She mentored hundreds of students throughout her career, inspiring them to achieve their full potential in the field of engineering



#### TSU Engineering Team won 2nd place in 2023 TN Engineers' Conference

group of 9 students from the TSU Department of Civil and Architectural Engineering, including Ms. Denise Borja, Mr. Beatrice Magombana, Ms. Dorcas Machimu, Ms. Mercy Sammy, Ms. Doris Atieno Noah, Mr. John Amann, Mr. Gregory Hobbs, Mr. Zachary Archer, and Mr. Zachary Lanier, won second place in the Tennessee Engineers Conference (TNEC) Student Competition held in 2023. The competition was organized by the Tennessee Society of Professional Engineers (TSPE) and featured eight different universities. The qualifying round required the students to build the tallest possible sand structure using damp sand and two sheets of A4 paper in 20 minutes. The structures were judged by the maximum height reached and their stability. The TSU team managed a height of 13 inches, which took them to the final round. In the final round, the teams were required to construct a bridge using 2" X 1" X 0.5" wood blocks across an A4 sheet that represented water with two vertical blocks as supports on either side. The TSU team built a stable bridge which was able to carry 1 block and had 2 unused blocks for its construction, which put them in second place. Lipscomb took first place and Vanderbilt took third place. The TSU team demonstrated their engineering skills, resilience, teamwork, and competitive spirit. They received a plaque from the judges and will also be receiving a cash award soon. The TSU students also utilized the conference for professional networking with various companies from the



areas of stormwater management, structural engineering, geotechnical engineering, surveying, and others..



# **Celebration of Engineering Week 2023**

*II* I am thrilled to announce the successful completion of the TSU

College of Engineering Engineers Week 2023 (Feb 19th - 25th). I would like to extend my heartfelt gratitude to all the students, faculty, and staff who participated in making this event possible. I would also like to express my sincere appreciation to faculty advisors Catherine Armwood-Gordon, Charles McCurry, and Leitao Chen for their invaluable guidance and support. It was an honor to be part of the team leading, planning, and organizing this event. I am grateful to Zackee Dosky for being my partner in organizing this event. A special thank you to the students who also made this event possible by their participation in planning and organizing various activities throughout the entire week. These students are John Amann, Angelica Smith, Ipek Ismael Denise Borja, Amari Meddling, Andrew Mikhaeil, and Tupac Moseley.

FEBRUARY 19-25 Engineers' Week

Industry N Pre

Organizati

Health

event

Ith is weath?" We college of Engineering for education and fun on Engineers We will host department led events as well as health Resume and professional prep workshop, Food and provided.

attle of the Departments Games

I would also like to thank our seminar speakers throughout the week; Michelle Daughtry, Tamika Tomlin, and Courtney Hale. The lessons learned from you all were extremely important and will serve to guide us as we continue our journey in engineering and life. Congratulations to the Mechanical Engineering Department and the Civil Engineering Department for winning

> Mental Health Experience during the Pandemic

this year's Battle of the Departments Games. A big thank you to the entire College of engineering for making this event a grand success! I am eagerly looking forward to next year's event!".

Havilah Akachukwu ASME Student Chapter President and Engineering Weeks 2023 Director

Tennessee State University College of Engineering

**GINEERS W** 



#### 2023 ASCE CONCRETE CANOE COMPETITION



The 2023 ASCE Concrete Canoe team focused on engineering fundamentals and last year's feedback to improve their design by building a lighter canoe. Good communication and a sense of togetherness drove many of their improvements this year. The team would like to thank Dave Livingston for all the advice throughout the project, as well as Nashville Ready Mix, Gresham Smith, Arcosa Aggregates, Tennessee Concrete Association, and Stalite for sponsoring the project. In addition, volunteers helped put the canoe together. The entire team worked extremely hard and dedicated so much time into this project! Hard work, dedication, and determination will always lead us to success! The team leader of Concrete Canoe is CE senior Ipek Ismael, and the faculty advisor is Dr. Ranganathan Parthasarathy in Civil Engineering.

# Dr. Chimba and 7 TSU engineering students present at TRB 2023

Transportation Engineering Professor Dr. Deo Chimba led seven engineering students from Tennessee State University to the 2023 Transportation Research Board (TRB) Annual Meeting to present research papers. Four of the civil engineering students, Aaron Lamson, Mahad Abdii, Ipek Ismael, and Bahati Chimba, were sponsored by the Federal Highway Administration (FHWA) under the Dwight David Eisenhower Transportation Fellowship Program (DDETFP). Civil Engineering student Diana Cortez was sponsored under the TRB Minority Student Fellows Program.



# TSU Wins the first place in 2023 WERC Environmental Design Contest



Dr. Ghosh, a faculty member of Electrical Engineering, led eight student teams from the College of Engineering to participate in the national 2023 WERC Environmental Design Contest. The team won the championship, and we congratulate them on their success! The students who participated are R. Ibrahim, J. Wilson, J. Buford, R. Wiencek (captain), H. Akachukwu, B. Martinez, G. Book, and M. Eromosele.

### 2023 BEYA Conference and AMIE Design challenge

Dr. Charles McCurry led 50 College of Engineering students to attend the 37th BEYA Conference at Baltimore's Gaylord National Resort & Convention Center from Thursday, February 9 to Saturday, February 11, 2023. The conference was attended by over 10,000 students, corporate, government, military professionals, business, and industry employers who participated in three days of learning, networking, celebrating excellence and showcasing STEM career opportunities.



Marques, J. Khiri, R. Elijah, C. Juan to attend 2023 AMIE Design Challenge during the 37th BEYA Conference at Baltimore, MD on February 9, 2023. They developed a design solution for water issue in city of Nashville. They presented their design in front of other 13 design teams from HBCUs and audience. Their design project was evaluated by 7 judges from industry. They did excellent in their design



and oral presentation.

#### College of Engineering Welcomes 2023 Incoming Freshmen

On August 17, 2023, the College of Engineering welcomed the 2023 incoming freshmen. There are over 200 freshmen with major in Computer Science, Architectural Engineering, Civil Engineering, Electrical

Engineering, Mechanical Engineering, and Applied & Industrial Technologies met with the Dean, Department Chairs, Faculty, and Freshmen Advisors. Dr. Li introduced

the college to them. Dr. Armwood-Gordon awarded 12 students with \$37,000 in scholarships.



#### US Department of Navy Honor Dr. Amir Shirkhodaie as Distinguished Fellowship Award (PI), \$1,190,000



US DoN nominated Dr. Amir Shirkhodaie, Professor of Mechanical and Manufacturing Engineering at TSU, as a recipient of the Distinguished Fellowship Award. Dr. Shirkhodaie's exceptional achievements and contributions in his field make him an outstanding candidate for this prestigious recognition. Dr. Shirkhodaie's unwavering commitment to excellence and his significant research accomplishments have not only earned him national recognition but have also established him as a distinguished researcher in the field of Mechanical and Manufacturing Engineering. His expertise, dedication, and innovative thinking make him an ideal choice for the Distinguished Fellowship Award. The Distinguished Fellowship

Award offers an exceptional opportunity for Dr. Shirkhodaie to devote his full attention and expertise to conduct research in the continuation of his ongoing research effort for the DoN. Dr. Shirkhodaie will focus on continuation of his current research work related to physics-based synthetic multi-modal imagery data generation for training of deep learning classifiers. This funding will encompass three years of research release time to enable him to devote his efforts solely to the DoN's research initiatives. His appointment as a Distinguished Fellow will not only enhance the collaboration between TSU and the DoN but also yield significant advancements in the field of multi-modal remote sensing.

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#### College Of Engineering Hosts The First College Career Fair



College of Engineering hosted the first college career fair on October 20, 2023 at Kean Hall. There are over 15 local and national engineering firms attending this event. More than 100 students joined the career fair.

# College of Engineering Homecoming Breakfast

hrough Resilience and Perseverance, We Are One. On October 13, 2023, College of Engineering welcomed engineering alumni to come back and embrace the legacy. After graduate student Tupac Mosley gave the welcome, Vice Chair of the TSU Foundation Roosevelt Luster III provided the keynote. AVP and AE Alumni Will Raford updated the stastus of the New Engineering Building. Dean Li gave the annual report for the college progress. Student organization officers introduced their leadership team and major activities for Fall 2023-Spring 2024 academic year. The student organizations are NSBE, ASCE, ASME, IEEE, SWE, AEI. Thanks for Mr. Davenport!



## **ALUMNI PROFILES**



Dr. Bethany King Wilkes has an impressive educational background. She earned a Ph.D. in Educational Psychology and Research from The University of Memphis, a Master of Engineering Management from Christian Brothers University, and a B.S. in Mechanical Engineering from TSU. She has dedicated 18 years to STEM education and currently serves as the Education Program Manager in the Office of Research Experiences and Education of the Underwriters Laboratories Research Institutes (ULRI). Prior to joining ULRI, she held various leadership roles in higher education such as a Program Director in the Office of Academic Affairs for The College System of Tennessee, Director of Student Services and Outreach

for the College of Engineering at Tennessee State University, Coordinator of Women in Engineering, Architecture and Technology (WEAT) at Oklahoma State University, and Assistant Director of Graduate Engineering at Christian Brothers University. Dr. Wilkes was a member of the 2020-21 Complete Tennessee Leadership Institute and the 2019 recipient of the Think. Work. Serve. Alumni Award. Before transitioning into education, she worked in industry as an engineer and currently serves on the Executive Board of Tennessee State University Engineering Alumni Association as recording secretary.

Kenneth Perkins is a Professional Engineer, Investor and Real Estate developer based in Nashville. Kenneth obtained both his bachelor's and master's degrees in civil engineering from Tennessee State University. He has been practicing engineering for 15 years with a professional engineers' license in four states (TX, TN, FL & GA) and is a Professional Traffic Operations Engineer (PTOE). Kenneth is currently a Project Manager at Benesch where he designs and manages various roadway, traffic, and roundabout projects. He is currently the Past President of the Tennessee Section Institute of Transportation Engineers and serves on the board for



Tennessee State University Engineering Alumni Association. In 2021, Kenneth was named one of Nashville's Black 40 Under 40 and recognized for his work as President of the Nashville Branch of the American Society of Civil Engineers (ASCE).

# **ALUMNI SPOTLIGHT**



April L. Taylor has worked in various industries, including manufacturing, management consulting, aerospace and defense, healthcare, and financial services across 9 states. In 2022, she joined Mars' Petcare division as a Sr. Strategic HR Business Partner1. She graduated from Tennessee State University with a BS in Electrical Engineering and later pursued her MS in Software Engineering at Brandeis University and MBA at Indiana University1. April has been featured in the US Black Engineer and Information Technology magazine and serves on numerous boards1. Her passion for developing people is demonstrated in her personal and professional commitments.

Marcus W. Shute, P.E., Ph. D has been actively involved in research and development, engineering, agile product and technology development, and manufacturing activities across several technology sectors since 1983. He has extensive experience in leading cross-functional teams to transition technology innovations from laboratory prototypes to products in compressed timeframes with a wide variety of organizations from start-ups to established corporations. During his tenure at Bell Laboratories, Lucent Technologies, he developed expertise, led development efforts, obtained several patents, and is widely published in optical fiber communications, wireless communications, electronic



materials, and initiatives related to increasing minority participation in science, technology, engineering, and mathematics.

Dr. Shute is also the **co-founder and COO of Pruuvn**®, a credentialing data trust leveraging blockchain and AI to empower the gig economy. During his career, Dr. Shute has served as a Distinguished Member of Technical Staff at Bell Laboratories, AT&T and Lucent Technologies; Vice President of Engineering and as Vice President of Advanced Technologies at Luxcore Networks, Inc.; President and Chairman of Nile Valle Investment company; Vice President for Research and Sponsored Programs and Professor in the College of Engineering, Technology, and Computer Science at Tennessee State University where he was responsible for managing and leading the research enterprise at the University; Vice President for Research and Sponsored Programs and Professor in the Physics Department and the Dual Degree Engineering Program at Clark Atlanta University; Vice President for R&D and Commercialization at 510nano Inc., a renewable energy and technology development company.

Dr. Shute has received numerous awards and honors throughout his career.

#### SUMMER PROGRAMS

Tennessee State University's College of Engineering offers a variety of summer programs for students of different ages and interests. Here are some of the summer programs that might interest you:

- **Engineering Concept Institute for incoming freshmen:** This program is designed for incoming freshmen who are interested in engineering. The program will introduce students to the fundamentals of engineering and help them develop their problem-solving skills. It is a 4-week residential program for incoming freshmen each July.
- Engineering Exploration Camps for high school students: These camps are designed for high school students who are interested in engineering. The camps will provide students with hands-on experience in various fields of engineering, including civil, electrical, and mechanical engineering. It is a 3-week residential program for rising 9th-12th graders each June.
- National Summer Transportation Institute for high school students: This program is designed for high school students who are interested in transportation engineering. The program will provide students with hands-on experience in various aspects of transportation engineering, including traffic safety, transportation planning, and intelligent transportation systems. It is a 4-week residential program for rising 9th-12th graders during each June.
- **3D Printing camp for middle school students:** This camp is designed for middle school students who are interested in 3D printing. The camp will provide students with hands-on experience in designing and printing 3D objects. It is a 2-week non-residential program for rising 6th-8th graders in the first two weeks of each July.
  - Verizon Innovative Learning STEM Achievers program: This program is designed for high school

students who are interested in clean energy. The camp will provide students with hands-on experience in energy efficiency and renewable energy. It is a 2-week nonresidential program for rising 11th-12th graders in the first two weeks of June 2024.

Verizon coding camp for middle school students: This camp is designed for middle school students who are interested in technology. The camp will provide students with hands-on experience in coding and app development. It is a 3-week non-residential program for rising 6th-8th graders each July.

You can contact the College of Engineering at (615) 963-5401 or visit their website at https://www.tnstate.edu/engineering/ precollege.aspx to learn more about these programs.







Dr. Nathan hosted the 2023 3D printing summer camp at TSU in July 2023. Over 25 middle school students attended the camp, which included a technology immersion program covering solid modeling, 3D printing, coding, engineering design, material testing, and AI. Thank you to all the middle school students who put in their enthusiasm, creativity and technical skills into the 2023 TSU Summer Technology Immersion Workshop and their parents for the support!

Professor Du hosted the 2023 NSTI summer camp at TSU, and 20 high school students from 5 different 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. Students participated in enrichment and preparatory coursework in computing, mathematics and physics and covered different aspects of transportation (AIR, LAND, and SEA). Activities included hands-on labs, field trips and presentations by various professionals working in transportation-related fields.



Over 80 middle school students attended the 2023 Verizon Innovative Learning STEM Achievers Program in July. Faculty and students from the College, as well as local middle school teachers, provided instruction in 3D design and printing, VR, electronics, mobile robotics, and more! Dr. Rogers and Dr. Yao have been directing this program since its beginning 6 years ago.

# **CoE Leadership**

Name	Role	Phone (615)	Email
Dr. Lin Li	Interim Dean	9635401	lli1@tnstate.edu
Dr. Catherine Armwood – Gordon	Associate Dean, College Director of Development	9635416	<u>carmwood@tnstate.edu</u>
Dr. Tamara Rogers	Interim Chair, Computer Science Dept	9631520	trogers3@tnstate.edu
Dr. Ivan Mosley	Chair, Applied & Industrial Technologies Dept	9635378	imosley@tnstate.edu
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Dr. Deo Chimba	Interim Chair, Civil & Architectural Engineering Dept	9635430	dchimba@tnstate.edu
Dr. Dyanne Williams	Director of Financial Services	9635405	dywilliams@tnstate.edu
Deondre Davenport	Coordinator of Recruitment and Student Services	9635389	ddaventp@tnstate.edu
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Dr. Richard Mu	Associate Director, Tiger Institute	9635527	rmu@tnstate.edu



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#### **ABOUT TENNESSEE STATE UNIVERSITY:**

Tennessee State University (TSU) is a public, coeducational, land-grant university located in Nashville, Tennessee. It was founded in 1912 and has a 500-acre campus. TSU offers 83 comprehensive degree programs from the baccalaureate through doctorate degrees and has been designated as an "R2 Doctoral/Research University" by the Carnegie Foundation. The university has nine academic colleges and schools, including the College of Engineering, which offers EAC ABET-accredited undergraduate programs in Architectural, Civil, Electrical, and Mechanical Engineering, as well as a CAC ABETaccredited program in Computer Science and an ATMAE-accredited program in Applied & Industrial Technologies. The College of Engineering also hosts 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 programs. The college houses a TIGER institute that focuses on interdisciplinary graduate engineering research in advanced materials, clean energy, and AI.



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**OTSU\_CoEngineering** 

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