SECS INFORMER
SCHOOL OF ENGINEERING AND COMPUTER SCIENCE
MOREHEAD STATE UNIVERSITY
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Maximizing Resources for Student Success

The School of Engineering and Computer Science (SECS) faculty prepare students with advanced skills in Computer Science, Mechanical and Manufacturing, Design, Simulation and Animation, Robotics, OSHA and Fanuc Certification. The 21st Century Center for Manufacturing Systems was established through the generous matching grant of the James Graham Brown Foundation (JGBF) of Louisville and the Advisory Board companies' contributions.

The 21st Century Center for Manufacturing has been further developed and expanded through the $500,000 NSF EPSCoR project Advanced Manufacturing Partnership for Enhanced Robotics and Structure led by Dr. Kouroush Jenab and Dr. Jorge Ortega-Moody. This project aims to enhance the 21st Century Center for Manufacturing Systems' potential to teach cutting-edge technologies, provide workshops, and conduct applied research in order to aid technology transfer from the University to industries that will result in in our region's economic development.

The Department of Computer Science and Electronics continues to recruit students for the new Computer Science concentrations in Data Science, Cybersecurity, and Computer Engineering in fall 2020. The revised CS curriculum strengthens the core requirements for all Computer Science students and introduces new courses in emerging fields to meet the recent changes and demands in the evolving fields of Computer Science.

The Computer Science program continues to focus on preparing graduates to design and implement solutions for new problems, to be ready to pursue 21st Century careers in the diverse fields of Computer Science, and to be able to pursue the study of Computer Science at the graduate level. The CS faculty have made major curriculum revisions and have added new tracks including Data Science and Computer Engineering.

In fall 2020, the Department of Engineering and Technology Management began recruiting students for the Bachelor of Science degree in Systems Integration Engineering (BSSIE). The BSSIE program, which has an engineering CIP code (14.2701), integrates an appropriate blend of science, physics, and mathematics with hands-on design, mechanical, electronic, and computing content, to prepare graduates who are capable of applying engineering and mathematical concepts to solve complex systems-based technical problems.

ETM students Levi Howell, Ritesh Chakradhar, and Victoria Russ working in the NSF Grant Lab.

To attract motivated and academically prepared students, we have focused on strengthening the merit-based advisory board scholarship. Major accomplishments have become possible with the Advisory Board's dedication of time and expertise as well as strong financial support for our programs.

Sincerely,

Ahmad Zargari
Professor and Associate Dean
School of Engineering and Computer Science

Inside this issue...

ATMAE The Association of Technology, Management, and Applied Engineering
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FACULTY spotlight

Cheng Cheng

Dr. Cheng is invited to contribute to the 2022 Special Issue on Reviews of the journal Electrophoresis from Wiley. This special issue on Reviews receives great attention from our community and Dr. Cheng plans to submit a review paper entitled "DEP assisted label free nucleic acid sensor for POC diagnostic applications".

Dr. Cheng's URF student, Ms. Allie Skaggs, is making significant progress in her research "A portable analyzer for rapid and sensitive protein detection by AC electrokinetics capacitive sensing", which will be presented at the upcoming Posters on the Hill. This project is focusing on ACEK enhanced capacitive bioparticle detection, which is a promising method for point-of-care diagnosis. The end goal of this project is to develop a portable capacitive sensing platform for rapid and sensitive bioparticles detection.

Heba Elgazzar

Dr. Heba Elgazzar has co-authored a new journal paper with Dr. Sahar Ghanem entitled "Predicting the Behavior of Reinforced Concrete Columns Confined by Fiber Reinforced Polymers using Data Mining Techniques".

The paper was recently published in Springer Nature Applied Sciences (SN Applied Sciences). Artificial Neural Networks (ANNs) and Regression Analysis (RA) algorithms were used effectively in this research to analyze a dataset of concrete columns under the compressive concentric load to build two predictive models.

STUDENT spotlight

Ritesh Chakradhar

Ritesh Chakradhar, from Nepal, completed his bachelor's degree in Mechanical Engineering from India in 2017. Presently at Morehead State University, he is pursuing a master's degree in Engineering and Technology Management. Currently, he is working under Professors Dr. Kouroush Jenab and Dr. Jorge Ortega-Moody as a Graduate Assistant on a KY NSF EPSCoR grant project.

Ritesh's research is the implementation of virtual reality to train a user to perform welding operations, eliminating the training expenses. This research will enhance safety and improve hands-on performance. The key point of incorporating virtual reality is to build confidence and a deeper understanding of welding along with the aid of different hardware and software.

Thomas Andrew Buteyn

Morehead State graduate student Thomas Buteyn of Somerset is currently serving as the student member of the board of directors for the Association of Technology, Management and Applied Engineering (ATMAE). Buteyn is pursuing his Master of Science degree in Engineering and Technology Management and plans to graduate in May of 2022. ATMAE is a collegiate accrediting agency and a professional organization with more than 1,000 student and professional members.

As A Graduate Assistant Buteyn Assists in teaching 6 lab sections for Dr. Grise, Dr. Cheng, and assists with Dr. Moody's classes as well. Buteyn is working to create a glove that will track finger position and hand movement in VR training scenarios.

Andres Salinas-Hernandez

Andres Salinas-Hernandez, from Mexico, is a GA working on the KY NSF EPSCoR grant project under the guidance of Dr. Kouroush Jenab and Dr. Jorge Ortega Moody. He received a BS degree in Mechatronic Engineering from Technical Institute of Veracruz and MS degree in Automation and Sustainability Engineering from Technical Institute of Queretaro. He also has eight years of work experience in hospital maintenance.

Andres is currently working on research and development of a virtual reality scenario with a flexible manufacturing process for automation training. His project includes integration of hardware, software, and machines into virtual reality scenarios that can be controlled using PLCs in the lab and the virtual environment.

SECS NEWS spotlight

Engineering Technology uses AR and VR to Improve Advanced Manufacturing Training

Faculty and students in Morehead State's Department of Engineering and Technology Management are developing augmented reality (AR) and virtual reality (VR) programs to improve advanced manufacturing training programs.

Last year, Dr. Kouroush Jenab and Dr. Jorge Ortega-Moody, both assistant professors of engineering and technology management at MSU, received $500,000 from a collaborative grant from the Kentucky National Science Foundation's (NSF) Established Program to Stimulate Competitive Research (EPSCoR) initiative's Kentucky Advanced Partnership for Enhanced Robotics and Structures. The funds are being used to develop MSU's laboratory for training in condition-based maintenance (CBM), sustainable advanced manufacturing (SAM) and industrial controls. The laboratory is housed in the 21st Century Center for Manufacturing Systems at MSU.

The research team includes one post-doctorate candidate, two graduate assistants and two Undergraduate Research Fellows. They are developing algorithms for failure prediction and condition-based maintenance data and the augmented virtual and physical laboratories (AVRL) for workforce training in advanced condition-based maintenance, robotics, and industrial infrastructure control.

"The main focus of using AR and VR, first of all, is safety," Ortega-Moody said in a video produced by KyEPSCoR. "A lot of jobs, for example, welding and automation, or driving, like forklift driving, have a lot of safety issues and we can reduce those issues." He added using AR and VR in the lab allows them to stretch limited resources and reduce maintenance costs.

The researchers have created virtual reality and augmented reality programs designed to train workers in automation training, welding, farming and more. Students are also researching using artificial intelligence vision systems for quality control and incorporating other senses into virtual and augmented reality environments using a scent generator. Students learn mechanical and electrical design skills and programming through creating AR and VR scenarios. Ortega-Moody said the lab would one day provide automation training for regional businesses, which will create even more career opportunities for graduates.

"They have the need to train people in automation, especially the companies that are small. They want to do automation to produce more. And the people that have a lot of automation want even more automation, so it's a field that's going to keep growing and growing."

Engineering Technology Programs Earn reaccreditation

Five programs in Morehead State's School of Engineering and Computer Science have been accredited or reaccredited by the Association of Technology, Management, and Applied Engineering (ATMAE).

The Bachelor of Science (BS) in Construction and Civil Engineering Technology, BS in Electronics and Computer Engineering Technology, BS in Mechanical and Manufacturing Technology, BS in Technology Management, and the Master of Science in Engineering and Technology Management have been accredited/reaccredited through November 2026.

"ATMAE accreditation provides us with a framework for self-evaluation and continuous program improvement to ensure that our graduates will have attained a recognized skill level and set of competencies required by industry," said Dr. Ahmad Zargari, associate dean of School of Engineering and Computer Science.

The ATMAE accreditation visiting team made a virtual visit to MSU in mid-April 2020 and met virtually with the advisory board members, alumni, employers, faculty, staff, the dean, provost, and MSU President Dr. Jay Morgan. The team was also provided with a virtual tour of ATMAE accredited programs, laboratories, and classrooms. The ATMAE Board of Accreditation approved the visiting team's recommendation to accredit/reaccredit MSU programs during the board hearing on Nov. 4, 2020, conducted at the 2020 Annual ATMAE Conference held virtually from Nov. 4 to Nov. 6, 2020.

The primary purpose of the ATMAE accreditation is to provide recognition of the attainment of certain professional goals and standards for technology, management, and applied engineering programs.

SECS NEWS spotlight

Jenab and Moody Awarded NSF Grant

Kentucky NSF EPSCoR awarded Kentucky Advanced Manufacturing Partnership for Enhanced Robotics and Structures (KAMPERS) Research which is conducted by several academic institutes (UK, UofL, MSU, WKU, EKU) to develop global excellence in next-generation flexible electronics, robotics, and manufacturing technologies.

The mission is to advance the state-of-the-art in advanced manufacturing through the integration of synthetic biology, 3D printing, and the emerging field of printed electronics to revolutionize the capabilities of robotic manufacturing infrastructure, medical assistive robots, prosthetics, and consumer products.

The MSU Research Team (Dr. Jenab (PI), Dr. Ortega-Moody (Co-PI), a PostDoc, two graduate students and two undergraduate students) nested in "21st Century Center for Manufacturing Systems" at MSU, works on
1- the algorithms for failure prediction and condition-based maintenance data from SE structures, and
2- the augmented virtual and physical laboratories (AVRL) for workforce training in advanced condition-based maintenance, robotics, and control of industrial infrastructure.

As a result, over 12 refereed journals/conference papers/ posters have been developed/presented in the past two years. Furthermore, this research grant would enhance 21st Century Center for Manufacturing Systems to teach cutting-edge technologies, and conduct applied research in science, technology, engineering, and mathematics (STEM), and aid technology transfer from the University to industries that will result in economic development in the region.

ETM Students Achieve 90% Pass Rate on CTM Exam

Morehead State University's Department of Engineering and Technology Management (ETM) fall 2020 graduating class achieved a 90 percent pass rate on the Certified Technology Manager (CTM) Exam, earning them national certification.

The CTM Exam is nationally administered through the Association of Technology, Management and Applied Engineering (ATMAE) to certify accredited program graduates. The Department of Engineering and Technology Management has been accredited by ATMAE since 1998, with reaccreditation achieved through 2026. Twenty-seven of the 30 MSU students who took the exam passed it.

"We are proud of ETM faculty and graduating seniors for their success," said School of Engineering and Computer Science Associate Dean Dr. Ahmad Zargari.

A minimum score of 95 out of 160 in leadership, self-management, systems, processes, operations, people, project, quality, risk and safety is required to pass the exam and qualify for certification. Certified Technology Manager is the initial certification status awarded by ATMAE's. Certification holders may report continuing education activity to be eligible for certified senior technology manager (CSTM) status.

MSU's ETM students take the Certified Technology Manager (CTM) exam before graduation in their senior year. The historical average national pass rate for the CTM exam is 69 percent.

ADVISORY BOARD spotlight

Sam Howard

As a fifth-generation native of Vanceburg, Kentucky, Sam Howard is an innovator and visionary who worked his way up in various capacities of the construction field. He has served as a construction laborer, carpenter, electrical lineman, project superintendent, estimator, project manager and general contractor. Along the way, he saw firsthand the way things are done and realized there was a better way that was focused on the needs of clients.

In 1993 he dedicated himself to creating a powerful, capable and respected construction firm that was a reflection of his personal ideals with the founding of Trace Creek Construction. Sam is committed to the principles of honor and integrity and doing things right. As CEO of Trace Creek, he has grown the company unpretentiously named for the creek on the land where he was raised to the team of 35 employees. In just two decades, he built the company's gross revenue of less than $500,000 and no bonding capacity to managing multi-million dollar projects and a single project bonding limit of $50 million. Everything that Trace Creek does is based upon Sam's personal commitment to the best interests of his customers.

As a direct result of Sam's innovative approach, Trace Creek has become the preferred choice as Construction Manager, Design/Build or General Contractor on a wide range of public and private projects across a multi-state region. His company has established a well-earned reputation for on-time and on-budget project completion with both high quality and an extraordinary jobsite safety record.

Sam serves on numerous community service boards and nonprofitorganizations including the Vanceburg Lion's Club, Lewis County 4-H Council, Hope's Place women's crisis center, Kentucky Chamber of Commerce, and Tennco Workforce Investment. He believes working with community leaders and mentoring the next generation provides a better environment in which to live and conduct business in the region.

Executive Roles

Pre-construction
During the pre-construction phase of each project, Sam and the Trace Creek team oversee the overall planning, coordination, and control from inception to completion. Sam's experience managing major construction projects ensures accurate project cost planning and constructibility reviews. He oversees site logistics and safety planning, scheduling, and bid-package strategy for every Trace Creek project.

Construction
Sam's broad experience as a construction manager and general contractor for a wide range of project types ensures that all planning, coordination and communications are followed through from the project's start to finish. In his role as CEO, Sam has the ultimate responsibility for client relations as well as all of Trace Creek's general responsibilities. Day to day, his time is spent with client interaction, executive level project supervision, administration, management and finances of company operations. He is also deeply involved with the professional development and mentoring of his growing staff.

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Randy Bumgardner

Randy Bumgardner is the Manufacturing Engineering Manager at Regal Power Transmission Solutions in Morehead Kentucky. He holds a diploma in Drafting from Rowan Tech. and a AAS in General Occupational Studies from Maysville Community College.

During Randy's 31 year career at Regal Beloit's Power Transmission Solutions facility in Morehead, KY he has held positions as Tool Designer, Manufacturing Engineer, Quality Manager and Manufacturing Engineering Manager. Regal Beloit's facility in Morehead manufactures Sealmaster, Browning, McGill and Hub City ball and roller bearings. Randy is a certified ISO-9000 Lead Auditor, Yellow Belt certified and currently completing Regal Beloit's Green Belt certification. In his current position, he is responsible for manufacturing processes, equipment, tooling, maintenance and facilities.

Randy and his wife Keena, a MSU graduate, reside in Flemingsburg with their two children. In his spare time, Randy builds and shows custom cars.

ALUMNI spotlight

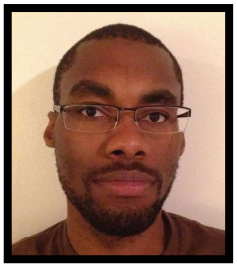
Caiwen Ding

Caiwen Ding is an assistant professor in the Department of Computer Science & Engineering at the University of Connecticut. He received his Ph.D. and Master degree from Northeastern University (NEU), Boston in 2019 and Morehead State University in 2015, respectively.

Caiwen's research interests include Machine Learning & Deep Neural Network Systems; Computer Vision, Natural Language Processing; Computer Architecture and Heterogeneous Computing (CPUs/FPGAs/GPUs); Non-von Neumann Computing and Neuromorphic Computing; Privacy-Preserving Machine Learning; Efficient computing for cyber-physical systems and embedded systems.

His work has been published in high-impact conferences (e.g., AAAI, EMNLP, ASPLOS, ISCA, MICRO, HPCA, FPGA, DAC, DATE, ISLPED) and Journals (IEEE TPDS, TCAD, TVLSI, and RA-L). His work on Block-Circulant Matrix-based Smartphone Acceleration received the Best Paper Award Nomination at DATE 2018; his work on ReRAM-based In-Memory Computing for DNN Acceleration received the Best Paper Award Nomination at DATE 2021.

Caiwen is a recipient of Google's exploreCSR Award and USDA-NIFA HATCH Award. He also received an Excellent in teaching award from UConn Provost in 2021.



Andre Talley

Andre Talley graduated with a B.S in Geography from the University of Kentucky. Eventually he came to Morehead State University and completed the Master of Science in Engineering and Technology Management.

While he was at MSU, he successfully completed an internship at Rowan County Water assisting with a GIS project. After that internship, he obtained a Co-op at the Greater Cincinnati Water Works as a chemist.

After graduating from MSU, Andre worked as an Area Manager at Amazon, as Warehouse Supervisor at John Deere, and Maintenance Supervisor at Buffalo Trace. Through Quest Global, he was placed at a Honeywell plant as a manufacturing engineer. Currently, Andre is employed at Ford as a Process Coach (Production Supervisor).

Feng Gao

Feng Gao is a graduate student in the Business School MSBAPM program at the University of Connecticut. She received a Masters of Science in Engineering and Technology Management from Morehead State University (MSU) in 2016, where she was supervised by Dr. Ahmad Zargari.

Feng was employed as a quality engineer in Fuyao Glass American in Dayton, Ohio, from 2016 to 2019. While there, she led the Quality outgoing team receiving success from International Organization for Standardization ISO9001, Built In Quality Supply, and Internationsl Automotive Task Force 16949 Audit in 2017 and 2018. Feng and her team also received an award for the best team-work in 2018.

Clay Ratliff

Clay Ratliff graduated from Morehead State University in 2011 with a Bachelor's Degree in Engineering Technolgy with a Construction Management option. After graduation, Clay began his construction career with Brasfield & Gorrie General Contractors as a carpenter's helper, working directly with the foreman and carpenter crew. As his skills evolved, he was promoted to a field engineer position. His experience as a field engineer has made Clay thoroughly familiar with all aspects of the construction process from start to finish. In recognition of Clay's ability to manage work on a large scale while remaining detail-oriented, he was promoted to Assistant Superintendent.

After gaining eight years of field experience, Clay moved back home to Kentucky to accept a position with Trace Creek Construction as a Project Manager. As a Project Manager, Clay focuses on great communication; developing an excellent working relationship with the client, architect and subcontractors; and keeping a close eye on each and every detail to ensure that everything meets Trace Creek's high-quality standards.

As a reflection of Clay's experience in the field and as a Project Manager, he was promoted to Vice President of Trace Creek in 2020. Clay is able to guide the construction process to a successful conclusion by ensuring that schedules are met, blueprints and schedules reflect the construction reality, and that work is done correctly the first time. Clay is focused on Trace Creek's dedication to delivering quality projects.

ALUMNI spotlight

Jarred Hunt

Lt. Jarred Hunt is a native of Pike County, Kentucky. He and his wife Amy moved to the Morehead area after graduating high school to attend Morehead State University. Lt. Hunt graduated in 2003 with a Bachelor of Science degree with an emphasis in Construction Management.

After graduation, he began working as a field engineer for FMSM Engineering in Lexington. After several months in this position, he fulfilled his ambition of being a police officer and began his career as a patrol officer in 2004 for the Morehead State University Police Department. As a patrol officer, he twice achieved the Governor's Award for Impaired Driving Enforcement for the department. He was promoted to Sergeant in 2008 and to Lieutenant in 2013.

Lt. Hunt received a Master of Science in Career & Technical Education degree from MSU in 2017 and followed that with a Master of Science in Engineering & Technology Management degree in 2019. Lt. Hunt then began instructing classes at MSU in the Engineering & Technology program the same year. Jarred, his wife Amy, and daughter Kaylee reside on a small farm in Bath County.

Jack Hughes

Jack Hughes is a Project Manager/Estimator within the asphalt paving division for Hinkle Contracting Inc., with 20 years of experience in the heavy and highway construction trade. After graduating from MSU in 2001 with an associate degree in Construction and Mining Technology, Jack continued his career and education, completing his bachelor's degree in 2012 for Construction Management, and finishing up with an MS in Construction and Engineering Management in 2017.

Jack has been employed with both the public and private sectors having spent 12 years with the Kentucky Transportation Cabinet as an Engineering Technician for road and bridge projects, specializing in inspection, project coordination, DTM mapping and surveying, and material testing. Currently, Jack has a driven focus for integrating new technology and methods into the industry, while bidding, building, and delivering completed project on time and under budget.

While he spends a lot of time at the office and Jobsite, his Family remains number one with his wife Karla Hughes, and three children, Trinity, Jackson and MaKayla. If you Don't find him at the jobsite, the next best place to look is on a Softball or Soccer Field somewhere across the state, as he enjoys coaching and spending time with his family.

FOR YOUR INFORMATION

The School of Engineering and Computer Science has made adjustments to courses and software to allow for virtual delivery of courses and labs.

MSU's Office of Career Services held a virtual Engineering and Science Career and Internship Fair on Monday, March 15.

The next SECS Advisory Board meeting will be held on October 29, 2021.

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Learn much more at **www.moreheadstate.edu/secs**