

Robotic Pancake-Makers Require Team Effort

by Randy Weiler, MTSU News and Media Relation

While an MTSU student-athlete, Ed Simpson was a consummate team player.

The 6-foot-2 guard was a contributor, both as a starter and coming off the bench for the men's basketball team, which won a record-tying 100 games during his four seasons. He could hit the 3-pointer or dish out assists.

One of more than 2,600 graduates May 4-5 in Murphy Center, the 22-year-old Ocean Springs, Mississippi, native was a team man in his mechatronics engineering major, too.

This spring, he was project manager for a four-man team making a robotic pancake-making machine — one of five such contraptions producing plenty of pancakes for visitors attending the recent Department of Engineering Technology Open House featuring senior projects.

"I did a lot of documentation, making sure we stayed on track," Simpson said of the group that included fellow seniors Chance Ferguson, Eli Little and Jeremy Hood. "We would meet every two weeks to make sure everything was running smoothly."

Simpson also did a lot of math as they planned, designed and built the pancake-maker, which had to dispense batter, flip a pancake and place it on a plate.

During the open house — where the aroma of cooked pancakes and the accompanying syrup filled the room in the Tom H. Jackson Building's Cantrell Hall — things ran smoothly until the power went out because there were too many cooks (and pancake-makers) using too much electricity on one end of the facility.

Simpson, who could've chosen an Ivy League school because of his strong academic background, entered MTSU majoring in mechanical engineering technology. By his sophomore year and at the suggestion of an adviser, he switched to the fast-growing mechatronics program.

A member of the Conference USA All-Academic team and True Blue President's Award recipient, Simpson said he landed a systems engineering position with aviation, defense, space and security giant Boeing in Oklahoma City, Oklahoma, and began work there in mid-June.

EVP in the Community

On May 24th, Dr. Judith Gross brought her class to see the Experimental Vehicles Program. Dr. Foroudastan gave a lecture on solar boat, rover, and Baja based on Dr. Gross's request. He also talked about alternative energy.



Patent for Dr. Karim Salman

Dr. Salman received formal acceptance and publication by the US Patent Office of his patent no. 10,078,492 titled "Generating pseudo-random numbers using cellular automata" as of September 18, 2018.

MTSU Celebrates Mechatronics Engineering Accreditation

by Randy Weiler, MTSU News and Media Relation

Middle Tennessee State University academic officials laid the groundwork for a new mechatronics engineering program in 2012-13. With the state's blessings, the program went from ground zero in early August 2013 to 20 students that first semester.

Five years and nearly 400 students later, mechatronics is a fast-growing program that's already graduated 66 students earning \$65,000 to \$75,000 per year — and received a titanic boost by recently gaining accreditation from the Baltimore, Maryland-based Accreditation Board for Engineering and Technology Inc., or ABET, and its Engineering Accreditation Commission.

It is a program retired Bridgestone North Americas Inc. corporate manager Keith Hamilton said is "a step toward moving MTSU into being the premier engineering school in the Southeastern part of the United States." And it is a program that event host Tonya Scott referenced as growing "from imagination to accreditation."

Mechatronics is a multidisciplinary field of engineering that includes a combination of systems, mechanical, electrical, telecommunications, control and computer engineering. The program is based on a three-level international certification program created by Siemens, a German engineering company and MTSU partner.

The Department of Engineering Technology hailed the accreditation achievement with a celebration Friday, September 21, in the Tom H. Jackson Building's Cantrell Hall.

"It is a pretty big deal," said Walter Boles, engineering technology chair, who has been a facilitator of the program since the beginning, referencing the accreditation. "We're celebrating a milestone and what mechatronics means for the community, our students, industry partners and Tennessee's economy."

The ABET action is retroactive to 2015 ("to cover all graduates," Boles said) and the MTSU accreditation status will appear on ABET's website in October, he added. ABET is an organization that accredits postsecondary education programs in applied and natural science, engineering and engineering technology.

Provost Mark Byrnes, who attended the celebration, said the university is pleased the mechatronics engineering program received national accreditation.

"It confirms the quality of our mechatronics program and should reassure students that they will receive a high-quality education," Byrnes said.

College of Basic and Applied Sciences Dean Bud Fischer said the "highly successful ABET accreditation of the MTSU mechatronics program is evidence the program has met the high standards needed to produce graduates ready to enter this critical field of engineering."

"Students graduating from this program receive a solid educational foundation and are certainly sufficiently prepared for entry into the engineering profession," Fischer added.

Hamilton, who led Bridgestone's North America Manufacturing Education Center and is a Franklin County resident, said he's "just elated that it's (accreditation) happening. It's a remarkable accomplishment — an accomplishment no one else believed could be done. It has gone beyond everyone's expectations."

Mechatronics is seeing an increase of about 100 students per year. Sixty students will graduate in May 2019.

"There's a very high demand for our graduates," Boles said.

State Sen. Shane Reeves of Murfreesboro told the crowd he is "excited about the future of mechatronics" and he "will do what we can to get money for an (engineering) building" to house the growing program and department.

As an undergraduate, Elijah Little was undeclared until he "heard about mechatronics. It seemed to fit the bill. Being a part of the Experimental Vehicles Program helped me utilize my skills and knowledge, and I'd like to thank MTSU for all the opportunities it has given me." He is now earning a master's in engineering management.

MTSU has articulations agreements with Motlow, Roan State and Cleveland State community colleges and is working on an agreement with Volunteer State Community College, allowing students from the colleges to transfer to MTSU "and receive a significant amount of transfer credit toward the bachelor's degree," Boles said.

Motlow, which confers associate degrees to its graduates, offered the first mechatronics program in Tennessee and is considered one of the best in the nation. It joins with MTSU to assist area high school programs at Oakland and others. Industry partners pushed for MTSU to offer the four-year bachelor's degree.

Hamilton, Jimmy Davis with The Davis Groupe and other industry partners attended the event. Another major partner is Smyrna, Tennessee-based Nissan North America, which was represented by Kevin Smith, now retired and others. Alumna Sarah Jost also shared about her positive mechatronics experience.

"With achievement comes a new set of challenges," said Davis, who added it is imperative MTSU "get an engineering school, a new building and add a master's program" in mechatronics.

Companies Court MTSU Engineering Technology Students at Fair

by Randy Weiler, MTSU News and Media Relation

More than 100 MTSU Department of Engineering Technology students attending a career fair on campus noted the increase in companies and organizations wanting to hire new employees from a previous fair.

Eighteen companies participated in the six-hour fair held Wednesday, September 26, in the Cantrell Hall of the Tom H. Jackson Building.

Joining forces with the Career Development Center, many departments conduct career fairs to enhance their students' chances of landing full-time jobs or internships with the companies.

Frito Lay in Fayetteville, Tennessee, Nissan, Navy recruiters from Nashville, Smyrna, Tennessee-based Schneider Electric, Murfreesboro Electric and Franklin, Tennessee-based Spring Automation were among the participating companies.

A number of company's represented included recent MTSU alumni.

Nathanael Blankenship, 20, a junior mechatronics engineering major, recognized the number of companies more than doubled from 2017.

"It's encouraging to see companies come out and show interest. We had half this number last year," Blankenship said.

As for the growing mechatronics program's ability to be attractive to the companies, Blankenship said he felt "they were not looking specifically for mechatronics students, but all of our students have a great deal to offer."

Mechatronics is a multidisciplinary field of engineering that includes a combination of systems, mechanical, electrical, telecommunications, control and computer engineering. MTSU just obtained full accreditation from the Accreditation Board for Engineering and Technology Inc.

Another mechatronics major, junior Ashraf Yaseen, 21, a junior from Jordan originally and now living in Murfreesboro, said he was "looking to get an internship for (next) spring and summer" in order to move out of the classroom and "get more hands-on things ... real life."

At MTSU, Yaseen works as a teaching assistant and tutor for engineering technology. He also works for Advance Auto Salvage.

Recent MTSU graduate Brandon Wright, who is a buyer in the Nissan purchasing department, told Israiah Beraman, 20, a mechatronics major from Lebanon, Tennessee, companies "want to know your communications skills, your ability to network, school projects, keywords on the resume" (for recruiters and hiring managers to quickly identify top candidates) and more.

Mechatronics Alumni Featured in OEM Magazine

Joe Beck, a controls engineer for F. R. Drake and a 2017 Mechatronics Engineering graduate, was featured in the summer 2018 issue of OEM magazine. His employer,



Drake has developed its own sanitary stainless steel robot with the help of Joe Beck (right), controls engineer, and Maks Kirichun, machine tester. Beck, top of his class, was a part of the first graduating class from Middle Tennessee State University's Mechatronics program. Maks was also a part of the first graduating class from Blue Ridge Community College's Mechatronics program.

F.D Drake, is a manufacturer of high-speed automated food loaders for cylindrical food products such as hot dogs, cheese sticks, and Vienna sausages.

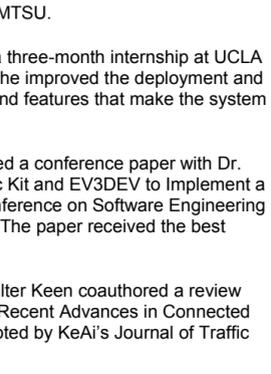
Joe has been with the company since graduation and has made several trips to Norway and Sweden, providing technical support for food processing equipment installations. While the flights can be long and tedious, Joe has enjoyed the opportunity to see and experience parts of the world he might not otherwise parts of.

F.D Drake is one of many companies implementing increased use of automation in their production process.

In 2014, it developed robotics loaders as a FANUC integrator, providing a larger market for smaller customers. Today, robotic loaders make up 50 percent of their business. Drake has also developed its own stainless steel and titanium robot and created its own programming and kinematics for it, allowing the robot to communicate with other portions of the packaging line.

Other News...

- Mechatronics Engineering received TAF funding to purchase new Festo equipment for ENGR4520: Electrical Power and Machinery. The new equipment gives the students opportunities to perform hands-on LAB activities related to single/three phase AC circuits, single/three phase power transformers, DC motors, inductive motors, and synchronous motors and generators.
- Former mechatronics students Kody Vonbargen and Matthew Radice are enrolled in the Computational Science Ph.D. program at MTSU.
- ET master student Simeon Adebola completed a three-month internship at UCLA in summer 2018. During the summer internship, he improved the deployment and operation of OpenPTrack with a focus on tools and features that make the system easier and faster as it grows in complexity.
- Mechatronics student Andrew Mikael co-authored a conference paper with Dr. Lei Miao: "Using LEGO Mindstorms EV3 Robotic Kit and EV3DEV to Implement a Self-Balancing Robot", the 2nd International Conference on Software Engineering and Development, June 2018, Chengdu, China. The paper received the best presentation award from the conference.
- Former ET master students David Elliott and Walter Keen coauthored a review paper about self-driving cars with Dr. Lei Miao: "Recent Advances in Connected and Automated Vehicles", which has been accepted by KeAi's Journal of Traffic and Transportation Engineering.
- Dr. Lei Miao published two conference papers in summer 2018: "Optimal City Navigation for Pedestrians using Agent-specific Q-learning", *American Control Conference*, June 2018, Milwaukee, WI "Structural Properties of Optimal Wireless Transmission Using Harvested Energy", the 2nd International Conference on Robotics and Automation Sciences, June 2018, Wuhan, China.
- The Department Fair provided the Experimental Vehicles Program an excellent opportunity to reach a variety of different students. The program was set up near the Engineering Technology department's display, attracting students from other nearby displays. Having a tangible project they can observe and participate with positively drives students' interest. During the Department Fair, two SAE Baja's, one Solar Boat, and one NASA Rover were displayed. While the program traditionally attracts Engineering and Engineering Technology students, the Experimental Vehicles Program's presence attracted students from various other disciplines. All students have a perspective that the program could utilize, and no idea is insignificant. The department fair gave students from all over campus access to members of the Experimental Vehicles Program so that they could hear individuals' stories and decide if they wanted to participate as well.
- The Experimental Vehicle program participated in the Student Organization Fair and attracted a large number of students. The program displayed their Solar Boat that placed second in an international competition, a rover that excelled in a NASA-sponsored competition, and a Baja vehicle that satisfies all standards required for a technical inspection by the Society of Automotive Engineers. By providing informational flyers and having members present from every team, all student inquiries were directed to the correct person. The rover was extremely popular, because students could safely ride the vehicle with a friend and experience what all of the time and effort the program put forth had created. To experience the joy of driving the Baja, for safety reasons, students must join the program. The Experimental Vehicles Program welcomes all students, regardless of field of study, because everyone has something to contribute. All inquiries about joining the program should be directed to the Voorhies Engineering Technology (VET) building, room 170D.
- Students from Blackman High School visited the Experimental Vehicles program lab as part of a tour of the Engineering Technology department. While they made learn a lot during their time at Middle Tennessee State University, the Experimental Vehicles Program provides the perfect opportunity to apply their knowledge to a project. By practicing the skills that they learn, they are able to enhance their education and become a major contributor to the success of the program. We hope that a number of these students will choose the Engineering Technology program and become part of the Experimental Vehicles Program.



Elissa Ledoux was born and raised in Baton Rouge, LA, the oldest of seven children in a big Catholic family. After dropping out of preschool, she was homeschooled through 12th grade, and then graduated from Louisiana State University in 2013 with a B.S. in Mechanical Engineering. She earned her M.S. in Mechanical Engineering from Vanderbilt University in 2016, with a focus on robotic prosthetics research as part of the NSF GRFP. Elissa then worked in mechanical design for Universal Logic, an industrial robotics startup, designing robot end effectors and cell layouts. Recently she started a Star Wars themed AirBnB as a side project, complete with hand-painted murals. Through a whirlwind of events, she excitedly joined MTSU this September as a full time temporary lecturer for Mechatronics Engineering.



Dr. Emmanuel Rowe hold a B.S. in Mathematics from Morehouse College and a B.S. in Electrical Engineering from North Carolina Agricultural and Technical State University (Dual Degree Program). Prior to attending graduate school, he held the position of Process Engineer II at Cree Inc., where he worked on gallium nitride based Light Emitting Diode growth by Metal-Organic Chemical Vapor Deposition. Dr. Rowe's graduate work in Electrical Engineering was completed at Virginia Commonwealth University, where he conducted research on semiconductor materials for high frequency dual tunable dielectric ferrites, ultimately focusing on bulk crystal growth of doped strontium iodide scintillators. Dr. Rowe completed his Fisk-Vanderbilt Bridge Post-Doctoral Fellowship at Fisk University. Dr. Rowe's research area is the optimization of halide based radiation detectors.

Do you have news to share with the MTSU ET family? Email your stories and pictures to etdept@mtsu.edu. Deadline for the November issue of Driven is October 29.