



Message from the Dean

Greetings from the Beautiful Campus at the University of Tennessee at Chattanooga



The 2018-2019 academic year was another great one for the college. The dedication and commitment of our students, staff and faculty with the support of the community enabled the college to continue its growth in both capacity and numbers – enrollment, applied research productivity and community engagement.

As you will read in the Annual Review, the accomplishments of our students through their commitment to learning were impressive, enabled by the work of faculty and staff behind the scenes, creating opportunities for students to shine and to flourish. The Rocket Mocs collegiate rocketry competition team had a first in the history of the college: winning a national championship. At the same time, cybersecurity, concrete canoe, steel bridge, Chem-E-Car, Associated Schools of Construction team, Baja car, Institute of Electrical and Electronics Engineers robot and other teams came home from regional and national competitions with commendable success.

Our students also shined by winning a coveted National Science Foundation Graduate Research Fellowship and a large number of external, university-wide and college scholarships, celebrated at the annual awards dinner, including professional society scholarships such as the ones won by electrical engineering students. Through initiatives like the 2nd annual Technology Symposium, which took place at the downtown public library, articulation agreements with local colleges, new academic programs in mechatronics and computer engineering, the speaker series, technical and cultural immersion programs and the newly created residential college, we are creating new ways for our students to excel.

In this issue you will also find the valuable impact our faculty and students are making in the area of applied research, from work on smart cities and big data to a partnership with Erlanger. From the wastewater treatment effort, to cybersecurity research and learning

enhancements for schools, we are making significant contributions toward enhancing the lives of people in our region and the nation.

As we celebrate our success stories of the past year, some of which you will read in this annual report, I am continually humbled by the support the college is blessed to have from our advisory board, amazing alumni and the Chattanooga community. We continue in pursuit of excellence. Go Mocs!

Gratefully,

Dean

Contents

Enriching the Student Experience.....	4
Cultivating Excellence in Teaching	12
Research	20
Outreach and Community Engagement	22
Speaker Series.....	32
Alumni and Partnerships	34
College Data	43

Editor: Amber Burdsall

Art Director: Bryan Wootan

Contributing Writers: Laura Bond,
Gina Stafford, Shawn Ryan, Emily Sane

Photography: Angela Foster, Laura Wootan



UTC is a comprehensive, community-engaged campus of the UT System. UTC is an EEO/AA/Title VI & IX Section 504/ADA/ADEA institution. E041301-002-20



College of Engineering and Computer Science 2018-2019 Advisory Board

Executive Advisory Board:

Joe Ferguson	<i>Chairman, Electric Power Board (retired)</i>
Mack McCarley	<i>President, PDM Associates</i>
Mike McGauley	<i>Chairman, Fidelity Trust Company</i>
Daniel Pack	<i>Dean, UTC College of Engineering and Computer Science</i>
Jim Vaughn	<i>East Tennessee Regional President, Sun Trust Bank</i>

Advisory Board:

Rowena Belcher	<i>Tennessee Valley Authority Executive (retired)</i>
Joe Brown	<i>Vice President, Engineering and Quality Education, Miller Industries</i>
Larry Buie	<i>Regional Director and Chairman, Chattanooga Chamber of Commerce, Chattanooga Gas</i>
Jeff Cornett	<i>Alumnus, Industry Partnerships and Development, Oak Ridge National Laboratory</i>
Nick Coussoule Sr.	<i>Senior Vice President and CIO, BlueCross BlueShield of Tennessee</i>
Steven Douglas	<i>Vice President Nuclear Engineering, Tennessee Valley Authority</i>
Todd Gardenhire	<i>Alumnus, Tennessee Senate District 10, Senior Vice President, Morgan Stanley Smith Barney</i>
Leslie Gower	<i>Executive Director, Associated General Contractors of East Tennessee</i>
Tom Griscom	<i>Alumnus, former Executive Editor and Publisher, former White House Strategist, Q Strategies</i>
Patsy Hazlewood	<i>Member, Tennessee House of Representatives, District 27</i>
Jon Kinsey	<i>Former Mayor, City of Chattanooga</i>
Tom Kline	<i>Alumnus, Pfizer Pharma Executive (retired), Kline Health Group</i>
Jimmy Lail	<i>Vice President, Raines Brothers Inc.</i>
John McNeely	<i>General Manager/Senior Vice President, Eastern U.S., Avertium</i>
Bill Raines	<i>President and CEO, The Raines Group</i>
Bill Stacy	<i>Chancellor Emeritus, University of Tennessee at Chattanooga</i>
Elaine Swafford	<i>Director, Chattanooga Girls Leadership Academy</i>
Roger Tudor	<i>Past President and CEO, Associate General Contractor</i>
David Wade	<i>President, Electric Power Board</i>
Albert Woodard	<i>Alumnus, Founder and Chairman, Kazee, Inc., Healthcare Software and Technology Firm</i>



No. 1 Rocket Mocs Honored by Mayor Berke

In honor of earning the No. 1 ranking in the country, the Rocket Mocs were recognized by Chattanooga Mayor Andy Berke for the achievement.

Rocket Mocs Soar to First in the Nation

UTC's student rocket team—the Rocket Mocs—are the No. 1 team in the country, the first time a team from the University has reached those heights.

Formed in early 2018, the six-member team from the College launched a rocket to 11,563 feet, a figure that drew gasps when announced at the awards ceremony for the Students for the Exploration and Development of Space Rocketry Contest. The team placing second reached only 6,635 feet.

A second round of gasps came when attendees were told that the UTC rocket—named Phoenix—reached a maximum speed of 1,294 mph. But claiming No. 1 was more than just big numbers, says team member Sam Ashwyn, a senior in mechanical engineering and math and a member of the Honors College.

“While this was a great academic achievement, it was more importantly an achievement of courage, hope, perseverance and friendship, too,” he said.

The competition included 113 teams from across the nation, including Purdue University, Arizona State University, MIT and Tennessee Tech University.

Winning can make it easier in the future to recruit students for Rocket Mocs as well as the college itself, says team advisor Trevor Elliott, assistant professor in mechanical engineering.

“We now have a university-recognized club that will start recruiting freshmen and sophomores so

that we'll have that continuity," he says. Current team members can work with the newcomers and "help them learn it as they come up."

As for this year's team, he says they earned the title through dedication, long hours and hard work.

"They put their all into it, so they deserved getting to go to the competition and they deserved gaining the respect of those other teams."

"While this was a great academic achievement, it was more importantly an achievement of courage, hope, perseverance and friendship, too."



VIDEO

Rocket Mocs Dedication in Action

Watch the team wade through Florida swamps in waist-deep water, being cut by sawgrass, to locate a sustainer and record the altimeter notifications.



 **SCAN TO WATCH VIDEO**

STEM Your Curiosity at Welcome Week

The College hosted STEM Your Curiosity at Welcome Week. In attendance were the Chem-E-Car, Concrete Canoe and Baja teams for new Mocs to learn about club involvement and opportunities to participate in competitions. Hands-on opportunities included robotics, 3D printing and drone research.



Annual Awards Dinner



The annual Spring Awards Dinner in April was attended by students, faculty, scholarship donors and community leaders. More than 125 awards and scholarships were presented, honoring research accomplishments, academic performance, service to the community and outstanding teaching.

“Sometimes It’s Okay to Have an Unspoken Thought,” was the title of the keynote address delivered by college advisory board member, 1971 UTC graduate and retired White House Press

Secretary Tom Griscom. Griscom parlayed his White House success into careers in public affairs and media relations—even serving as the first West Chair of Excellence at UTC. Today, Griscom is a communication consultant and continues to serve the public as a member of the board of directors of the Tennessee Board of Regents system.

More than 30 endowed and private scholarships were awarded at the dinner, in addition to more than 20 Dean’s Merit Scholarships. The College



Keynote Speaker Tom Griscom

Scholarship Committee, made up of college faculty and staff, reviews and administers the awards. Students submit one application to be considered for all college scholarships.

Nominees for university-level awards also were recognized. Trevor Elliott, assistant professor of mechanical engineering, was the college nominee for Outstanding Service. Craig Tanis, assistant professor of computer science and engineering, was the college nominee for Outstanding Teaching. Hong Qin, associate professor of computer science and engineering, was the college nominee for Outstanding Research and Creative Achievement.

Staff also were recognized at the event with three college-level awards. Karen Lomen, administrative assistant in civil and chemical engineering, was awarded Administrative Staff Member of the Year. Amber Burdsall, chief of staff in the dean's office, was awarded Professional Staff Member of the Year. Sara Jackson, outreach coordinator, was awarded Student Success Staff Member of the Year.

Two faculty members and one staff member were formally recognized by Tau Beta Pi for outstanding service. Since 1990, Gary McDonald, associate professor in mechanical engineering and James Hiestand, professor in mechanical engineering, have advised the engineering honors society. McDonald was recognized as Outstanding Advisor and Heistand was recognized as Outstanding Chapter Officer. Andrea James, administrative assistant in mechanical engineering, was recognized with the Tau Beta Pi Service Award.



Hong Qin, the college nominee for Outstanding Research and Creative Achievement.



Dean's Merit Scholarship Recipients



Karen Lomen, administrative assistant in civil and chemical engineering

Student Scholarships and Awards

Students Receive ChaTech Scholarships

The Chattanooga Technology Council (ChaTech) awarded \$22,500 to 21 scholarship recipients, and more than half of the recipients were UTC engineering and computer science students. The awards ranged from \$1,000 to \$1,500 for the 2019-2020 academic year. The awards were made possible by a generous grant from Volkswagen Chattanooga, individual donations, support from the 2018 CxO Auction and a contribution from Chattanooga's DevOpsDay conference.



Selective IEEE Power and Energy Society Scholarships Come to UTC

Power and energy engineers work with some of today's most exciting technologies, developing solutions to problems that affect our lives and lifestyles.

The PES Scholarship Plus Initiative provides scholarships and real-world experience to undergraduates who are interested in power and energy engineering careers. Out of 174 awards to universities in the U.S. and Canada, UTC earned two scholarships. Congratulations to electrical engineering students Christopher Lee and Timothy Mannon.

Football? Engineering?

Wil Young Chose Both ... and Made History



Wil Young didn't go to college to make history. He just wanted to play football and earn a degree.

Young did both at the University of Tennessee at Chattanooga and, along with receiving a diploma in May, he earned a place in UTC history as the first Mocs football player to ever graduate with a bachelor's in electrical engineering.

"I definitely never expected it because I didn't know when I came here that it hadn't happened before. It's pretty cool to know that I'll be the first. It'll be something good to add to my resume," Young said with a laugh.

That resume also includes four years of membership, including one year as an officer, in Kappa Alpha Psi fraternity and, of course, four years of playing Division I college football. As a Mobile, Alabama, high school receiver, Young was rated a three-star recruit. He chose a football scholarship from UTC over possible military appointments to the Naval Academy or West Point. His campus visit—and the city and scenery of Chattanooga—won him over.

"I actually didn't know too much about UTC coming out of high school," Young says. "I came

on an official visit here, and I just fell in love with the town, really. It was a change of scenery. It's different from back home. Back home, you know, you got no mountains or anything like that. I liked it here and decided to come up."

While he sat out the 2014 football season as a redshirt freshman, Young kicked off his academic performance by making both the UTC Dean's List and the Athletics Director's Honor Roll, along with the Southern Conference's SoCon Honor Roll.

In 2015, Young's second year on campus and his first football season on the roster, he played in

all 13 games and started in two of the last three contests. On the field, he made 15 catches for 154 yards, including six catches for 82 yards at Virginia Military Institute. Off the field, he made the Dean's List and Athletics Director's Honor Roll again.

He missed five games of the 2016 football season to injury but was back in 2017, playing in 10 games, making 16 catches for 128 yards and—again—the Dean's List and Athletics Director's Honor Roll in spring semester 2018.

Fall 2018, Young's last as a Mocs receiver, saw him achieve all four of his collegiate career touchdowns, part of his 46 catches for 535 yards. When he wasn't working out, at practice or playing football, he was studying.

"I knew it was going to be tough, but I didn't know how tough it was going to be when I

first got into the major," he says. "Fortunately, I've always kind of had a knack for math, but I wasn't so crazy about the sciences—biology, the chemistries and everything—so I thought

engineering would be a good route to go to use my skill set and develop myself from there.

"Still, I ran into Calculus II and Differential Equations; those were some really tough math classes that I had to put in a lot of time and effort that I'm not used to putting in toward school, and to make sure I did well in those classes."

Among the favorite memories that Young is taking with him from UTC, football games dominate, especially in the fall of 2014.

"That first time we ever saw a Southern Conference championship, and we got to

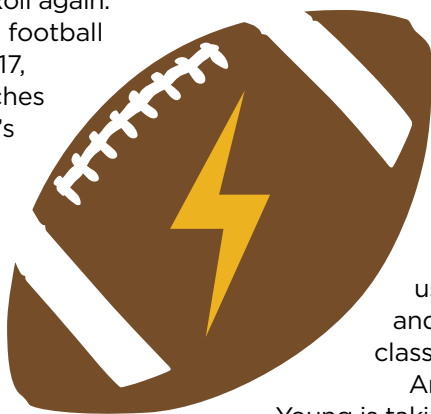
celebrate on the field and everything with the team," he says. "It was a special moment, and I really got to see how that felt winning the conference championship.

"And some of our big games that we played—like when we played Florida State (in 2015)—and got to compete against guys that you see every day in the National Football League. This past year, one of my favorite games was the VMI game—Homecoming—I had a pretty cool catch in that game, so I'll always remember that one.

"I'd do anything to have those (days) back. That's what I would tell any of the young guys coming in because, once you get away from it for just a second, you're going to miss it."

For now, though, he's focused on what comes after graduation.

"I have some mixed emotions, but the strongest right now is just me being anxious, ready to see what's next. I'm ready to take my next step, to see—moving forward—what my future holds."



Engineering Graduate Heads into New 'Adventure'

Chantz Yanagida has started his own business, ELab Repairs. Chantz Yanagida graduated from UTC in May with a degree in mechanical engineering, but the future path of his life traces back to sixth grade, a path that includes work with local, national and international companies and organizations.

He gives a lot of credit to the College and its Student Success Center. "Academically, it gave me a lot of confidence. I reached out to every single professor in that building. I had every level of support."

The center, meanwhile, "really kills it" by forming relationships with local companies and

schools, both bringing them to campus and visiting them, to show "some of the cool stuff at UTC," he says. "The relationship building was top-notch, spectacular."

Chantz is always smiling," says Julie David, director of the Success Center. "His positive attitude, passion for learning and enthusiasm for community involvement demonstrate his dedication to making a positive difference in Chattanooga and influencing real-world change.

"On numerous occasions, I have witnessed Chantz shine as he displays his creations and explains the experiences involved with each project."

[Continued p. 29]



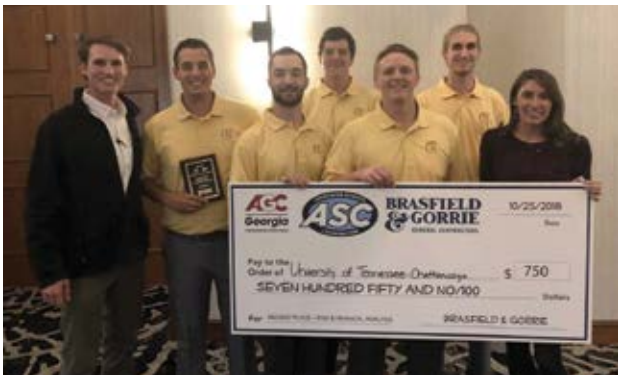
UTC Racing Mocs Get an Upgrade
New truck and trailer funded by DENSO received a wrap designed, funded, printed and installed by Miller Industries for the Baja SAE team



MocSec Only Cybersecurity Team from the State to Make Regionals

The UTC student Cyber Competition team—known as MocSec—ranked 7th of 31 teams in the Southeast Collegiate Cyber Defense Competition. They were the only Tennessee team to qualify for the regional competition in Atlanta.

In the Cyber Defense Competition, students must defend their computer networks from hackers while at the same time dealing with the day-to-day issues common to the life of an IT security professional.



Top Finish in Risk and Finance

The only all-undergraduate student team to compete at the Associated Schools of Construction Regional Competition came from UTC and placed second in the Risk and Finance category. The College sent four teams to compete over the course of the three-day competition. More than 360 students from 13 universities from the east coast and southeastern U.S. attended the event, which also featured a job fair and on-site interviews with some of the largest contractors in the industry.



Steel Bridge

The UTC Steel Bridge team competed at the 2019 Southeast Regional Student Steel Bridge Competition in March in Knoxville. This group is to design, fabricate and build a 22-foot steel bridge to enter into the AISC Southeastern conference. The team, including students Lukas Barr, Seth Caudle, Clint Clayton, Joshua London, Nathan Murrell and Taylor Warde, advised by Ignatius Fomunung, were judged on weight, construction time and deflection with a loading of 2,500 pounds vertically.



Students Pitch Their Business Ideas to Pros in Hatch It Competition

Described as a nicer version of Shark Tank, this year's Hatch It competition featured computer science and engineering students in four of the top seven teams, including the top finishing team. For the competition, students prepared two-minute pitches and spent three minutes answering questions, all in a quest to convince the judges to "invest" in their product or business idea.

First place went to BeforeWeBegin, an interactive, customizable web-based program. The team included computer science major Christina Buck. As winners, they received \$2,000 and a chance to learn more about business accounting and legal issues through workshops at Chattanooga's Co.Lab.

Attracting students from a variety of majors was a specific intent, says Libby Santin, director of the Center for Innovation and Entrepreneurship in the Gary W. Rollins College of Business.

"We really wanted to engage students from across campus and get them excited about entrepreneurship and the passions they were interested in."

CECS Hatch It Pitches

BeforeWeBegin

Kenzie Butera (Women's Studies)
Beth Rachlin (Psychology)
Christina Buck (Computer Science)

Deep Learning Drone

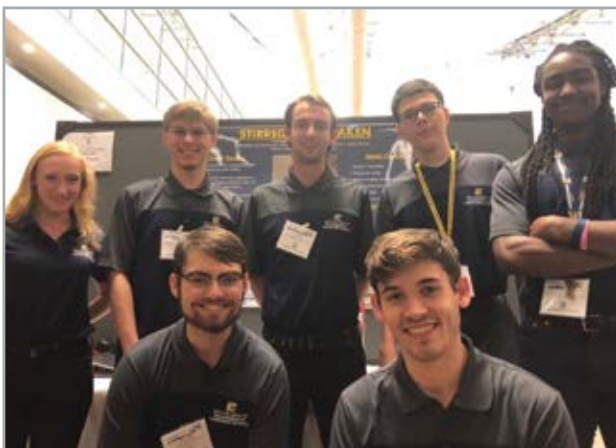
Murad Al Qurishee, Babatunde Atolagbe,
Ammer Abdelhafiz Ali Elnaiem
(Civil Engineering)

Provality

Stephanie Honore (Computer Science)

LanguageGenies

Jacquelin O'Gary (Psychology)
Dan Mailman (Computer Science)



Robot Team Engineers a Top 3 Finish in Competition

A robot built and run by a team from the College placed third out of 44 teams in a regional robotics contest.

The four-member team from UTC competed in the SoutheastCon Robotics Hardware Competition in Huntsville, Alabama.

The electrical engineering students—Anthony Maxwell, Artem Malashiy, Shane Taylor, Robert Rhodes—built the prototype for the robot in December, finetuning its design about four times before finishing the final model that was used in the competition. They named it Scrappy Bot.

"Our robot was the talk of the tournament and, by far, the favorite of the fans from the 44 college teams that participated," said Abdul R. Ofoli, UC Foundation associate professor of electrical engineering. "I am very proud of this team and what they have accomplished."

In the competition, teams were instructed to build "an autonomous debris removal bot" to clear space junk from Earth's atmosphere, making sure spacecraft would not hit it and cause a possibly catastrophic and fatal event.

Robots were placed in a "box" that measured 108 inches on all sides with an "orbit circle"



drawn inside that was divided into four quadrants, each containing balls and blocks. Corners of the box had squares drawn in them, the starting spot for the robots. The goal was to push as many of the balls and blocks as possible into the corner squares or outside the orbit circle within three minutes.

"We were the team to beat, but during the semifinals when making a turn, our robot made contact with the opponents' bot and could not turn fully which made it get stuck," Ofoli says. "It cost us the chance to compete for the top spot, but we won the third-place runoff."

A Car that Runs on Chemicals

The Chem-E-Car team designs a car that runs using a chemical battery and stops when signaled by a chemical reaction. This year, students designed a car that operated using an aluminum air battery and the color-changing Chameleon reaction. The team competed at the AIChE Southern Regional Conference last spring at Mississippi State University.



College Establishes Clear Paths for Transfer Students

Under new agreements with community colleges in the region, it is now easier for students to transfer to UTC and earn a bachelor's degree in engineering or computer science.

The College developed transfer articulation agreements with Chattanooga State, Cleveland State and Dalton State community colleges, as well as Covenant College. The agreements with community colleges include all majors in engineering and computer science, streamlining the transfer process to ensure students are taking the right courses to complete their degrees at UTC. The 3:2 agreement with Covenant allows students to complete their foundational studies at Covenant and transfer to UTC to earn an engineering degree.

"We made a priority over the past year to help transfer students be successful by developing articulation agreements and are excited to have finalized these agreements," said Daniel Pack, dean of the UTC College of Engineering and Computer Science. "There is a growing demand for engineers and technologists in the region, and these agreements give students a clear path for transferring to UTC to complete their bachelor's degrees in engineering, computer science and mechatronics."

"Our students can be confident the courses in this agreement will transfer to UTC and apply toward an engineering or computer science degree," said Randall Griffus, dean of Dalton State's School of Science, Technology and Mathematics. "As long as the student maintains the required academic standards, they can be assured of acceptance into one of those programs."

The agreements with Chattanooga State and Cleveland State community colleges allow UTC students to use the mechatronics labs. Mechatronics is a program that began at UTC in fall 2018 and integrates computer technology, electronics and mechanics into a single discipline. The College also signed an articulation agreement for mechatronics with Columbia State Community College in Middle Tennessee. A broader agreement with Columbia State is being discussed.

Discussions for similar agreements are underway with other colleges in the region, including Roane State and Pellissippi State, near or in Knoxville, and Volunteer State, based in Hendersonville, Tennessee.



Watch on YouTube

SCAN QR CODES TO WATCH
ARTICULATION AGREEMENT
SIGNING VIDEOS

Chattanooga State



Dalton State



Cleveland State



Covenant College



College Introduces Two New Undergraduate Programs

The College added two new interdisciplinary programs to its robust list of undergraduate majors and minors. The bachelor of applied science in mechatronics engineering technology and the bachelor of science in computer engineering were available for students to enroll starting fall 2018.



Mechatronics Engineering Technology

Combining the studies of electro-mechanical systems and cutting-edge controls technology, the new mechatronics engineering technology degree is the first program of its kind in the southeast and only one of five available nationwide.

The program will help students better understand and succeed in the changing world of manufacturing.

“Manufacturing in the past has been mostly mechanical, people in the assembly line using machines to make things,” Dean Daniel Pack said. “With the emergence of more sophisticated technology, manufacturing has changed. Instead of humans making decisions, we’re using machines to perform tasks under the direction of computer software.” Need an example? Think of a robot in a car manufacturing plant or in a hospital operating room.

The increasingly automated manufacturing industry has created a high demand for employees who not only have a solid grasp on the fundamentals of engineering but also are well-versed in designing and enhancing robotics and automated systems.

Meeting that demand is what helped propel the new mechatronics degree forward. Established with the strong support of the local manufacturing industry and community colleges, the program was designed to be highly hands-on using the latest automation equipment and industry practices. In addition to the electrical, mechanical and computer programming education, the curriculum also focuses on a wide variety of skills including systems integration, project management, technical communication, device networking, lean manufacturing, supply chain management and industrial safety.



Computer Engineering

The rise of smart devices—phones, TVs, refrigerators, for example—has driven demand for computer engineers, highly trained professionals with knowledge and skills from the fields of computer science, electrical engineering and other engineering disciplines.

“Computer engineering is a hybrid of computer science and electrical engineering. Traditionally, engineering mainly concentrated in the hardware of the systems and computer science was only interested in software. Now, industry needs someone who can understand both and that’s where computer engineering comes in,” Dean Daniel Pack explained.

Computer engineers design and create systems that include the hardware of electronics with the software of computers. The sharp rise in “embedded” computing systems like those increasingly used in cars and appliances has driven demand.

The curriculum for the newly created undergraduate degree in computer engineering focuses on working with these embedded systems. Students will take classes in integrating computer software and hardware, getting hands-on experience in networking, operating systems, programming, computer technology and more.



Engineering and Computer Science Residential College

Beginning in fall 2019, the College turned its successful Living and Learning Community into a Residential College. Whereas the Living and Learning Community was limited to first-year students, the Residential College will encourage students to participate through graduation. Students in the Residential College will be able to live with the same cohort through their senior years.

The Residential College provides students a unique, inclusive residential learning experience that takes education outside of the classroom and allows students to learn where they live—alongside students with similar academic interests and values. Common courses can be taken together and there will be ongoing academic and social programming and events.

Residential College has Professors Living in Resident Housing

Ahad Nasab admits that living in one of UTC's residence halls is a brand-new experience for him, but he points out that it's a brand-new experience for the students, too.

He is one of three faculty members living full-time in residence halls for the school year. The Burkett Miller Chair and department head in engineering management and technology lives alongside the Engineering and Computer Science Residential College in UC Foundation Apartments.

“Learning is not limited to the four walls of the classroom.”

“It's going to start slow as far as people gravitating to this idea,” says Nasab. “Once a few students communicate and use me as a resource, then the word will get around.”

“The intent of the Faculty-in-Residence program is to help students forge relationships with faculty members outside of the classroom during their first year living on campus,” said Valara Sample, director of Residence Life. “It's a way to help students feel more connected to the campus community. Basically, it connects living and learning to enhance the overall student experience.”

“The role is really going to depend on how students see me,” Nasab says. “I can be a lot of things. I can be just a general mentor for life issues. I can be an academic mentor. Or, I can be just a buddy to bounce ideas around and just someone to have lunch and dinner with.”

Joshua McPhatter, assistant director of academic initiatives in the Department of Housing and Residence Life, acknowledges that “the idea of faculty living alongside students might seem unusual,” but he notes that when Harvard University was founded in 1636, faculty lived with students.

“The thought was that faculty could mold young students into proper adults,” he explains. “The Department of Housing and Residence Life wants to rekindle this spirit of faculty playing an important role in student housing. We want to connect living and learning to enrich the overall UTC student experience.”

“At the end of the day, I see our Faculty-in-Residence members learning residents by name and story. If they do that, we are confident we will see an impact on retention, persistence and graduation. We will see the power and transformation that living on-campus can bring.”

Ahad Nasab, center, department head in engineering management and technology, is living in the UC Foundation Apartments.





Online MS Programs

Enrollment is now open for three wholly-online, graduate degree programs. Built on the success of the online master of science in engineering management, the two new online master of science programs are in engineering and computer science.

“For more than 50 years, our mission has emphasized strong community involvement and leadership while focusing on applied research and education,” said Daniel Pack, dean of the College of Engineering and Computer Science. “These programs are designed to address workforce readiness and meet the needs of non-traditional students and adult learners.”

Master’s in Engineering Management Ranked in Top 20 Nationwide

The online master of science in engineering management at UTC has been ranked in the Top 20 nationwide.

The degree in the College of Engineering and Computer Science is No. 16 in the U.S. for affordability, according to the SR Education Group, a website that compiles information about online degree programs across the country. The 25 schools in the rankings all have average tuition of less than \$12,000 a year. UTC’s is \$9,503. No other colleges in Tennessee made the list.

Dean Daniel Pack says the ranking is “a recognition that shows our commitment to delivering the highest level of education in Engineering Management at an affordable cost.”

“The College will continue to play an important role in providing access to students in the greater Chattanooga area and beyond who are interested in furthering their educational goals in technical areas of engineering, computer science and engineering management,” Pack said.





Faculty Profile

Gary McDonald

Commencement. The word conjures feelings of excitement and celebration. For students, it is a tremendous achievement of four (or more) years of effort. For families, it is a celebration of that achievement and the start of another chapter in life. For Gary McDonald, it is one of the more enjoyable parts of his job.

Since he joined UTC in 1985, McDonald has attended many commencement ceremonies. McDonald has led graduates into the arena, ushered them to the stage

and helped them exit the arena as an assistant marshal over the years. Seeing students with their families at the commencement receptions is what makes it a memorable event for McDonald. “The receptions are a good way to see students after they graduate and visit with their families,” he said.

A cap and gown can be an expensive investment. In 1992, a student-led award, with a stipend, put him in a “proper” cap and gown. Every year the Student Government Association recognizes a faculty

member with the Outstanding Professor Award. In 1992, McDonald was recognized by the SGA and the award came with a stipend. “Using that stipend to buy a new cap and gown just made sense,” said McDonald. “Also, there are photographs of all of us, past and present, in the University Center who have received that SGA award”.

That same year McDonald was promoted from assistant professor to associate professor. He was also awarded a UC Foundation Professorship. This

professorship recognizes faculty who demonstrate a high caliber of teaching, scholarship and service.

A native Tennessean, McDonald graduated from Tennessee Tech University with bachelor's, master's and doctoral degrees in mechanical engineering.

Service to the College, University, and community is something that seems to come naturally for McDonald. He has led student orientations, been an academic advisor and helped with course scheduling. He has served as department head for mechanical engineering and

“Education seems to have become the family business.”

is the director of freshman and transfer student advising. Outside the classroom, McDonald helped coordinate Math Counts, a math competition for middle school students, and he has advised multiple student organizations, including the student chapter of the American Society of Mechanical Engineers and Tennessee Zeta Chapter of the Tau Beta Pi National Honor Society. In 2019, the Tennessee Zeta Chapter of Tau Beta Pi recognized McDonald with an award for his service as “Outstanding Advisor since 1990.”

Thirty years before being recognized by Tau Beta Pi, McDonald was surprised by another honor. Every year, working engineers in Chattanooga recognize a professional for outstanding contributions to the profession and community with the Young Engineer of the Year award. In 1989, McDonald attended the awards dinner with no idea that he was the recipient. “It wasn’t long before I knew something was up,” he said. “They started reading the biography of the winner and that is when I knew. I feel very fortunate to have been recognized by Chattanooga Engineers during E-Week.”

An interest in automobiles, NASA, and rocketry spurred McDonald’s passion and pursuit of engineering. “I grew up fascinated by the developments in the space program of the 1960s,” he said.” When I was a teenager in the Boy Scouts, I was able to attend the Apollo 14 launch. “I’ll never forget the experience. The wind, heat and pressure waves that moved us back and forth during launch due to the Saturn V, first-stage rocket engines.” McDonald said of his interest in cars, “When I was growing up, I had some neighbors who owned some fancy cars (now called muscle cars) with big engines, like Chevrolet Chevelle SSs and Pontiac GTOs. From that time onward, I was always fascinated about cars and their design.”

Of all the commencement ceremonies he has attended, there were a couple of ceremonies where he wasn’t an assistant marshal, but just an audience member. “I was just Emily’s Dad,” he said, of his daughter’s graduation from Tennessee Tech with both bachelor’s and later master’s degrees in education. “I’m thankful that Shirley and I were able to see her promotions from elementary school and middle school along with graduating from high school, and then college.”

The McDonalds are a family of educators. Emily is a math teacher at Red Bank High School. McDonald’s wife, Shirley, is a math teacher at Ringgold Middle School. “Education seems to have become the family business,” he said.

When asked about his professional influences, McDonald said three mentors stand out as having the biggest impact on him as an educator. William Gurley was McDonald’s first department head and was instrumental in helping him establish good teaching practices and encouraging him with the development of both research and professional service activities. From Mike Jones, McDonald learned the methods of effectively advising students. McDonald learned the patience and perseverance necessary that would help him advise so many students through the years. Jones also encouraged McDonald to volunteer

for a variety of service activities for both the College and the University. Charles Knight helped McDonald with an appreciation of engineering laboratories and equipment and how to teach from a laboratory perspective. Knight started the mechanical engineering experimentation lab in 1997 and asked McDonald to help with teaching mechanics experiments in the lab. “Really, nearly all the engineering faculty and staff that I have worked with through the years, have had a positive impact on me, both professionally and personally,” McDonald said.

“Engineering professors wear many hats when working with students, so, it is rewarding to watch, at the commencement ceremony, the celebrations and recognition of these student’s accomplishments and hope that their experiences in college have positively impacted them in their pursuit of future endeavors.”



Pictured above: Gary McDonald with his wife Shirley and daughter Emily



UTC Research Facility Part of National Top 50 Ranking

A UTC-based research center has been recognized for its role in earning Chattanooga the designation as one of the Top 50 “Smart City” projects for 2019.

UTC’s new Center for Urban Informatics and Progress (CUIP) has been recognized as a critical partner in Chattanooga’s Smart City effort. CUIP—pronounced “quip”—is the go-to organization for such projects as designing transportation systems—both public and private—that are more efficient and safer, finding new and better methods for energy delivery and usage to the area and improving healthcare for the region.

“We’re working at CUIP to create Smart City solutions that can help improve citizens’ lives,” said Mina Sartipi, director of CUIP and a UC Foundation professor of Computer Science.

The ranking came from US Ignite, a National Science Foundation project that connects and helps find funding for public and private groups, including universities and cities, to encourage smart city initiatives. The group doesn’t rank the projects in a No. 1-50 order; it selects 50 projects as a whole.

Chattanooga was recognized in April at the Smart Cities Connect Conference in Denver as one of three cities recognized in the “Horizon” category for demonstrating foundational and inspiring groundwork for the future.

“This award recognizes the robust research program we’re building right here in Chattanooga, taking advantage of our world-class fiber optic network,” Chattanooga Mayor Andy Berke said. The Chattanooga Smart Community Collaborative, which began last fall, is a research partnership between The University of Tennessee at Chattanooga, the city of Chattanooga, Erlanger Health System, EPB, Hamilton County, the Co.Lab and The Enterprise Center. It is working with researchers from Oak Ridge National Laboratory, Vanderbilt University, Georgia Institute of Technology, the University of Texas at Dallas and The University of Vermont.



EE Professor Earns Award from Nuclear Science Group

Daniel Loveless was the recipient of the 2019 Institute of Electrical and Electronics Engineers’ Nuclear and Plasma Sciences Society Award.

Loveless, UC Foundation assistant professor in electrical engineering, was given the society’s Radiation Effects Early Achievement Award. He received it in July at IEEE’s Nuclear and Space Radiation Effects Conference in San Antonio, Texas.

A statement from the society says Loveless earned the prize “for contributions to radiation effects research in high-speed analog and mixed-signal electronics and student mentorship in the radiation effects community.”

The purpose of the Radiation Effects Committee is to “advance the theory and application of radiation effects and allied sciences, to disseminate information pertaining to those fields, and to maintain high scientific and technical standards among its members,” according to its website.

The Nuclear and Space Radiation Effects Conference is an international forum for the presentation of research papers on nuclear and space radiation effects.



UTC Council of Scholars Member Li Yang Earns Legacy NSF Appointment

Li Yang, Guerry Professor of Computer Science and Engineering and Director of the National Center of Academic Excellence in Cyber Defense, earned an appointment as

Program Director at the National Science Foundation for the 2019-2020 academic year.

Yang is the first UTC faculty member to receive the honor, representing the university at NSF.

Yang’s expertise is nationally recognized, exemplifying the deep interconnection between meritorious research and student learning. Her prowess in cybersecurity and innovations has attracted more than \$4 million in funding from a number of national agencies. Notably, Yang has invested her talents not only in pursuing research but also in mentoring faculty to build the university’s capacity to attract resources to support the needs of the future workforce. With her leadership, UTC has secured external funding to promote innovation in applied research and to foster diversity, inclusion and excellence in computing and cybersecurity. Yang’s dedication and accomplishments resulted in NSF funding to establish the National Center of Academic Excellence in Cyber Defense

With this appointment to NSF, Yang will be exercising her expertise by serving as a Program Director for NSF’s CyberCorps and Secure and Trustworthy Cyberspace programs, which seek to advance and bolster the U.S. cybersecurity education and workforce development.

At the spring faculty awards banquet, Yang was inducted as one of two new members to the UTC Council of Scholars. Yang is an expert in network and information security, big data analytics and engineering techniques for complex software systems.

New Faculty and Staff

Associate Dean

Michael Danquah, professor and Director of the Chemical Engineering Program at the College, is now associate dean. He joined UTC after more than a decade of professional experience in academia and industry. He is a Chartered Professional Engineer, Chartered Scientist and a Fellow of the Institution of Chemical Engineers. His research focuses on utilization of bioprocess and biomolecular engineering principles to develop emerging biopharmaceuticals; biosensing and molecular separation systems; environmental bioremediation systems; and biofuels and bioproducts. With more than 230 peer-reviewed publications and conference proceedings, and a current H-index of 34, his research findings are well-published and cited. His research also has resulted in five intellectual properties, three large-scale manufacturing plants, and six commercialized products and formulations. Danquah has served as a consultant to various companies including agricultural, pharmaceutical and biofuels industries. He worked in various capacities in Australia and Malaysia to promote bio engineering education. Danquah is a member of the Board of Trustees of OA Publishing London, an associate editor of BMC Biotechnology, and an editorial advisory board member of Current Pharmaceutical Biotechnology.

Department Head of Computer Science and Engineering

Joseph Kizza, after serving the college as associate dean, will lead the department of Computer Science and Engineering as department head. As associate dean, Kizza successfully led a variety of programs and activities at the college, including transfer articulation agreements, the Technology Symposium, CECS Distinguished Speaker Series and the launch of online MS programs.

Interim Department Head of Electrical Engineering

Abdelrahman Karrar is serving as interim department head for Electrical Engineering. Ahmed Eltom, after successfully serving the college as department head for more than 10 years, will pursue his faculty role. Karrar received a master's from the University of Khartoum and a doctorate from Loughborough University in the U.K. Karrar taught power systems engineering at the University of Khartoum, Sudan and Yanbu College of Engineering, Saudi Arabia. He was head of the Department of Electrical and Electronics Engineering at the University of Khartoum for two terms and has wide industrial experience in the electrical sector as an analyst and technical consultant, and he collaborated with large power firms such as ABB and Siemens. His research interests center on power systems stability and control. He recently led successful collaboration efforts with TVA and EPB.

New Faculty



Erkan Kaplanoglu
Engineering
Management and
Technology



Osama Osman
Civil Engineering



Reetesh Ranjan
Mechanical
Engineering



**Khalid Hasan
Tantawi**
Engineering
Management and
Technology



Don Warrington
Mechanical
Engineering



Chang Phuong
Computer
Science

New Staff



Carmela Castro
Student Success
Center



KariAnn Evans
IT and Laboratories



Mandy McWeeney
Electrical Engineering



Teresa R. Phillips
Dean's Office



Lisa Tarr
Student Success
Center



Christy Waldrep
Dean's Office



Bryan Wootan
Dean's Office



Mayor Berke Praises Research Work of UTC Professors

Chattanooga Mayor Andy Berke ran into UTC professors Li Yang and Dalei Wu in March while they were conducting experiments in Miller Park and on Martin Luther King Jr. Boulevard.

With local participants organized through Chattanooga's Enterprise Center, Wu and Yang collaborated with the University of Vermont to use equipment such as radar and magnetic sensors to search underground and document the location and condition of water and sewer pipes, electrical conduits and other infrastructure. The data is fed into high-speed computers at the UTC SimCenter and turned into spreadsheets, graphics and other documents.

Berke later tweeted: "The @ChattanoogaID is where new ideas are tested in partnership, like these University of Vermont and @UTChattanooga researchers experimenting in Miller Park."

Documentation for underground infrastructure can be out of date or inaccurate, depending on the city, so data gathered by the sensing project can be used by city engineers, planners and maintenance supervisors, as well as construction companies, to locate pipes, conduits and other utilities before digging begins, reducing the danger of damaging critical equipment.

In 2018, Wu and Yang picked up an award for the research project, which was selected as one of the 50 best in the country by Smart Cities Connect Media and Research, a national network focused on Smart Cities projects, which are designed to make urban areas more efficient and safer. Using EPB's 10-gig fiber-optic network, the fastest in America, Chattanooga is one of the pioneers of the Smart Cities concept.

Chemical Engineering Student Earns Prestigious National Science Foundation Fellowship

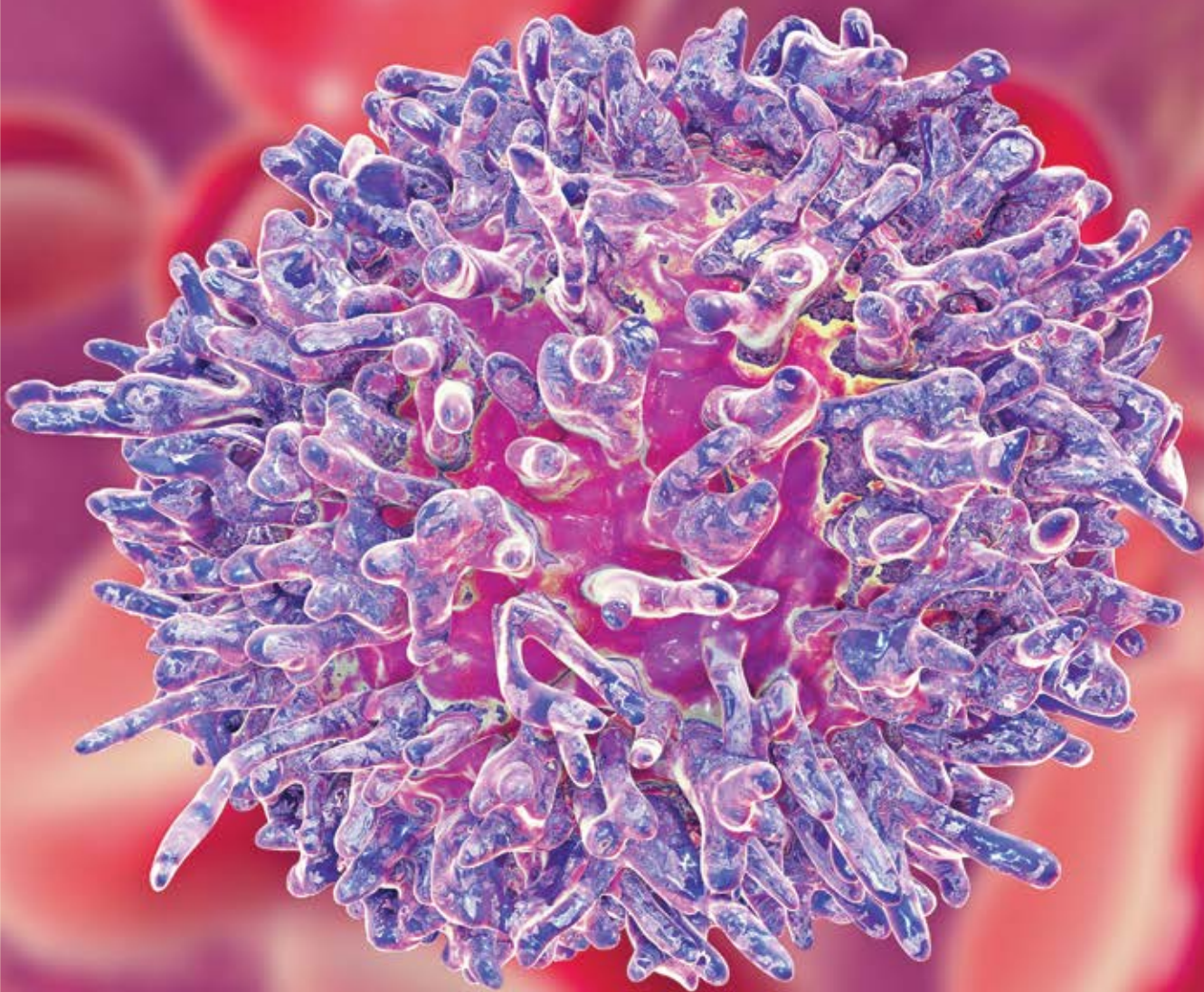


2019 UTC graduate Olivia George was chosen for a prestigious National Science Foundation Graduate Research Fellowship. The highly competitive and acclaimed fellowship is awarded to outstanding students in the STEM fields for graduate study. George receives a three-year stipend of \$34,000 a year for graduate school as well as \$12,000 a year toward the school of her choice, with all tuition and fees waived.

"Who wins nationally competitive scholarships and fellowships offers one indication of a university's overall academic excellence," says Honors College Dean Linda Frost. "Students who win them are one answer to the question: Are our students nationally competitive on the academic scene? This year, the answer is a resounding 'Yes.' UTC's students are doing just fine."

George, who graduated in May with a degree in chemical engineering, plans to attend Georgia Tech to pursue a Ph.D. in materials science and engineering, focusing on nanotechnology research.

"My research interests range from biomedical nanomaterials—which is what I have been researching here at UTC under the direction of Dr. Soubantika Palchoudhury—to clean energy to material structures and developing novel materials to have useful, tailored properties on both the nano and the macro scales," George says.



UTC and Erlanger Partner to Improve Leukemia Therapy

A cutting-edge biomedical engineering project has won a \$25,000 grant. The funding award went to a joint research venture between UTC and Erlanger Health System aimed at finding solutions to challenges facing acute lymphoblastic leukemia therapy.

The grant was awarded through the inaugural competition of the Collaborative Research Grant initiative, a partnership between UTC, the University of Tennessee College of Medicine Chattanooga and Erlanger. The research team is led by Michael Danquah, professor and director of chemical engineering at UTC and Dr. Manoo Bhakta, a pediatric oncologist with Erlanger.

The research team is seeking ways to improve the targeting mechanism used in therapy for acute lymphoblastic leukemia to reduce the side effects of chemotherapy. Improving targeting capabilities of DNA molecules can help therapy drugs more easily navigate to specific cancer sites.

The design of smart-targeted, drug-delivery systems to improve treatment options for leukemia is a national and global competitive effort. By using cutting-edge biomedical technologies to improve disease treatment and community healthcare, the project promotes the strategic research missions of UTC and Erlanger.

Engineering Students Conceptualize and Build Music Wall for Open Arms Care

Larry Westfall is getting down with his bad self. A musical mallet in each hand, he pounds ferociously on two tambourines, switches to crash on two cymbals, then switches back to the tambourines. As he does, he starts singing “I Saw the Light.”

“That’s his favorite song,” says McKenzie Brandt, day services manager at the Ooltewah location of Open Arms Care, which works with those who have intellectual disabilities.

Larry, who has Down syndrome, is one of the group’s clients and he, like many other clients at the facility, has fallen in love with the Music Wall, a multi-instrumental device conceived, designed and built by four UTC engineering students.

Brandt says that, in the few weeks since the students installed the wall, she hasn’t gone a single day without hearing a client playing its instruments. “They’re having a blast,” she says.

“We want this thing to be used and abused. It will be beaten up, hopefully, for lots of years,” says Kevin Finch, a sophomore in mechanical engineering and member of the Music Wall team.

The Music Wall was built by the students—Finch, Matthew Branning, Gary Paradis and John Crabtree—as part of the Introduction to Engineering Design class helmed by Cecelia Wigal, UC Foundation professor in mechanical engineering. Students had to choose a project that involved a problem faced by someone with disabilities and design a device to reduce or even alleviate that problem. “We had to stimulate the senses, entertain the users and accommodate the users and to make sound,” says Finch.

Wigal has taught the Engineering Design course for more than a decade. It starts off with project proposals from organizations such as Open Arms, Signal Centers and Special Olympics, those who deal with disabled adults. Students

then choose from a list of projects that Wigal has compiled. Students must work with the “customer” to understand their needs and come up with a solution. In the case of the Music Wall, whatever the team came up with also had to meet Americans with Disabilities Act requirements.

“The thinking processes they went through, and how they came up with what they did, I thought was very innovative. That’s the fun of it, to be surprised to see what they do.”

“We really work hard on trying to think of what the need is and then the best way to meet that need and don’t just think about typical solutions,” Wigal says. The ultimate goal of the projects is multi-faceted, she explains. “It’s an experiential-based course. They learn the design process; they’re learning to work in a team; they’re learning how to manage a project; they’re learning how to relate to a customer,” Wigal says.

The team built the wall from plywood, then covered it in the multi-colored, interlocking foam squares often seen on playroom floors in daycares and other areas used by young children. “We used foam because it’s soft and it

has a little bit of texture to it. They can play with it and not hurt themselves,” says Branning, a junior in environmental engineering. “I’ve bumped my head on this a couple of times and, look, I’m fine.” The Music Wall is five feet long and three feet tall and hangs in a hallway in the Open Arms facility. There are 12 cowbells, two triangles, two sets of wind chimes, a wooden xylophone, two tambourines, two cymbals and a steel drum. “We thought about instruments that would be useful on the shape and structure,” says Paradis, a sophomore in mechanical engineering. “We agreed on percussion instruments for a couple of reasons. They’re pretty low-maintenance. You don’t have to tune them. They’re pretty durable; they should last a lifetime.”

To keep the musical mallets from getting lost, they are attached with cords to PVC pipes cut in half to act as trays. The cords are long enough that every mallet can hit every instrument on the wall, giving players the freedom to indulge their inner musicians.

During one of Wigal’s occasional visits to update the status of the project, it was evident that team members had spent time carefully reflecting and considering how to meet the needs of Open Arms clients when coming up with the Music Wall’s design, she says. “The thinking processes they went through, and how they came up with what they did, I thought was very innovative. That’s the fun of it, to be surprised to see what they do.”

Each of the Music Wall’s students play instruments, so they took the Music Wall on several test runs while





it was being made and when it was finished. “We jammed a lot on this,” Branning says. “It’s as loud as we can make it,” Finch says.

On the day the Music Wall was installed, Open Arms employees came out of their offices to look at it. The reaction was euphoric.

“That’s so cool!”

“That’s pure genius!”

“I hope you guys get a good grade on that.” Robin Liner, director of day services at Open Arms, had a more emotional reaction. “I just want to cry. I know they’re just going to love it,” she said, wiping her eyes.

While Larry was finding his musical muse on the tambourine, Liner’s daughter, Lori, who also has Down syndrome, was standing next to him, playing the xylophone and wind chimes. And yes, she too was getting down with her bad self.

Above: UTC engineering students, from left, Gary Paradis, Matthew Branning, John Crabtree and Kevin Finch

Right: Larry Westfall and Lori Liner try out the Music wall.



UTC and Smart Cities Initiative Wins a National Award

Chattanooga's Smart Community Collaborative is the top award winner of the IDC Smart Cities North America Awards in the education category. The collaborative directly involves UTC faculty, researchers and students in its initiatives.

IDC—or International Data Corp.—provides market information, advice and events for the information technology, telecommunications and consumer technology markets worldwide.

As part of the partnership, UTC recently created the Center for Urban Informatics and Progress, or CUIP, to help drive the city's Smart Community Collaborative as well as push forward other local projects. The collaborative designated Reinhold Mann, UTC's deputy vice chancellor for research, as the chief scientist of the initiative.

Mina Sartipi, professor of computer science and engineering, is director of CUIP and a major participant in Chattanooga's push to become a "smart city," an urban area that uses electronic data-collection sensors to supply information to monitor and manage traffic and transportation systems, power plants, water supply networks, waste management, law enforcement and other city services.

"We continue to be impressed with the quality of projects being implemented by cities and their partners in North America," says Ruthbea Yesner, vice president of IDC Government Insights and Smart Cities and Communities.

Finalists in the Smart Cities North America Awards were scored by a panel of IDC government and smart cities analysts, a global panel of outside judges from academia and international non-profits, as well as more than 4,100 public votes. The awards were presented in New York in May.



Integrating Biological Big Data Research into Student Training and Education

The College was awarded a \$1 million National Science Foundation Big Data Spoke project in collaboration with Tuskegee University in Alabama, Spelman College in Atlanta and West Virginia University. The project is led by UTC Computer Science and Engineering Professor, Hong Qin.

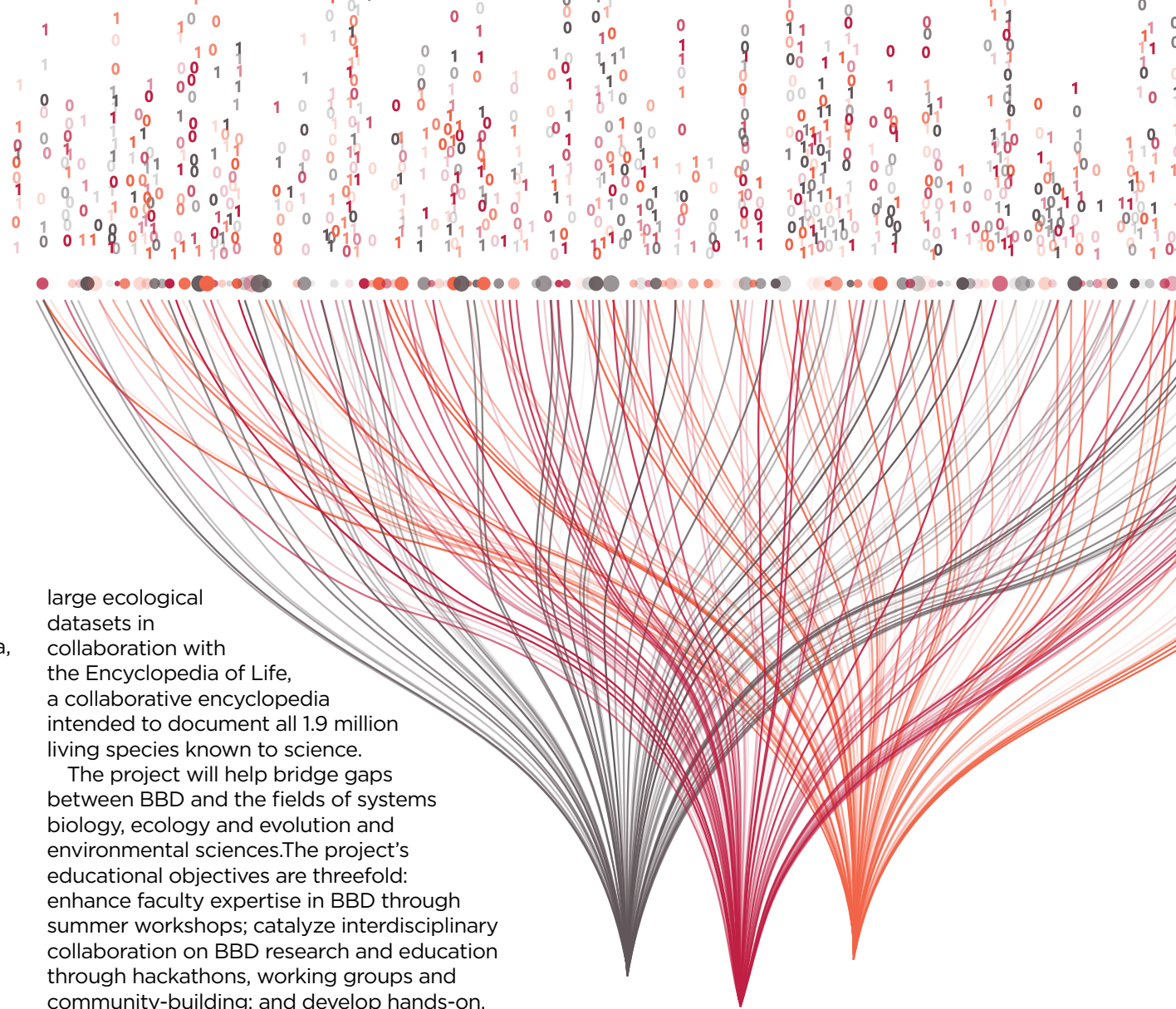
The Spoke project is to promote the integration and automation of biological big data (BBD) into student training and education. Major educational activities will help faculty and students bridge the gap between big data research and life science communities. Leveraging the team's expertise in computer science and ecology, the project will offer workshops on using network models to integrate heterogeneous genomic big data and heterogeneous ecological big data to address large-scale questions in biology.

Faculty and students will be engaged to develop a protocol to automate field data collection and prototype automated methods to enhance plant image digitization. The team will leverage the large collection of digitized plant images and meta-information at the SouthEast Regional Network of Expertise and Collections, a consortium of 233 herbaria in 14 states in the Southeast, and

large ecological datasets in collaboration with the Encyclopedia of Life, a collaborative encyclopedia intended to document all 1.9 million living species known to science.

The project will help bridge gaps between BBD and the fields of systems biology, ecology and evolution and environmental sciences. The project's educational objectives are threefold: enhance faculty expertise in BBD through summer workshops; catalyze interdisciplinary collaboration on BBD research and education through hackathons, working groups and community-building; and develop hands-on, constructively peer-evaluated learning modules incorporating high-quality video tutorials.

Activities that the research team undertakes will address challenges surrounding the integration and automation of BBD into student research training and education. The project's total funding award is \$1 million, with approximately \$550,000 going to UTC.



Virtual Reality Project will Help Train Firefighters in Different, Dangerous Situations

Jim Gault, chief deputy of Waldens Ridge Emergency Service, wears virtual reality goggles as part of a research project to use computer simulations to safely train firefighters in a variety of scenarios. Behind him stands UTC student Dax Ledesma, who has written the computer programming for the simulations.

Orange flames surge up from a trash can in the corner of the lab. Smoke builds in the room. Thankfully, a thick stream of water from a firehose sprays at the can.

But the hose doesn't stay on the fire. It circles around the lab in a dizzying spin. Now spraying this way, now spraying that way. Now facing the ceiling, now facing the floor. The fire continues to burn and the smoke increases.

Not to worry. It's not real.

The endangered lab is on a computer screen, part of a research project. The goal is to create virtual-reality environments that help train firefighters to handle the dangerous scenarios they may encounter in the real world.

"In the virtual environment, we can simulate all kinds of situations," says Li Yang, professor of computer science and engineering and lead researcher for the project. "For example, there are different kinds of chemicals and they have a different burning rate. Also different scenarios, it can be an apartment, it can be in a subway; it can be in some of the complex, office buildings."

Sensors will tell firefighters where the fire is located, the surrounding air temperature, even information such as how long they should stay in an area before they're risking their safety.



“We have seen the disaster management and fire is one of the hazards that we have to deal with because it will lead to a lot of loss of lives,” Yang says. “We want to help from the technology point of view.”

Currently, the faculty researchers—Yang, Dalei Wu, Yu Liang —and their students are in the development stage of the project, which includes writing computer code for the virtual-reality program and testing it in the lab. Yang says she is reading firefighter training manuals to get a better grasp of what the program needs to make it realistic.

Firefighters themselves have not yet strapped on the virtual-reality goggles, but that’s the ultimate goal.

Gault is offering guidance and suggestions. The research team visited a Walden’s Ridge fire station to see how it operated, “so that they could come back and put that into the virtual reality world,” he says.

The virtual-reality program “has the potential to change the fire services across the country and across the world,” Gault says.

“As budgets are decreased and dollars for training are decreased, the training with the virtual-reality augmentation will allow firefighters to be educated and trained in a virtual reality atmosphere, and it can be done at their own pace. It’s a computer-based learning technology.

“It can teach whatever we would like for it to teach,” he says. “You could teach emergency medicine. You could teach search-and-rescue. You could teach fire tactics and behaviors. It’s limitless what could be taught.”

At one time, training for firefighters involved live exercises such as setting fire to a structure and battling the blaze. But that has drawbacks.

“A burning building is expensive; the training is expensive,” Yang explains. “There are also some potential hazards to the firefighters, like some of the air conditions and the temperatures. For a new person, it’s very hard to react and adapt and to keep them safe.”

Federal, state and local regulations also have become an issue, Gault says.

“I don’t think there will ever be a substitute for a live fire exercise,” he continues. “The difficulty is that there are more and more standards and more and more regulations handed down by multiple agencies that make it so difficult. “I think a lot of departments, a lot of training staffs, shy away from doing a live fire now because of all of those requirements. That will make this virtual reality world even more valuable as that kind of goes away.”

The program doesn’t skimp on realism, a critical component, Gault adds.

“It is concentrating on that quick evaluation of the scene, of the conditions in the fire room and then putting together that solution package. It’s problem-solving. It’s critical thinking. What conditions am I faced with, and what equipment do I have that can solve that problem?”

“And, of course, if they do the wrong thing, then there are consequences in the program, just as there are in real life.”

College Hosts Summer Programs Funded by NSF

Over the summer, the College hosted three National Science Foundation-sponsored programs. Two programs, led by Daniel Loveless of Electrical Engineering and Hong Qin of Computer Science, provided students with opportunities to perform research in developing embedded systems for satellites and bio-computational systems under the umbrella of the Research Experiences for Undergraduates (REU) program. The third program, led by Raga Ahmed of Electrical Engineering, was designed to train K-12 teachers to teach STEM subjects.



UTChattSat: A CubeSat Research and STEM Program

For the UTChattSat REU, students worked closely with mentors on cutting-edge projects. Research topics included space systems, radiation effects, embedded systems, communications and mechanics. Students also toured Oak Ridge National Laboratory and the Amazon fulfillment center in Chattanooga.

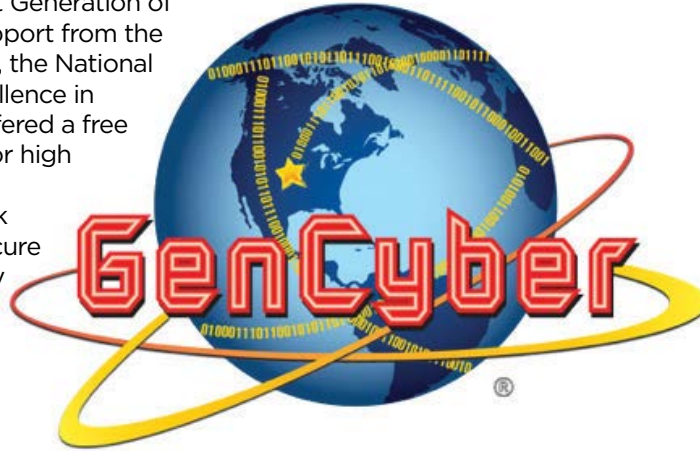


iCompBio REU - Engaging Undergraduates in Interdisciplinary Computing for Biological Research

The iCompBio student research projects included gene network control and aging, nanofertilizers, plant digitization, fatty acid pathways in microbial genomes, molecular dynamics studies on bacterial cell membranes and associated proteins, machine learning of eye tracking and developing new biostatistical methods.

Professional Development for Teachers

The supply of cyber security professionals has fallen far short of demand with some studies estimating the gap being as large as 600,000 professionals needed. The College aims to turn that around. GenCyber means “Inspiring the Next Generation of CyberStars.” With the support from the National Security Agency, the National Center of Academic Excellence in Cyber Defense at UTC offered a free camp over the summer for high school teachers covering design principles, network security, web security, secure coding, and cybersecurity and society.



Grant Approved for Research into Wastewater Treatment Using Microalgae

A UTC research team led by Michael Danquah, professor and director of the university’s chemical engineering program, is developing sustainable technology to treat Hamilton County wastewater using microalgae.

These organisms can recycle carbon while consuming contaminants from wastewater to produce useful biological compounds such as lipids, carbohydrates, peptides and proteins. The use of microalgae to treat wastewater offers great potential to develop a green technology that provides both upstream and downstream benefits.

The production of copious quantities of wastewater is an unavoidable consequence of

domestic and industrial activities in Hamilton County and Chattanooga. The composition of wastewater can be hazardous to human beings, animals, aquatic life and the environment and requires effective treatment before disposal into streams, lakes, sea and land. The proposed project will develop a bioreactor that uses light to grow microalgae.

This approach is targeted toward a sustainable technology with zero environmental impact and lower operating costs compared to conventional wastewater treatment.

Engineering Graduate Heads into New ‘Adventure’ [Continued from p. 9]

Yanagida’s future life “adventure,” as he calls it, started about a year ago when he heard that his former high school, Hixson High, had been chosen as one of 16 locations for a Volkswagen eLab, a program started in 2017 in Hamilton County schools. Training the next generation of researchers to tackle technological problems yet to come, the labs contain tools such as robotics, laser cutters, automated manufacturing equipment, microcomputers and 3D printers. Hearing that the equipment in the labs was being used for hours and hours, he knew the machines would soon need repair from simple wear-and-tear. Wanting to help, he eventually wound up at the eLab in Red Bank High School.

“Only to find out that the specialist in charge was none other than my sixth-grade computer science teacher, Matthew Craig,” Yanagida says. Craig told him that the eLab machines across Hamilton County schools had built up more than 10,000 hours of usage in a year.

“It comes as no surprise that many of the machines were experiencing issues that ranged from heavy clogs to component failure due to fatigue,” Yanagida says. “It was at this point that I was able to begin extrapolating the amount

of time before equipment issues would reach a critical point across many of the labs.”

Since then, he has maintained equipment in the eLabs for free, including the repair of its 3D printers with a combination of software writing and hands-on design and fabrication. He has installed new equipment such as a heavy-duty laser cutter that he built from the ground up. “Truly, every little piece came in multiple wooden crates,” he says.

“It was my hope to nurture this business to ultimately serve the students’ interest because going through Hamilton County schools myself, I know that it required heavy investment and sacrifice to make my education possible, so it has always been my goal to give back in some way, and it was through these labs that I have been able to.”

Using the knowledge he gained both at UTC and working in the eLabs, he landed a job about two months ago at Tuftco Corp., which manufactures equipment for carpet and flooring companies such as Mohawk and Shaw.

“It has been a fantastic opportunity for me to see a bit more of the design processes,” he says. “They have been extremely flexible with the needs of my business, and it has been a very

pleasant experience working for them. I hope to continue contributing to their team for the foreseeable future.

Most of his work at Tuftco is with 3D modeling software, and it has brought back “all of the tricks and thought processes” he developed at UTC, he says.

At the recent Nation of Makers Convention in Chattanooga, he took another step toward his future when he met Sherry Lassiter, president of the Fab Foundation, a nonprofit that helps expand the growth of the worldwide fabrication industry through grants, access to tools and education through its multiple Fab Labs. Working in those labs is one of Yanagida’s goals.

“I believe that our conversation was quite fruitful in the realm of possibly being able to provide an all-in-one service to install their labs and conduct proper preventative maintenance to further extend the life of their equipment,” he says.

Even if that doesn’t come through, though, “I’m going full throttle with my business,” Yanagida says.



Students Receive Scholarships from NFS, Government Appointments and Internships

A UTC computer science student received a U.S. Department of Defense scholarship as well as a full-time appointment as a cyber specialist at a U.S. Naval Base. Four other students received the National Science Foundation CyberCorps Scholarship. One of them joined the Defense Information Systems Agency, and others worked as interns at the Department of Homeland Security and the City of Chattanooga (student names are withheld due to potential clearance requirements).

College Hosts Largest Career Fair Ever

More than 55 booths set up on two floors of the College of Engineering and Computer Science made up the Spring Career Fair, the strongest showing of employers since the College began hosting its bi-annual career fair five years ago.

Interest was so great for the event that booths were fully booked by the beginning of March. Hosting the Career Fair at the College makes it easy for students to participate and for faculty and staff to network with employers.

“We had such positive feedback from employers about our students, that they were both prepared and professional,” says Julie David, director of student success. “I feel confident that many students will gain employment from today’s event.”

Representatives of employers in industries such as manufacturing, aerospace, automotive technologies, government, construction and data analytics participated. Among the companies represented were Denso, Volkswagen, TVA, Erlanger Health System, Komatsu, EPB and McKee Foods.

To help students put their best feet forward, the College hosted a variety of events, including a resume workshop.

The College holds career fairs twice a year, on the first Wednesdays of March and November. Alumni and community college students are invited to attend.





Students Graduate from CO.STARTERS Summer Cohort

College of Engineering and Computer Science students joined other UTC students participating in a nine-week summer CO.STARTERS program. Participants developed research projects throughout the summer and graduated from the program in August.

Julie David, director of student success for the College, attended the CO.STARTERS + Research Graduation Night, which included student presentations. “I was so inspired to hear the student feedback on all the exciting research and was touched to hear the heartfelt comments about how positive and supportive the CO.STARTERS team was,” David said.

Students who graduated from the program:

- Dan Mailman — LanguageGenie
- Hiroshi (Chantz) Yanagida — Fixing 3D Printers
- Lenward Lee Brackin Jr. + Deborah Yanagida — Solving a gap in the care and education of those with special needs
- Evan Gildernew — Water Harvesting
- Rebekah Thompson + Jose Stovall + Daniel Velasquez + Peter Way — UTC Urban Mapping
- Jonathan (Cody) Wilson — Brews beer / wine

CO.STARTERS

CO.STARTERS is a program by the Company Lab (CO.LAB), a nonprofit startup accelerator that supports entrepreneurial growth in southeast Tennessee. CO.LAB is a partner for the College’s annual Technology Symposium and the company sponsors an entrepreneurship award at the event.



Mechanical engineering senior Hiroshi (Chantz) Yanagida presents at graduation



sP^oaker series

Third Year for Speaker Series Features Mix of Researchers and Professionals

Top researchers and industry leaders shared their ideas and experiences at the annual Speaker Series. Launched in 2016 to inspire innovation and collaboration, the series is free and open to the public. While on campus, speakers are invited to tour the college and meet one-on-one with faculty and students.

2018-2019 Speaker Series

Engineering Pathways: A Real-World Mix of Engineering and Business

Tim Barnes, Managing Partner, ByteBackers

Maximize Your Value with Diverse Experiences and Views

John Loudermilk, COO, Birla Carbon

Product Safety Management and the Human Side of Engineering: Forensics and Manufacturing a Reasonably Safe Product

Tyler Kress, President and Principal Consultant, BEST Engineering Inc; adjunct professor, Virginia Tech

The Future of Energy

Hash Hashemian, President and CEO, AMS Corporation; adjunct professor of nuclear engineering, University of Tennessee, Knoxville

After the Engineering Degree: Core Non-Technical Traits that Accelerate Career Success

Julian Bell, Executive Vice President, Signal Energy Constructors

Robots that Need to Mislead: Biologically-inspired Machine Deception

Ronald Arkin, Regents' Professor and Director of Mobile Robot Laboratory, Georgia Institute of Technology



Tim Barnes



John Loudermilk



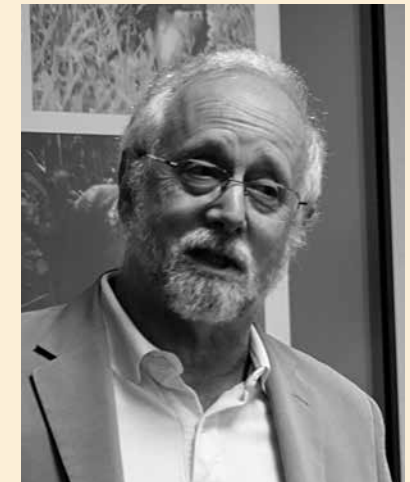
Tyler Kress



Hash Hashemian



Julian Bell



Ronald Arkin

2019

TECHNOLOGY SYMPOSIUM

What's the **BIG IDEA?**



Tech Symposium Brings 130 Student Projects to the Innovation District Clogged Arteries

Not an unusual problem faced by hospitals from a medical standpoint. In some ways, not an unusual problem from an efficiency standpoint, either.

UTC students Charles Anderson and James Beal faced those efficiency bottlenecks when officials from the Children's Hospital at Erlanger Kennedy Outpatient Center approached them. The hospital needed the seniors in engineering management to generate ideas on how to streamline its surgery process.

"Essentially getting patients in and out," said Anderson.

So they did, finding methods that not only increased the efficiency of the entire surgical process—from waiting room to operating room to recovery room to discharge from hospital—but also could increase the center's revenues by 20 to 25 percent.

At the 2019 Tech Symposium held in the heart of Chattanooga's Innovation District at the downtown public library, Anderson and Beal explained how they did it with "Erlanger Children's Surgical Throughput Analysis," one of the 130 projects on display at the event.

Projects on display ran the gamut. Some were as easily understood as designing a microbrewery or making a doghouse that automatically provides food, water and temperature control.

Others were more complex-sounding, such as "Microgrids Energy Management Using Robust Convex Programming." Despite the super-scientific title, it actually is just developing mathematical formulas to help renewable energy systems such as solar-power arrays or windmills keep up with fluctuating energy demands from the public and save money at the same time.

One of the more “out there” projects was “Feasibility & Potential Approach to Mining Near-Earth Asteroids.” (“near-earth” is a relative term, say 10 million miles or so.) Partners Dillon Grider and Kenneth Pruett believe you can send technology-carrying satellites to an asteroid and use photography, radar and other technology to see what minerals may be in the asteroid’s rocky surface and core.

“You can find anything from expensive things like platinum to ruthenium to iridium used in our technologies, to things like iron that can be used for structures in space; combustibles and fuels as well as water on the asteroids that can be used for life in space,” said Grider, a graduate student in mechanical engineering.

Connecting Students with Jobs

Students from several Hamilton County high schools attended the event, and companies from throughout the Chattanooga area came to hear about the projects and—hopefully—find future employees.

“It’s an opportunity to showcase their work to these companies who might, in the future, be their employers. It’s a way of showing your capabilities to potential employers,” said Daniel Pack, dean of the College of Engineering and Computer Science. Such wide-ranging ideas and engineering projects are one of the reasons that Candace Brown, talent acquisition consultant with TVA’s Nuclear Division, comes to events like the Tech Symposium. She’s able to get a look at mechanical, chemical and electrical engineering students, among others, who may be future employees at TVA, she said.

“We do hire people straight out of college,” she said. “But we also hire college recruits, and what we mean by college recruits is people who have already graduated within the last 48 months or less. We do hire them.”

Top Projects by Category

Freshman Design

Mitchell Bauer, Walker Fannon, Noah Grigsby, Shelby Hash, Jamison Snuggs and Cecelia Wigal, “Mind Stimulating Activity Sensory Wall”

Graduate Research

Areeg Ahmed, Anas Ali and Abdelrahman Karrar, “Estimating the Effects of Small Voltage and Frequency Changes on Industrial Induction Motor Loading”

Senior Capstone

Anthony Maxwell, Artem Malashiy, Robert Rhodes, Shane Taylor and Abdul Ofoli, “IEEE Robotics 2019”

Undergraduate Research

Olivia George, Dell Zimmerman, Gitapun Jur, Yasmin Foster, Ketan Patel and Soubantika Palchoudhury, “Effect of Different Ligands on Water-Soluble Iron Oxide Nanoparticles”

Mechanical Engineering

Sarah Thomas, Monica San Juan Garcia De Eulate and Cecelia Wigal, “Improving Nurse Scheduling for Effective Emergency Department”

Electrical Engineering

Anthony Maxwell, Artem Malashiy, Robert Rhodes, Shane Taylor and Abdul Ofoli, “IEEE Robotics 2019”

Engineering Management and Technology

Jared Bellamy, Kaitlyn Burkeen, Scott Campbell and Wolday Abrha, “Inventory Control System”

Computer Science and Engineering

Justin Clark and Hong Qin, “A Deep Learning Approach to Estimate Replicative Lifespans from Yeast Cells”

Chemical Engineering

Olivia George, Dell Zimmerman, Gitapun Jur, Yasmin Foster, Ketan Patel and Soubantika Palchoudhury, “Effect of Different Ligands on Water-Soluble Iron Oxide Nanoparticles”

Civil Engineering

Xuan Chen, Shuai Liu, Sean McDonough, Qihong Xie and J. Bathi, “UTC Roof”

Sponsors and Partners



Entrepreneurship Award – Sponsored by CO.LAB

An award for the research project that best represents the potential for commercialization. The winning team receives acceptance to one of CO.LAB’s programs, access to its CO.LAB network and mentorship through CO.LAB: Terrince Bramhall, Chase Futrell, Evan Lane and Abdul Ofoli, “Open Spots Parking Application.”



\$250,000 for Endowed Engineering Scholarship from California Alumnus

Daniel Seth Batkin, a New Jersey native who has called southern California home for many decades, designated \$250,000 to create the Daniel S. Batkin Endowed Engineering Scholarship. When Batkin was a student at UC/UTC in the late 1960s there was no engineering building; there was no gleaming library; there was no towering dormitory at the west end of campus. This brick and mortar progress—coupled with the traditions of decade’s passed—prompted Batkin to create a gift that will benefit engineering students for generations to come. For Batkin, UTC is a ‘great university,’ and through his generosity and others like him, it will continue to grow and blossom.



‘Mocs’Phersons: Siblings Plugged into Video-game Arcade

On the third floor of the CECS building, just down the hall from the common area where students quietly sit and study, is a blue-and-gold cabinet.

“Mocs Arcade” is stenciled across the top façade, and Power Cs are painted on both sides. In the center is a video screen with joystick

controls below. Red, green, blue, yellow and white buttons are alongside the joysticks.

It’s a familiar sight to anyone who has ever been inside a video arcade, but the games will be unknown to about 99.9 percent of the population. “Banana Bomber” is a two-person game in which

gorillas try to “bomb” each other with, yes, bananas. At the same time, the gorillas try not to get blown up while searching for “power” bananas to keep them going. “TwoTris” is a variation on the familiar “Tetris,” except two people can play it at the same time.

The games and their graphics are somewhat rudimentary, but sophistication isn’t the point. Four siblings—Andrew, David, Grace and Connor McPherson—have been heavily involved in creating and updating the games as well as

adding new features to the arcade cabinet since it was originally built three years ago by Andrew McPherson. The four are or will be UTC graduates, and all majored in some facet of engineering or computer science.

Grace McPherson, who graduated in December 2018 with a degree in computer science, worked on a team with four other students to create “TwoTris.”

“I am extremely proud of the team,” she says. “It was an amazing group and a wonderful experience.”

But simply racking up points on the games isn’t the goal, she and her siblings say. The plan is to throw down the gauntlet for other students. “I hope that each student takes full advantage of this opportunity to create a game and share it with the community,” Grace McPherson says. Andrew McPherson, who built the first Mocs Arcade as an extracurricular activity, echoes his sister’s comment.

“The goal of the project isn’t so much to make games for the arcade cabinet, but to encourage students to make games, be they good or bad regardless,” he says in a video made in 2015. Although it’s usually in the engineering and computer science building, Mocs Arcade sometimes is rolled out to various events on campus and around Chattanooga. It has visited several editions of the Mini Maker Faire, an annual



event in downtown Chattanooga’s First Tennessee Pavilion that lets local artists, engineers, visual artists, hobbyists and others show their work. Mocs Arcade always attracts a lot of attention.

“There’s a line of people who want to play the games, a lot of kids. For our students, it’s a chance to talk to them about their future,” says Craig Tanis, an assistant professor in the Department of Computer Science and Engineering who knows the McPhersons siblings.



Family affair

While various students and members of CompUTC, the University’s computer science club, have been major players in the maintenance and updating of Mocs Arcade, the project overall has been something of a McPherson family labor of love—well, for four of the nine siblings in the clan.

“We’ve been something of activists to keep the vision of Mocs Arcade alive. Most often, we started these projects,” says Connor McPherson, a computer science major who will graduate in 2020.

Andrew McPherson graduated with a degree in computer science in 2015 and is now working in Seattle. David McPherson earned a degree in electrical engineering the same year and is in Berkeley, California.

Tanis is impressed that the McPherson clan can produce “a steady stream” of students through the department.

“It’s a testament to their family,” he says.

And the McPherson-UTC connection continues. Younger brother Luke McPherson entered UTC as a freshman in 2018, pursuing a degree in business and marketing. Their mother, Joyce McPherson, is enrolled at the University, working on a doctorate in education and leadership. McPherson siblings



Grace, Connor and Luke also are all students in the Honors College.

Genetically inclined

For the McPhersons, technology is a family tradition that goes back a couple of generations. “I’m pretty sure it started with my grandpa, who was a computer scientist,” says Connor McPherson. “He worked for the Army and Marine Corps on long-distance communications. He made it his goal to get as many of his grandkids into the tech field as possible and, by golly, he succeeded.”

Grace McPherson says their mother also was key in their career choices and life philosophy.

“We all heard this mantra, ‘Create, don’t consume,’ growing up from our mother, who encouraged us to create solutions using whatever skills and materials we are given,” she says. With Grace McPherson’s graduation, Connor is the only McPherson currently working on the game, but he stresses that Mocs Arcade is not the property of his family.

“I think it would be an exaggeration to claim any sense of ownership. We don’t own the arcade and I hope no one ever thinks of it that way,” he says. “The arcade is a gift, an offering, a vision, a push for innovation in the Computer Science department. We don’t preserve the arcade for our own sakes.”

Hopefully, he adds, that community will include other UTC students once he graduates.

“Once I graduate, I will have to pass the baton of the arcade’s upkeep to someone outside of the family. I can only pray an inspired maker will come with their own dreams and ideas to add to the arcade’s rich history.”

For her part, Grace McPherson isn’t too concerned about the future of Mocs Arcade. “I’m not worried about it,” she says. “I know it will do well as long as there are clubs and teachers that continue to encourage students to take full advantage of this platform.”



John Loudermilk

From Chemical Engineering Grad to Chief Operating Officer

An executive in the chemical industry, John Loudermilk is passionate about innovation and building inspired teams. It's a drive he discovered as a chemical engineering student at UTC in an atmosphere akin to the one he sees in the College today.

The Chattanooga native arrived at UTC in August 1988 with an interest in chemistry and science. From a practical standpoint, he knew chemical engineering was the way to go. It wasn't the easiest path by any stretch; at the time, chemical engineering had the longest time-to-degree.

"I knew coming in, that if I wanted to get a chemical engineering degree, I had to start early," he said. "If I wanted to change later that would be easier than trying to jump into chemical engineering at a later point."

It was a practical choice that would prove to be a smart move. "In taking engineering classes, professors were engaging and open. They fostered a cross-functional, diverse perspective to problem solving. I found it interesting at the time, but particularly beneficial later in life when realizing that you don't spend your career working on a single subject matter, but need diverse teams and perspectives to drive success."

Those lessons were most pronounced in the chemical engineering labs. “We’d try to perform experiments that didn’t quite work out, spend time discussing what went wrong, and try again,” said Loudermilk. “It helped me to see that there is an iterative process to engineering and you’re not going to have the answer just based on what you studied or read in a book.”

Connections with faculty outside the classroom also had a lasting impact. Jim Henry and Jim Cunningham, the only chemical engineering professors at the time, led student activities outside the classroom. Loudermilk joined other chemical engineering students on a team-building ropes course. Henry took Loudermilk and another student canoeing on the Hiwassee River.

“Those personal interactions helped me appreciate that it’s not all about the science, you have to also manage the interpersonal side of things to be effective and successful,” Loudermilk said.

“Your piece of the puzzle is small – and it doesn’t mean much unless you have others.”

Jim Hiestand, who is still an engineering faculty member at UTC, connected Loudermilk with TVA for an internship. For three years, Loudermilk worked 20 hours a week and full-time in the summer as a paid intern at TVA. The connection allowed Loudermilk to work his way through school.

After graduating with a chemical engineering degree in May 1992, Loudermilk moved to Greenwood, South Carolina to work at a Monsanto nylon plant as a process engineer. Over the next 13 years, he would change roles within the company every few years, working in a variety of locations across business management, manufacturing, procurement, sales and supply chain.

“It was a benefit to come from an educational background that wasn’t exclusively focused on the technical side, but married that with relationships and diverse perspectives,” said Loudermilk. “Your piece of the puzzle is small – and it doesn’t mean much unless you have others. That lesson helped me be successful.”

In 2005, Loudermilk joined Birla Carbon as director of global operations. Three years later, he was appointed vice president of global operations with responsibility for global manufacturing facilities along with corporate engineering and quality. He subsequently took responsibility for the North American business and has led technology and strategy efforts for the company during his tenure. In 2016, he assumed additional responsibility for the European and African regions of Birla Carbon until his appointment as Chief Operating Officer in September 2017.

Loudermilk came back to campus in Spring 2019 as a distinguished speaker. “Even though it is a much larger organization, in talking with students and hearing their enthusiasm, it’s clear that the college has retained its focus on relationships and access to faculty to work on research and class projects,” he said. “Seeing faculty interact with students, I could feel that comfort and ease.” Chemical engineering faculty have since visited Birla Carbon in Atlanta, Georgia to explore synergies and research collaborations.

“Interacting with the college, it is obvious how interested faculty and staff are in connecting with companies and

institutions to give students experience and opportunities, to help them be successful,” he said. Connection is something that was especially clear during his campus visit in 2019. Loudermilk saw Henry, now retired, in a chemical engineering lab. “Dr. Henry showed me a picture of a tree in his backyard that a friend of mine and I gave him as a birthday gift while we were in school. It was humbling to see how he remembered.”



birlacarbon.com

SCAN TO
VISIT WEBSITE



Study Abroad in Germany



Automotive Engineering and Mechatronics at the Ostfalia University of Applied Sciences

A partnership with Ostfalia University of Applied Sciences in Wolfenbüttel, Germany allowed a group of UTC students to visit the country in summer 2019.

In fall 2018, Professor Rolf Roskam of Ostfalia visited the College for a talk about the opportunities for both students and professors to learn and teach at Ostfalia University of Applied Sciences. The program lets UTC students take classes in mechatronics and automotive engineering at Ostfalia University.

In the summer, a group of UTC students visited Germany, led by Ahad Nasab, professor and department head in engineering management and technology. The students - Alissa Coleman, Michael Dyer, Noah Grigsby, Brandon Ennis, Luis Ortiz and Cody O'Loughlin - include mechatronics, electrical and mechanical engineering majors. During the trip, they visited a variety of industry leaders including Siemens, Mercedes Benz, Aerotec and Volkswagen. While visiting Ostfalia University, they toured the virtual reality conference room, connecting people from across the globe.



“Studying abroad is a life-changing experience that creates valuable memories and can lead to future opportunities.”

Help a Deserving Student with a Gift to UTC CECS

Your generosity helps students achieve their dreams.

Every year, hundreds of alumni and friends support the UTC College of Engineering and Computer Science with a charitable donation.

Support our students by making an online gift at give.utc.edu/engineering





UTC Engineering Graduates Nominated; Marjorie Parsons is TVA Engineer of the Year

Three UTC graduates were in the running for TVA's 2019 Engineer of the Year. Nick McClung, Marjorie Parsons and Tamatha Womack are among six TVA employees nominated for the honor. Marjorie Parsons was named Ike Zeringue Engineer of the Year, the highest engineering honor TVA gives. The award was announced at the annual Engineers Week Awards Banquet in February.

"For over 85 years, TVA employees have been committed to improving life in the Tennessee Valley and those being recognized as engineers of the year exemplify the values and competencies and commitment to that mission. The future of TVA and its mission to serve the people of the valley is bright with employees like these," said Steve Douglas, vice president of nuclear engineering at TVA and College advisory board member.

Parsons, a 1998 UTC electrical engineering graduate, is senior program manager and North American Electric Reliability Corp. planning coordinator for transmission

and power supply. She has won three awards from the Southeastern Electric Reliability Council, a nonprofit that concentrates on maintaining reliability and efficiency in power systems across all or parts of 16 Central and Southeastern states.



TVA 2019 Engineer of the year, Marjorie Parsons, P.E., has a bachelor's degree in electrical engineering from UTC.

Denso Donates \$50,000 for Capstone Design Project

DENSO made a \$50,000 donation to fund the UTC Society of Automotive Engineers Baja Capstone Design project. DENSO representatives, including UTC alumnus Mark Bishop, attended a check presentation ceremony with students, faculty and staff at the UTC Engineering, Math and Computer Science building in August 2018. DENSO profiled Bishop internally with an associate spotlight. In the profile, Bishop credits programs like the SAE Baja with creating engineers who can problem solve, think creatively and manage their time. "It basically prepares them to step right into an organization and start contributing," Bishop said.



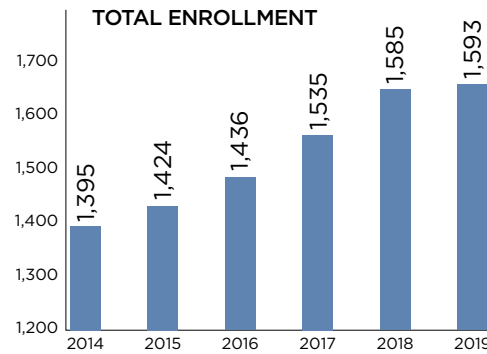
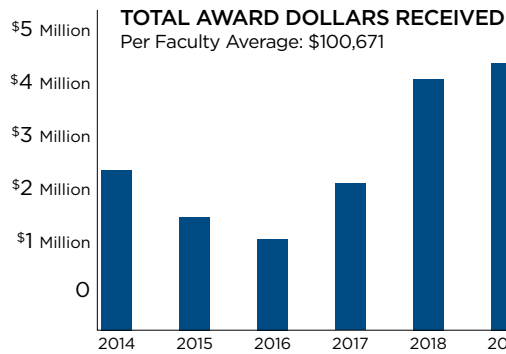
Volkswagen Awards \$15,000 to UTC Student Competitions

Volkswagen officials visited the College for a facilities tour in September and were introduced to student engineering projects including the chem-e car, rocket and baja car teams. The student teams explained their design process, recent successes and competition plans. Dean Daniel Pack accepted a \$15,000 commitment from Volkswagen from the company's communications manager, Amanda Plecas, for support of student competitions. VW has given the College \$160,000 since 2009 and this was the first gift since 2015.

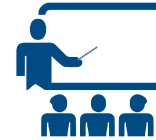


By the Numbers

2016-2018 Publication Outputs



NUMBER OF FACULTY AND STAFF
2018-2019

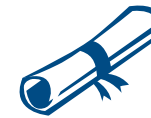


Faculty 54
Staff 22

STUDENT TO FACULTY RATIO

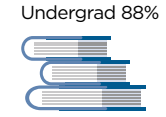
26:1

DEGREES AWARDED 2018



Bachelors 262
Masters 54
Doctoral 4

GRAD TO UNDERGRAD FALL 2018



Undergrad 88% Grad 12%

MALE TO FEMALE FALL 2018



Male 85% Female 15%

STUDENT DIVERSITY
FALL 2018

White 68%
(non-Hispanic)
Black, Asian,
American Indian,
Hispanic 32%



Degrees Offered

ENGINEERING

Bachelor of Science

- Chemical Engineering (B.S.Ch.E.)
- Chemical Engineering: Environmental (B.S.Ch.E.)
- Civil Engineering (B.S.C.E.)
- Civil Engineering: Environmental (B.S.C.E.)
- Electrical Engineering (B.S.E.E.)
- Mechanical Engineering (B.S.M.E.)

Master of Science (M.S.)

- Engineering: Automotive Systems
- Engineering: Chemical
- Engineering: Civil
- Engineering: Electrical
- Engineering: Mechanical

Ph.D. Programs

- Computational Science with concentrations in
 - Computational and Applied Mathematics
 - Computational Engineering
 - Computer Science

COMPUTER SCIENCE AND ENGINEERING

Bachelor of Science

- Computer Science (B.S.), with concentrations in:
 - Computer Engineering
 - Cyber Security
 - Data Science
 - Software Systems
 - STEM Education
- Computer Engineering (B.S.)

Minor

- Computer Science

Master of Science (M.S.)

- Computer Science with concentrations in
 - Computer Science
 - Data Science
 - Information Security and Assurance
 - Data Analytics

ENGINEERING MANAGEMENT AND TECHNOLOGY

Bachelor of Science

- Engineering Technology Management (B.S.), with concentrations in
 - Construction Management
 - Engineering Management
- Mechatronics Engineering Technology (B.A.S.)

Minor

- Construction Management
- Engineering Management

Master of Science (M.S.)

- Engineering Management with concentrations in
 - Construction Management
 - Engineering Management

CERTIFICATE PROGRAMS

Post-Baccalaureate Certificates

- **Computer Science:**
 - Biomedical Informatics
- **Engineering:**
 - Power System Protection
 - Smart Grid
 - Smart Power Distribution
 - Sustainable Electric Energy
- **Engineering Management:**
 - Construction Management
 - Fundamentals of Engineering Management
 - Leadership and Ethics
 - Logistics and Supply Chain Management
 - Power Systems Management
 - Project and Technology Management
 - Quality Management

Undergraduate Certificates

- Advanced Information Systems Security
- Information Systems Security

