

Kennesaw State University

CSMCONNECT

College of Science and Mathematics

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Star student overcomes homelessness to excel

CSMConnect is the College of Science and Mathematics (CSM) biannual newsletter designed to keep you informed of the latest activities and developments going on in the college. CSM values the networks developed with partners on and off campus. You are important in our network of partners. CSM provides students a high quality and innovative academic experience through our six minor programs, seven undergraduate degrees, and two masters programs. Students can create their own learning experience through provided tracks, research, and specialized courses. CSM is soaring into the next level of national prominence through cutting-edge research.



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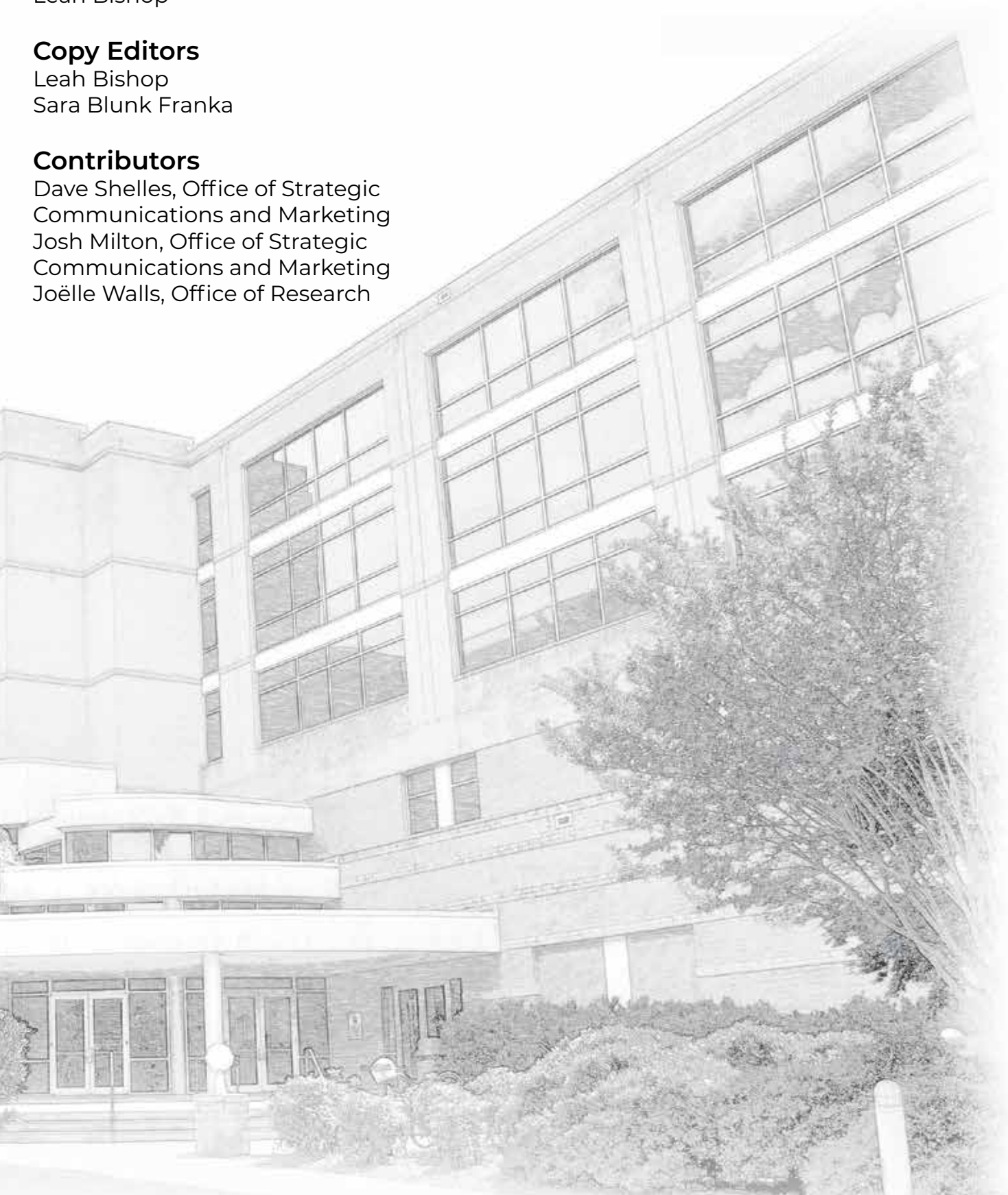
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College Briefs

Read the full article by clicking on the title.

Mushrooms & Microbiology

Kennesaw State University researchers Christopher Cornelison and Kyle Gabriel are exploring the possibilities of improving the food supply chain by leveraging technology to expand the opportunities for mushroom production in Georgia.

“We must be able to develop sustainable methods for producing readily preserved and nutritious foods without regional climactic limitations,” said Cornelison, an assistant professor of microbiology in the College of Science and Mathematics and director of the BioInnovation Laboratory at KSU.

“Mushrooms provide unique nutritional, medicinal and economic benefits, yet their demand still exceeds their supply,” added Gabriel, a research scientist in the BioInnovation Laboratory.

Biotechnology Entrepreneurship

Kennesaw State University had three student representatives participate in the summer I-Corps Bio-Entrepreneurship workshop, all of whom are working toward their master’s degrees in integrative biology. Morgan Woods, Azeeza Abdulrauf, and Lorenna Garcia-Bochas were all selected among applications from around the country to participate in this workshop, which was sponsored by the National Science Foundation, the United Negro College Fund, the Ernest E. Just Institute for the Life Sciences, the Biotechnology Innovation Organization (BIO), The California State University I-Corps, University of New Hampshire I-Corps, and Massachusetts Institute of Technology I-Corps.

Developmental biologist receives NSF grant

Kennesaw State University professor Anton Bryantsev has received a grant from the National Science Foundation to study organization of the cell nucleus.

The grant, more than \$400,000 over three years, will help fund Bryantsev’s research focused on making gene manipulations safer and more efficient while also examining how proteins concentrate in isolated bodies within the nucleus of a cell.



KSU lab seeks animal answers for human challenges

It turns out humans can learn something from animals when it comes to engineering.



A laboratory in Kennesaw State University’s College of Science and Mathematics focuses on how animals negotiate complex water flows to help humans in their design of vessels such as autonomous underwater vehicles and propulsive systems that can navigate unsteady flow environments, like rainfalls or rivers.

“We’re interested not only in how nature solves problems through the process of natural selection, but in how we might learn from that to improve engineering designs,” said professor of biology Christopher Sanford. “By looking at how fish swim and how natural selection might have improved swimming efficiency and movement, we can help rapidly advance how robots move underwater in challenging environments.”

2020-2021 CSM Distinguished Awards

We are proud to announce the 2020-2021 CSM Distinguished Award recipients:

Outstanding Early Career Faculty Award - Dr. Marco Guzzi, Assistant Professor of Theoretical Particle Physics

Outstanding Research and Creative Activity Award - Dr. Jianming Wen, Assistant Professor of Optical Physics

Outstanding Teaching Award - Dr. Jennifer Vandebussche, Professor of Mathematics

Distinguished Staff Award - Leah Bishop, Marketing & Communications Specialist



KSU Celebrates Birla Carbon Scholars

Kennesaw State University senior Basirat Olorunlambe’s research on the use of bacteria to reduce infections from MRSA, an infection caused by drug-resistant Staphylococcus bacteria, in healthcare facilities, won the top award at the College of Science and Mathematics Birla Carbon Symposium. The annual event recognizes 11 student scholars and their research.

“Our Birla Carbon Scholars reflect the depth and breadth of undergraduate research opportunities available in the College of Science and Mathematics, as well as the

dedication and expertise of their faculty mentors,” said Kojo Mensa-Wilmot, dean of the College of Science and Mathematics. “I congratulate all of the scholars for their outstanding accomplishments.”

The 11 scholars were chosen based on the recommendations of College of Science and Mathematics faculty members, submission of an undergraduate research project abstract, and a GPA of 3.0 or higher. Recipients worked with their sponsoring faculty members on their proposed research projects in five different departments within CSM.

The 2020 Birla Carbon Scholars, their majors and their mentors are:

Scholar	Major	Faculty Mentor
Soobin An	Biology	Anton Bryantsev
Preston Eldridge	Biochemistry	Thomas Leeper
Oliver Erasmus	Chemistry	Christopher Dockery
Ian Foster	Physics	Kisa Ranasinghe
Gracyn Jewett	Physics	David Joffe
Ansa Malik	Biology	Jonathan Lyon
Pavan Mayinampati	Mathematics	Glenn Young
Basirat Olorunlambe	Biochemistry	Ramja Rajagopalan
Abeer Osman	Biology	Jonathan McMurphy
Minh Vo	Biochemistry	Michael Stollenz
Brittney Vosper	Biochemistry	Rajnish Singh

Since 2014, funding provided by Birla Carbon, a worldwide chemical manufacturer, has allowed 72 Birla Carbon Scholars to participate in research opportunities. In 2019, Birla reaffirmed its commitment to the program by extending the agreement for another five years and adding \$275,000 to the commitment. Terence Norman, director of human resources at Birla Carbon, said the company looks forward to this event every year to showcase young scientists.

“Our Birla Carbon/Kennesaw State partnership continues to provide a platform for deserving STEM majors to conduct summer research and development,” he said. “Although the 2020 program was delayed and redesigned, the most important facet of the program was successfully achieved. Each scholar completed many hours of research and presented their results via virtual presentations. Congratulations to the 2020 Birla Scholars for displaying exceptional dedication, perseverance and stamina.”

Normally, the experience takes place over 10 weeks in the summer, but the coronavirus pandemic shifted the students’ research to the fall. The pandemic also rendered the annual symposium a virtual event in spring semester, a change from the poster presentation that typically takes place at the beginning of the fall semester.

The Birla Carbon Team judges awarded Olorunlambe, who works in the laboratory of assistant professor of molecular and cellular biology Ramja Rajagopalan, for her research project, titled “The Antibiotic-Resistant Bacteria Crisis: Overcoming Methicillin-Resistant Staphylococcus Aureus (MRSA) by Myxobacterial Predation.” She said Dr. Rajagopalan helped her find a focus for her project that sparked her desire to positively impact the medical community worldwide.

“My research centers around separating wild-isolate strains of a unique predatory bacterium called Myxo, which is found in soil, and using its distinctive ability to dissolve other bacteria to successfully prey on the pathogenic MRSA,” said Olorunlambe, a biochemistry major. “The goal is for this project to lead to more effective antibiotics to be used for treating severe infections caused by MRSA in healthcare facilities.”

Along with the \$4,000 stipend each scholar received, Olorunlambe received an additional \$2,000 in travel funds to present her research at a national or regional conference of her choice. She said she expects those conferences to take place virtually, and she’ll make her presentation this summer.

About Birla Carbon:

Birla Carbon is the world’s largest producer and supplier of carbon black additives, which are used to make everything from tires to plastics, from paints to electronics. A flagship business of the \$45 billion Aditya Birla Group, the multinational conglomerate based in Talaja, India. Birla Carbon’s Technology Laboratories are located in Marietta and Talaja, India.

Research with Relevance highlights CSM Research

With an emphasis on research with relevance, KSU's research portfolio is varied and far-reaching, leading to new knowledge and discoveries by faculty and hands-on opportunities for students. [Research with Relevance - Friday Features](#), an interactive web series produced by the Office of Research, gives an inside look into the varied research and scholarly activities taking place within Kennesaw State University. Check out the episodes featuring faculty from the College of Science and Mathematics.

Click the webshow title to learn more about the faculty member's research and view their talk.

Insects: From the Sidewalk to the Moon



Dr. Clint Penick, assistant professor of biology in the Department of Ecology, Evolution, and Organismal Biology, discussed his research focused on the evolution and ecological success of social insects such as ants and bees. Pound for pound, social insects and humans make up the largest animal biomass on dry land and occupy nearly every terrestrial ecosystem.

To understand the traits that have facilitated this success, Dr. Penick's research takes an integrative approach that combines techniques in ecology, physiology, behavior, and evolution. He and

his team have worked with a broad variety of species from ecosystems that range from remote tropical forests to the sidewalks of New York City.

Costly Care and Cooperation in an Uncertain World

Dr. Sarah Guindre-Parker, assistant professor of biology in the Department of Ecology, Evolution, and Organismal Biology, and Dr. Glenn Young, assistant professor of mathematics in the Department of Mathematics, discussed their interdisciplinary project focused on how animals – in this case superb starlings of east Africa – cope with challenges in their environment. The researchers are studying how the superb starlings use the arrangement of cooperative breeding in which animals come together to help raise offspring that are not their own.



What the flux? How First Principles Rule from the Alpine to the Tropics



Dr. Mario Bretfeld, assistant professor of biology in the Department of Ecology, Evolution, and Organismal Biology, discussed using a first-principles approach to research which enables scientists to test and predict plant physiological processes in vastly different biomes and across different spatial scales, from cells to ecosystems. At the KSU Field Station, he and his research team are using a first-principles approach to compare the thermo-biological properties

of organic and conventional tomatoes in order to better understand the impacts of growth conditions on the shelf life of tomato fruits.

As a plant ecophysiologicalist, Dr. Bretfeld studies how plants function in order to understand where they grow and how they interact with one another and the environment. His work integrates ecology and physiology of individual plants and vegetation communities at different spatial scales with the goal to optimize management of natural landscapes and their ecosystem functions.

How to Bid for a Better Auction

Dr. Brett Katzman, a professor of economics in the Michael J. Coles College of Business, and Dr. Sean Ellermeyer, a professor of mathematics in the College of Science and Mathematics combined forces to fix one of the largest auctions in history.

Dr. Ellermeyer, who also serves as chair of the Department of Mathematics, conducts research in the areas of differential equations, dynamical systems, mathematical modeling and more recently, game theory and auction theory.

Auctions are used to sell goods and procure services world wide. Auction theory has been developed as a branch of economics to study bidding behavior and auction design by applying game theory. The research of Dr. Katzman and Dr. Ellermeyer uses auction theory to identify fatal flaws in the largest auction ever conducted: the multi-billion dollar Medicare auction.



Star student overcomes homelessness to excel



To say Kennesaw State senior Carrie Lyn Barron has a lot of irons in the fire is an understatement.

Among those who know her, the most popular observation is “I don’t know how she does it.”

Barron, a non-traditional cellular, molecular and developmental biology major and student in KSU Journey Honors College, works in the lab of professor of biochemistry Jonathan McMurry, works two jobs and cares for her husband, Jay, who has autosomal dominant polycystic kidney disease (ADPKD). She donated a kidney to him in 2014. Complications and expenses from the disease and resulting treatments cost the couple their house, and they lived in their car for a year and a half. With support from Kennesaw State’s Campus Awareness, Resource and Empowerment (CARE) Services, the couple now have a stable place to live. Barron, scheduled to graduate on time in the spring, has her eye on completing a doctorate in molecular biology.

Barron’s answer to those observations is simple: “I can’t not do this.”



Carrie Lyn grew up in Burley, Idaho, a small town where she said girls were not encouraged to pursue higher education. The constraints of the place eventually got to her. So when Jay visited family in Idaho, he talked then-19-year-old Carrie Lyn into a date and proposed soon afterward. They married three months later—on the condition that they leave Burley. Shortly thereafter, the two moved to the Southeast, near his father and stepmother.

Eventually, Jay showed symptoms of ADPKD, a genetic disorder in which cysts form in the kidneys. Carrie Lyn said the disease ran through his family, so it was only a matter of time before it manifested in Jay. He eventually needed a kidney transplant, which happens in about half of ADPKD patients. In January 2014, Carrie Lyn donated a kidney for the transplant.

Renowned transplant doctor Christian Larsen of Emory University, who handled Jay's father's transplant, also operated on Jay. Carrie Lyn impressed Larsen with her curiosity, and he suggested she go to college.

All the while, Carrie Lyn hit the books and the internet, devouring any information she could find on ADPKD. She consulted YouTube channels, encyclopedias and scholarly journals. The doctors treating Jay were impressed enough with her diligence to insist she go to college, so she did, for the first time at age 37. But she had to drop out to work and care for Jay, though her love of learning never abated.

"I pushed the desire to learn aside, but it sparked up again when Jay got sick and I started doing all that research," she said. "I remembered how good it felt to learn things and then to have conversations with doctors and researchers, how it felt to be valued."

Jay's younger half-brother Daniel spoke highly of KSU, where he earned his degree and where Carrie Lyn enrolled for the fall semester in 2017, taking a full course load as she has done each semester since—including summers.

The ongoing medical issues left the Barrons devastated financially, and they lived in their car. When she confided in a professor that she was unsure of her housing situation, they recommended she approach CARE, where she met director and founder Marcy Stidum.

"She was always forthcoming about her academic and personal goals, humble regarding her academic capabilities, but we had to pull it out of her how badly she needed our help," Stidum said. "Carrie Lyn insisted she was OK, and was always thankful for the



pantry resources. She felt like someone was worse off than her, so it took a while for her to allow us to help find the right resources to meet all of her needs.”

Carrie Lyn said she had resolved in her mind to just get through her undergraduate years homeless before earning a spot in a Ph.D. program, which would carry a stipend that could pay for housing. Last summer, a CARE donor who owns an apartment complex offered to move the Barrons into an apartment for the 2019-20 school year, and then renewed the lease for the current school year, allowing the Barrons to save money before she moves on to graduate school.

Fully engaged with her studies, Carrie Lyn joined the research team in McMurry’s lab in March 2019 and immediately rose to the top.

“Carrie Lyn has by far the most specific research interest I’ve ever seen in an undergraduate, for obvious reasons,” McMurry said. “She has jumped into research with both feet and not looked back. The skills she’s learning—protein purification, tissue culture, confocal microscopy—will transfer to her chosen field, and she understands that, which probably explains why she has so much passion for what we’re doing.”

Stidum said Carrie Lyn has become an ambassador for CARE.

“She’s grown in her self-confidence,” Stidum said. “She sets the bar high and knows she can achieve her dreams and understands that she has a lot of people in her corner. But also, she has grown in her willingness to share her ‘CARE Story’ to help other KSU students like her get help from CARE, too.”

In the classroom and in the lab, Carrie Lyn has continued to excel. She will complete a Capstone project on cell-penetrating peptides this fall. She was set to present at the National Council for Undergraduate Research in spring 2020, and had lined up a summer internship at Cambridge University in England to study with renowned microbiologist Gillian Fraser, but COVID-19 scuttled those plans.

As for Jay, Carrie Lynn said that her husband is doing as well as he can. He has good days and bad days, draining off a pint of excess blood every six weeks, taking various medications and meeting regularly with physicians.

Nothing will keep Carrie Lyn from earning her doctorate and bringing the world closer to a cure for ADPKD. Her team of mentors collectively is confident she’ll achieve her goal, and so is she.

“I’m very excited to go to grad school. That was something I wanted from the start,” she said. “I didn’t know how I would get there, but I knew I would. After that first taste of education I knew I wanted to get my Ph.D. and that I’d figure it out along the way. Now it’s real.

“You know how deep down in your bones you know you’re in the right place in the right moment doing the right things? That’s what it feels like when I’m in the lab. I’m doing what I’m meant to do. And I want that feeling to last.”



“After that first taste of education I knew I wanted to get my Ph.D. and that I’d figure it out along the way. Now it’s real.”



Growing Education

Student learning experiences are enhanced by contributions provided to the college to support our student scholarships; improve the margin of excellence; and support research endeavors and professorships to help Kennesaw State University provide a strong environment for recruitment and retention of promising faculty.

For philanthropic opportunities, contact Jada Marcum, CSM Senior Director of Development at jmarcum@kennesaw.edu or call 470-578-6877. Visit giving.kennesaw.edu for more information.

To donate to the college, visit bit.ly/GivetoCSM.

KSU alum finds success at Equifax

Only months after earning a degree in computational and applied mathematics, Jessica Reyes is making waves in the data science industry and giving back to the academic program that set her on her path to success.

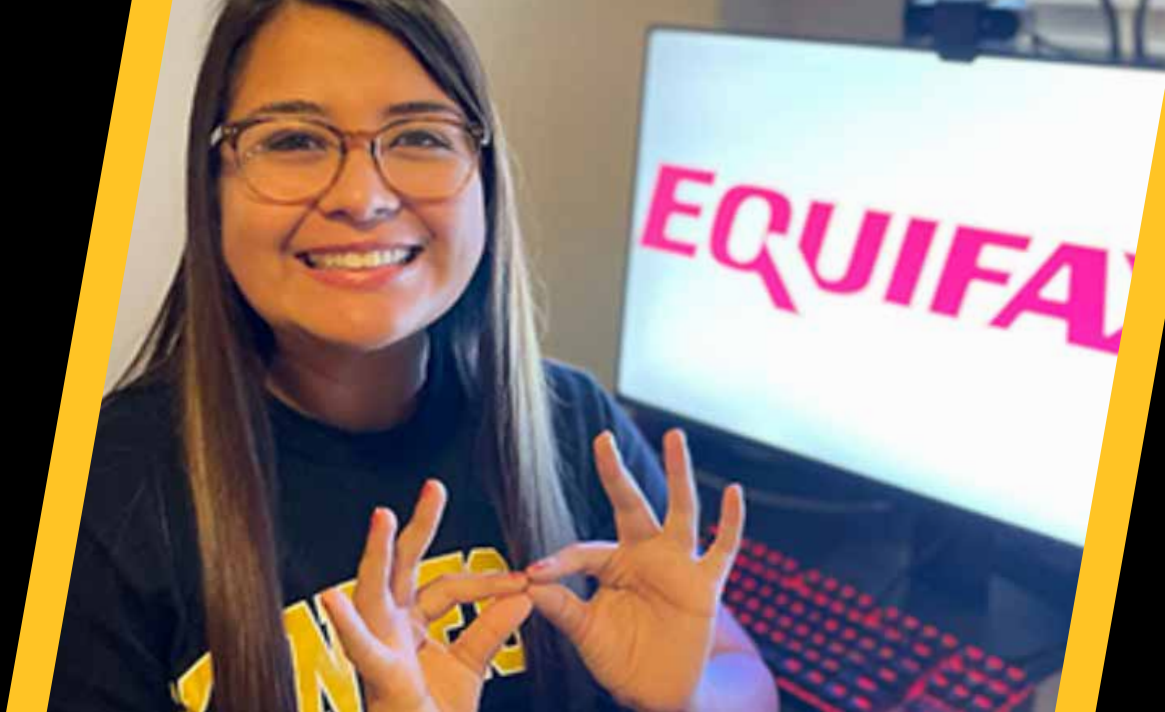
As a data scientist at Equifax, Reyes leverages her skills in data and analytics to understand financial lending trends in mortgage and auto industries and to provide her clients with sound decision-making.

She participates in the company's Rotational Development Program, a two-year transitional program for students who just graduated from college that allows them to attend training sessions and ask executives questions while also being exposed to several different teams at the company.

"I really like the program because I'm learning about the company and data science industry from people who are really experienced," Reyes said.

Although Reyes has only worked at Equifax for a few months, she has already found ways to apply her research studies in her professional life. Last month, a research paper she coauthored with her peer, Maharshi Pandya, was presented at the Institute of Electrical and Electronics Engineers' (IEEE) Big Data Conference, describing the data science project they finished during their 2019 IBM internship. The paper focused on how to extract key information from documents that load into a recommendation system comparable to that of Facebook or Netflix that generates news articles or movie suggestions relevant to the user.

"Attending conferences outside of work allows me to continue to learn from people and share knowledge so that I can go into my job and be that much better at what I do," Reyes said.



Reyes is now leveraging her professional success, giving back to the University by mentoring students who are in the same position she was in just four years ago. A first-generation college student, Reyes credits her success to her mentors at KSU who inspired her and helped land her job, ultimately influencing her decision to return. Recently, she assisted with a virtual open house hosted by the College of Science and Mathematics, where she shared her experience at KSU and answered questions from prospective and current students.

“It was such a great experience to virtually share my experience at KSU and have that window for aspiring or current KSU students to reach out to me if they had any questions or take my advice,” Reyes said. “Not having experience with higher education before, my outlook is brand new, and now that I’m removed from the university, I can serve as a success story and help students power through and achieve what they want to achieve.”

Reyes first caught the advising bug during her junior and senior year at KSU, when she attended the First Gen Owls club and was a student mentor for a Coca-Cola First Gen Scholars event, where she answered questions and had conversations with first-generation freshmen about internships, resources and networking. When her younger brother’s friends began asking for her advice regarding the University, she made it her mission to offer the same support to incoming students at KSU.

“I help because I’ve been there before,” said Reyes. “I remember vividly going through the university and experiencing everything for the first time. The support I’ve received from my mentors pushed me to provide that same support to students so they don’t feel as alone. I want them to feel confident about what they want to do after college and know it’s attainable.”



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