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Spring 2021

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The Investigator

RESEARCH MAGAZINE

SPRING 2021

Kennesaw State University

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Kennesaw State University

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On the Cover

RETURNING HOME TO KSU

Carl Saint-Louis in the College of Science and Mathematics and Karen Armstrong in the Wellstar College of Health and Human Services attribute their undergraduate days at KSU to helping prepare them for their respective careers. Now they are back as faculty to pay it forward!

FEATURES

DEPARTMENTS

from the OFFICE OF RESEARCH

Dear readers,

Our world has changed significantly. We have had to adapt to new teaching and learning modalities as well as develop enhanced research safety protocols in response to the coronavirus pandemic. Throughout this process, the Office of Research has worked with the colleges' assistant/associate deans of research to ensure the health, safety and well-being of our KSU research community. When we began to shelter in place in mid-March last year, we immediately implemented guidelines in which on-campus routine research activities, including undergraduate research, were stopped. Only projects deemed critical were maintained with institutional approvals, including work with graduate students. We moved into another phase over the summer when research personnel returned to campus following our workplace and health safety guidelines, including hygiene and social distancing procedures. Our fall research protocols brought back in-person human subjects research and projects with undergraduates.

Although 2020 was an unusual time, we have experienced incredible gains in research productivity thanks to the ongoing efforts of our faculty, staff and students. The number of research proposals submitted increased over this time period relative to the previous year, which demonstrates the perseverance, flexibility and creativity of our faculty. They were able to take this time to apply for external funding and publish their research papers.

The Office of Research saw an opportunity for increased engagement with the spring 2020 launch of a virtual show called "Research with Relevance – Friday Features," in which we spotlight the interdisciplinary work of various KSU researchers. The Office of Undergraduate Research and the Office of Research Development and Strategic Initiatives also successfully transitioned their programming to an online format.

Pandemic or not, KSU's researchers have remained dedicated to continuing their scholarship and providing our students with outstanding research experiences. We invite you to discover the many ways in which they have excelled in this issue of The Investigator.

Sincerely,

PSCorso

Dr. Phaedra Corso, Vice President for Research

Dear readers,

We are proud to present the spring issue of The Investigator and share with you the expansion of diverse research and scholarly activities occurring at Kennesaw State. Although this year was met with challenges, KSU's research enterprise has thrived and grown.

In this issue, Pamela Whitten discussed the establishment of the Interdisciplinary Innovation Initiative, an internal funding program to spur new collaborations focused on KSU's research themes. And alumni Carl Saint-Louis and Karen Armstrong, featured in our cover story, have returned as faculty to mentor the next generation.

This publication would not have been possible without the visual aesthetics of the creative services team and the diligent editorial contributions of undergraduates Dorothy Corbett and Jacob Segura and of volunteers Emily Berreth, Heather Hankins, Travis Highfield, and Kaelyn Ireland.

Happy reading!

Joëlle Walls

Joëlle Walls, Editor

PAYING IT FORWARD

Researchers return to alma mater to mentor the next generation

By Joëlle Walls

You can't be what you can't see.

Growing up in Haiti as a child, Carl Saint-Louis aspired to be just like Professor X, his favorite character on the animated television series *X-Men*.

"I told my father when I grow up, I want to be Professor S (with more hair) and have a laboratory with my own X-Men team," he said. "My father replied, 'If you believe in yourself and work hard, it will happen.'"

Fast forward a couple of decades, and now Saint-Louis has achieved his goals, building his own research team as an assistant professor of organic chemistry. His journey began at the university as an undergraduate.

"It's not easy being a first-generation college student because there is no blueprint for attaining success," Saint-Louis said. "I was just following the template like everyone else and was fortunate to meet a couple of friends along the way who helped me and guided me."

His career trajectory changed when he took an introductory organic chemistry course with Daniela Tapu, professor of chemistry, who later became his mentor.

"The way Professor Tapu taught, connecting the concepts to relatable examples made it more accessible to the general audience," he said.

After successfully completing Tapu's course, Saint-Louis joined her research lab, which focused on carbenes. They have played an important role as transient intermediates in organic chemistry ever since their first firm evidence of existence.

Saint-Louis' undergraduate research experience allowed him the opportunity to present his research at different conferences such as KSU's Symposium of Student Scholars and the American Chemical Society's Southeast Regional Meeting.

During his third year, he was selected to participate in a Research Experiences for Undergraduates program at The University of Alabama in Tuscaloosa, where he then returned to earn his doctorate degree in chemistry in 2015 and obtained a patent for his research.

"Professor Tapu was and continues to be an inspirational mentor," he said. "I don't think I would have been so successful in the summer research program without the lab experience and skills I gained at KSU, which propelled me on to pursue a Ph.D."

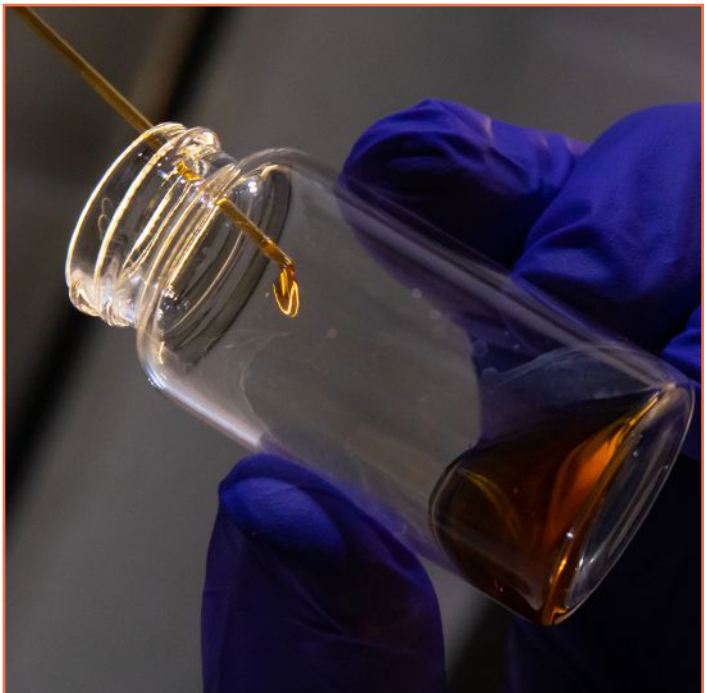
Saint-Louis' teaching style is mainly influenced by Tapu and chemistry professors Carol Chrestensen and Kevin Gwaltney. Gwaltney's upper-level organic spectroscopy course also prepared him to dive into research upon starting graduate school.

"One of the mottos that I follow is Marian Wright Edelman's 'you can't be what you can't see,'" he explained. "Being exposed to an academic research environment at KSU made me realize that I, too, can be a professor and have my own laboratory in the future."

Saint-Louis was also a postdoctoral associate at the University of West Florida, mentoring 12 undergraduates and publishing several research papers on the discovery and characterization of new fluorescent organic materials. He also published a book chapter while working at The University of Alabama at Birmingham.

Saint-Louis is now back at KSU leading projects involving undergraduate students funded by the College of Science and Mathematics' Mentor Protégé Research Program.

"Looking back at my past experiences and the mentorship I received at KSU influenced me by laying the foundation for becoming an assistant professor," Saint-Louis said. "My goal is to do the same for KSU students."



Find Your Passion, Find Your Destiny!

When Karen Armstrong migrated from Jamaica to New York, her dreams of becoming a medical doctor transitioned toward another career of finance and strategic management. She matriculated at Hunter College (City University of New York) as a pre-med major but later changed her life's course when she relocated to Georgia. There, she decided to embark on her nursing career.

This move proved serendipitous in defining Armstrong's path to a successful clinical, teaching, research, and leadership career in nursing. She attributes her undergraduate days at KSU to preparing her, which influenced her decision to return this past fall as a tenure track faculty member in nursing.

"Upon my relocation, I spoke to a good friend who had just graduated from the nursing program. She spoke so highly of it that I enrolled in the university, which was a really good start for me," she said.

Armstrong completed the prerequisites and easily fulfilled the requirements for a psychology degree. She immediately completed the graduate certificate in gerontology and learned of the accelerated program option in the Wellstar School of Nursing for those who already had a bachelor's degree.

"Since I always had a scientific background with emphasis in math, chemistry and biology, it made sense for me to combine both fields to become a well-rounded health care practitioner," she said. "I discovered my passion for research while completing my psychology degree, which has defined the way I conduct research today."

Armstrong began Honors research on the stigma of mental health under the guidance of the late Steven Walfish, a visiting professor of psychology. She gained a love of biostatistics, which she consolidated in collaborative research encompassing cardiovascular health disparities, neurology, palliative care, and oncology with a nexus of medication adherence and health literacy.

Armstrong also credits KSU nursing professor Marie Bremner, who recently retired, as a lifelong mentor and friend. They bonded during Armstrong's clinical rotations and have kept in touch since then, with Bremner inviting Armstrong to guest lecture and teach the research methods course.

"It's been so wonderful to have mentors like Dr. Bremner," said Armstrong. "When I reached back out to her recently, she spoke of KSU opportunities that I should consider. It was a good time for me to transition and one of the best decisions I made."

Armstrong has also earned a master's degree in gerontology and a doctorate in nursing from Georgia State University as well as a master's degree in public health from Emory University. She has served in roles such as dean of nursing at Gwinnett Technical College and as a research program director at Emory University.

One of Armstrong's KSU goals is to collaborate with Honors students on research projects this upcoming summer. She is currently teaching a research methods course with the intention of having her students present at a local or national conference. She will also chair thesis research committees for nursing candidates.

"I love mentoring and collaborating with students," she said. "With the plethora of opportunities available, I am ready to delve in and help my students reach their career goals."

UNPRECEDENTED YEAR

Office of Research adapts to carry on initiatives

By Dorothy Corbett

In an unprecedented year, Kennesaw State University students and faculty were able to adapt to the many changes necessary to maintain a safe on-campus experience, but they exceeded expectations by continuing to produce high-quality research and scholarship throughout the year. The Office of Research successfully maintained and launched programs to enhance and highlight the work of these initiatives.

Interdisciplinary Innovation Initiative

Led by the Office of Research, the Interdisciplinary Innovation Initiative (I^3) grant program was created to serve as a pathway for faculty in pursuing novel research that will support current research strengths in order to competitively apply for external funding. This internal funding opportunity also encourages interdisciplinary collaboration surrounding KSU's four broad research themes - Biomedical and Health Services, Computing and Technology, Human Development and Well-Being, and Sustainable and Safe Communities.

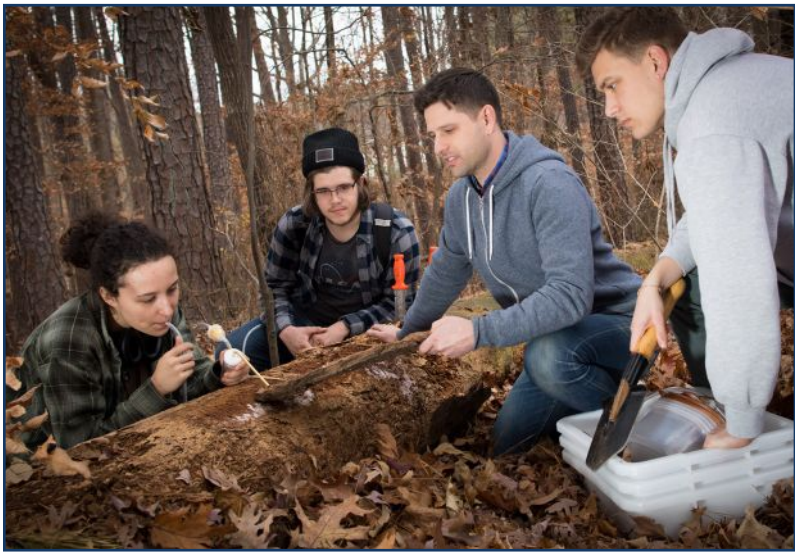
"Funding agencies require a very collaborative perspective, because faculty members achieve more with their research by working together," said Evelina Sterling, director of research development and strategic initiatives. "Kennesaw State is interested in solving complex problems that require complex solutions, and that is only possible when you cross those disciplinary boundaries."

Five teams were chosen in August to receive between $50,000 and $75,000 from the Kennesaw State University Research and Service Foundation to address key issues within the themes. I^3 scholarly teams are conducting research in postpartum health and well-being, microplastics and the environment, preparedness of military trainees, machine learning, and Omega-3 fatty acids for disease prevention.

Research with Relevance Series

In spring 2020 the Office of Research successfully launched "Research with Relevance - Friday Features," a one-hour webcast streamed live that showcases the varied research being conducted by KSU faculty members. The series was launched as an adaptive solution to increase community engagement during the coronavirus pandemic.

Since its inception, 16 installments have been released and enjoyed by viewers. Previous episodes have included



The Research with Relevance series showcases varied research endeavors at KSU.

a wide range of topics from research on improving transgenerational health to studies on the evolution and ecological success of social insects such as ants and bees.

Tune in live for the current spring season or catch up on previous shows by visiting: **https://bit.ly/KSUResearchwithRelevance**.

Cayuse Implementation

The Office of Sponsored Programs Administration began implementing Cayuse last summer, a new comprehensive grant management system that will ensure a seamless operation between pre- and post-award services. The grant management system allows the university to keep a record of proposals and awards through a database and have access to electronic internal routing that streamlines the submission tracking process.

> **Kennesaw State is interested in solving complex problems that require complex solutions, and that is only possible when you cross those disciplinary boundaries.**
>
> Evelina Sterling

"Overall, Cayuse will make research processes more productive and efficient with many benefits for the principal investigators involved," said Carolyn Elliot-Farino, director of pre-awards. "It will also significantly enhance our ability to be in compliance with various regulations."

Additionally, Kristine Nowak, director of research compliance, expressed that using Cayuse with the newly launched conflict of interest module will simplify the process of maintaining ethical standards. This includes researchers now being able to use Cayuse when submitting applications about activities involving human subjects to KSU's Institutional Review Board (IRB).

The First-Year Scholars Program has grown dramatically in its second year.

"Because we're already storing the sponsored programs module on Cayuse, the software will help link information between a funded study and the IRB while making document revisions between faculty and the board more efficient," said Nowak.

First-Year Scholars Program

The First-Year Scholars Program is an initiative through which first-year students are introduced to undergraduate research by serving as apprentices to faculty mentors for yearlong research projects. The program began with just 10 students in 2019, but this year's cohort has increased to over 70 first-year students.

"The Office of Undergraduate Research is committed to making sure that students are provided opportunities for early, sustained involvement in research," said Amy Buddie, director of undergraduate research. "We hope to continue the First-Year Scholars Program and work to improve programming at every level of coursework in order for students to maintain their momentum in research through their senior years."

Future goals include expanding peer support for participants and creating new activities that will encourage them to continue research even after the program ends.

DUAL ROLES

DEANS ENGAGED IN RESEARCH

ANDREW PAYNE

Architect Researcher and Spatial Designer

By Jacob Segura

Andrew Payne, who joined Kennesaw State as the dean of the College of Architecture and Construction Management in January 2020, brings a mixture of industry and research expertise to his position that he hopes to incorporate into the college.

"Kennesaw State is already well-known across the Southeast for the quality of its graduates, and I am overjoyed to play a role in supporting our faculty and staff in bolstering this first-class educational experience for our students," Payne said. "With the ever-growing necessity for construction for new industry or new homes, professional architects and construction managers remain in demand. It is my goal to ensure KSU is at the forefront of meeting that economic need."

Payne received his undergraduate and graduate degrees at North Carolina State University. During this time, he also served as a teaching and research assistant, which prepared him for his later academic career at Savannah College of Art and Design and Indiana State University.

"I became a designer because I have always appreciated building designs," he said. "I was very interested in architecture. Engineering and art were my main interest areas in high school when I was exploring career options, and those combined made architecture an obvious choice."

Payne has also held a variety of professional positions in architectural firms in the Southeast. Through this experience, he has learned that observing how people interact with a built environment can affect the way they feel when occupying that space. That is why his research area of focus includes universal design, particularly when considering the accessibility of buildings for people with a range of abilities.

"For example, my dissertation research focused on which combination of sidewalk construction materials are best detectable, identifiable, and able to be used in way-finding by visually impaired users," said Payne. "Way-finding and accessibility is a major problem that everybody contends with at some point when dealing with architecture."

Payne explained further that way-finding is about finding your way, specifically in the context of navigating a building. This is typically addressed using signage and graphics.

Now as dean, Payne wants to bring these professional experiences into the curriculum, research opportunities, and practical experiences for students. Payne aspires to bridge the present research gap between the disciplines of architecture and construction management. To him, it does not make sense to keep the fields of research separate when the two disciplines will ultimately affect one another.

"The built environment is bigger than just architecture and construction management," Payne said. "I think we can do a lot of great research by mixing and matching the units that we have within the college."

With this philosophy in mind, Payne is striving to create new collaborative research courses between architecture and construction management, find ways to have faculty share teaching loads between departments, and seek funding from outside sources to further strengthen the college's research efforts.

"What I most enjoy about research is the brainstorming and problem-solving," he said. "Providing opportunities to do that in a collaborative environment will better prepare our students for whichever field they choose in the architecture or construction management industries."

KOJO MENSA-WILMOT

Multidisciplinary Cellular Biologist

By Dorothy Corbett

"It is a lifestyle! My research feels like a journey into space - of exploration to convert reasonable speculation either into fact or fiction. The thrill involved in that journey explains why I continue this work, despite persistent failures along the way," said Kojo Mensa-Wilmot, dean of the College of Science and Mathematics (CSM) and professor of molecular and cellular biology.

He has held many titles ranging from world-renowned cellular biologist to passionate educator, so when he was appointed dean in February 2020, he knew it wouldn't stop his research.

"An important immediate goal is getting more federal funds into CSM to support the extraordinary growth of our university, and I choose to contribute directly to that goal. A deanship isn't going to stop me from achieving that objective," he said.

Mensa-Wilmot has already written three grant proposals to the National Institutes of Health since August when he began his tenure at KSU. He studies human African trypanosomiasis, a disease found in sub-Saharan Africa caused by the single-celled organism Trypanosoma brucei. By studying the pathogen, he will translate his data into efforts for drug development that could impact the nearly 60 million at-risk people.

"I teach my students that as scientists we must learn how to fail, in style; 90% of our projects do not produce results that we want, thus offering a chance for innovative explanations and new directions in research," he explained.

"You have to ask whether the problem you are trying to solve is important enough to expose your emotions in persistent failure and frustration," he said. "We cannot romanticize research. The process is painful, despite the joys accompanying our numerous successes."

For him, solving a problem that people are facing while balancing dean responsibilities is worth that risk of failure. Studying something with a meaningful application drives him to pursue an unusually high workload, but he thrives when given a challenge.

"Every project is a challenge because I am always attempting to solve a new problem whose answer has real-life value, relevance and impact," he said.

Mensa-Wilmot's cellular biology research will serve as a foundation for treating trypanosomiasis and other diseases caused by related parasites. After testing new compounds on the cultured parasite cells in vitro, his team will evaluate the compounds in a mouse model of the disease caused by trypanosomes. He is excited for the future of his research at KSU because the university's first facility for working with mice will be constructed by summer's end.

Mensa-Wilmot earned his B.S. degree from the University of Ghana and his Ph.D. in biochemistry and molecular biology from Johns Hopkins University's School of Public Health. He previously served as department head and professor in the University of Georgia's Department of Cellular Biology.

Mensa-Wilmot is now developing plans to expand academic programs for graduate students and to promote faculty research endeavors.

"First, we need to strengthen research productivity. Second, we need to develop the Ph.D. program in CSM," said Mensa-Wilmot. "A committee is helping me design programs that will strengthen current faculty research initiatives and hire new faculty who can establish strong research programs at KSU."

INVESTING IN FACULTY RESEARCH

By Dorothy Corbett

Summer program offers professional development in grant writing

The Summer Research Fellows Program is an annual intensive professional development and mentorship program hosted by the Office of Research that aims to help faculty members successfully apply for research grants. The program launched in summer 2019, and several participants from the initial cohort found tremendous success in receiving funding over the last year through entities like the National Science Foundation (NSF) and the National Institutes of Health (NIH).

"Given the fact that we are an emerging R2 institution with a growing need for external funding, we saw the need to provide faculty with specific training and resources around writing competitive grant proposals that will ultimately add to the resources and community that KSU can provide," said Evelina Sterling, director of research development and strategic initiatives.

Research that Resonates

Ayse Tekes, assistant professor of mechanical engineering in the Southern Polytechnic College of Engineering and Engineering Technology, received a three-year $297,262 NSF award in September 2020, along with co-principal investigator Tris Utschig, director of scholarly teaching in the Center for Excellence in Teaching and Learning. The award supports the implementation of student-created 3D-printed laboratory equipment in lecture and laboratory courses for dynamics, vibrations, machine design, and control theory. The grant was Tekes' first award as principal investigator, and she attributes much of her success to the mentorship she received through her participation in the program.

"The most exciting thing from the program was when the coordinators brought in two faculty members who had already received NSF and NIH funding. They shared their experiences for nearly two hours and provided useful insight into the reviewing process for each grant," she said.

Tekes is grateful that the grant has provided her the resources to expand opportunities for her students by purchasing necessary equipment, sending undergraduates to present research at prestigious conferences and allowing her to hire a graduate research assistant.

Nurturing Transgenerational Health

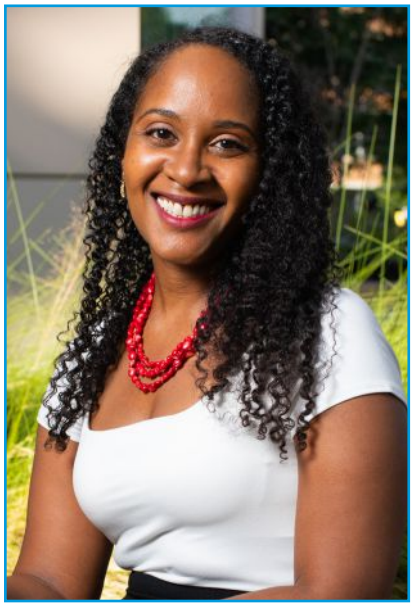
Katherine Ingram, associate professor of exercise science in the Wellstar College of Health and Human Services, also praises the program for helping her create more opportunities within her discipline. After receiving a $406,000 NIH grant awarded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development in September 2020, Ingram was able to create an interdisciplinary team of faculty and students to work on her research that analyzes the relationship between obesity and other risk factors for gestational diabetes.

"Through interdisciplinary activities and collaboration, students learn how knowledge is acquired and how collaborative teamwork extends the inquiry. The goal of my program is to provide experience in the research process," Ingram said. "I also create student leadership and mentorship opportunities, and I encourage the senior students to serve in these roles whenever possible."

By funding large research projects like this one, Ingram said she has engaged over 40 undergraduate and graduate students in laboratory research in the last six years. Although she had participated in many other grant writing workshops in the past, this program offered her the unique freedom to devote all her time to writing her proposal.

The Neuroscience of PTSD

Ebony Glover, director of the Affective Neuroscience Laboratory and associate professor of neuroscience, was excited to start the program and explore how she could further enhance her grant narratives. Undergraduate engagement is already a staple in all aspects of her work. "I appreciated the accountability, emotional support, and structured guidance that this program provided," she said.



Glover was able to secure a $406,300 NIH grant in October 2020 to fund her research on understanding the biological factors behind the heightened risk of post-traumatic stress disorder in women, with most of the pilot data collected by her undergraduates. She received the R15, or Academic Research Enhancement Award, a grant designed to support small research institutions with undergraduate-focused programs.

"By supporting faculty through professional development programs, the university is investing in more opportunities for us to train and mentor undergraduates through high-impact research," said Glover.

Health Literacy and Engagement

Mary Dioise Ramos, assistant professor in the Wellstar School of Nursing, participated in the program in summer 2020 and remains hopeful that she can provide similar opportunities to her students as she applies for funding this year to support her research on healthy aging, community engagement, and end-of-life care.

Throughout the pandemic, the program transformed to serve the needs of eligible faculty by offering the program through online, synchronous meetings. Although Ramos said it has been difficult securing funding for other projects when COVID-19 is a top priority for many external funding organizations, she believes that the training she received is invaluable.

"When most people think of giving back to the university, they only think in terms of monetary gains and donations, but investing in faculty through research develops our expertise and helps us engage with students at every level. Through our research, we can bring knowledge and experience to our community," Ramos said.

> "I appreciated the accountability, emotional support, and structured guidance that this program provided.
>
> Ebony Glover

INVENTING OPPORTUNITY

New office focuses on development of intellectual property

By Travis Highfield

"For all that researchers do well – from identifying problems to generating world-altering solutions – they often struggle to see their research reach its full potential by placing it in the hands of consumers," Chris Cornelison said, now serving as the director of KSU's newly formed Office of Intellectual Property Development.

The office, launched in July as a unit within the Office of Research, acts as a one-stop shop for university researchers looking to advance their discoveries. In his role, Cornelison is responsible for guiding inventors through the process of filing disclosures and connecting with attorneys, as well as linking with potential industry partners for the licensing of property and discovery of market opportunities.

While many functions have existed informally over the years, formalizing it into an official part of the university's infrastructure signals a renewed commitment to realizing its goal of becoming the premier Carnegie-designated R2 research institution, said Phaedra Corso, vice president for research.

"We have an incredibly rich research culture that spans a myriad of disciplines and industries," she said. "When a discovery has the potential to positively impact society, it is incumbent upon us to do everything we can to advance it. By launching the Office of Intellectual Property Development, we are empowering our inventors to take the next step and realize their potential."

CHRIS CORNELISON

The office addresses commercialization questions and concerns by funneling faculty and students to the appropriate resources. Through the Kennesaw State University Research and Service Foundation, the entity responsible for protecting and managing intellectual property on behalf of KSU, inventors are provided all the financial and legal means.

More resources will arrive as KSU launches its Innovation Launch Pad, a six-week workshop modeled after the National Science Foundation Innovation Corps program to provide training and guidance to KSU researchers on lean start-up methodology and customer discovery in an effort to advance their scholarly products to consumer markets.

"All of this combined makes KSU a very favorable place for inventors," Cornelison said. "If there is an ability to commercialize an idea, our inventors have the potential to realize revenue, and our structure allows for a bigger share of that revenue than any other institution in Georgia."

Still in its infancy, Cornelison said there won't be any single unit of measurement to demonstrate the overall impact of an ever-expanding intellectual property portfolio. However, in the future he expects to see significant growth in the number of disclosures filed, start-up companies spawned from university research and licensing deals secured, among many other metrics.

"Ultimately, we strive to achieve our mission to be the liaison into the corporate world by connecting our academic talent to industry sponsors who have real-world problems that need solving," he said. "At Kennesaw State, we have the talent pool to solve them."

UNDERGRADUATE RESEARCH THRIVES

Programming pivots to virtual format during pandemic

By Kaelyn Ireland

When the COVID-19 pandemic came to the U.S. in March 2020, it left many undergraduate researchers at Kennesaw State University worried about the future of their ongoing projects.

> The research hasn't changed. What I do is quantitative, so I use computers in my lab. But one experience students miss out on is, if I must update or repair a computer, they can't be side by side with me. They don't get to learn that skill.
>
> Tsai-Tien Tseng

Amy Buddie, director of the Office of Undergraduate Research (OUR), acted quickly to assist student researchers.

"That instant pivot was difficult for a lot of students, especially those who work in face-to-face labs," Buddie said. "We immediately put out guidelines for continuing research in a pandemic, including suggestions for how to pivot to an online environment where possible."

In the summer, OUR staff promptly created guidelines in preparation for returning to face-to-face life on campus so that researchers who wanted to continue research had the option to return. For this to happen, however, a mentor had to complete a form outlining the appropriate social distancing, sanitation, and personal protective equipment usage procedures.

By and large, the plan worked. Buddie, also a professor of psychology, easily moved groups of undergraduates she mentored to an online environment using Microsoft Teams. Their projects utilized web-based surveys from the beginning, and all that remained were data analyses using statistical software. Tsai-Tien Tseng, OUR associate director and associate professor of biology, also succeeded in moving his own research online.

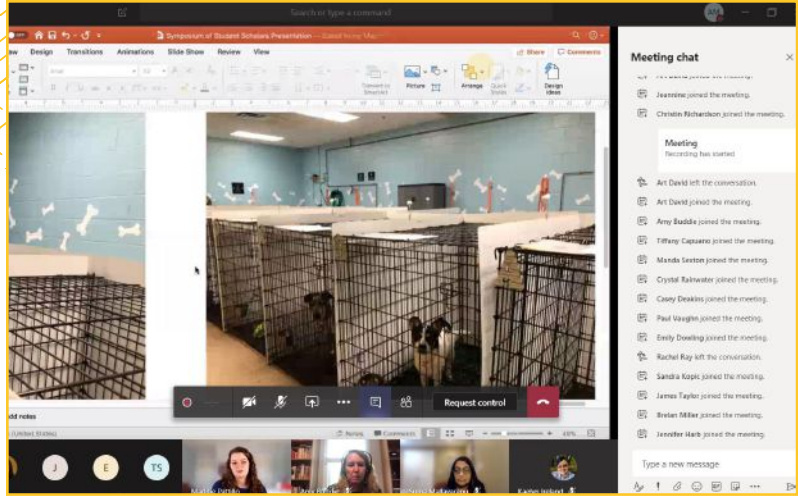
"The research hasn't changed," Tseng said. "What I do is quantitative, so I use computers in my lab. But one experience students miss out on is, if I must update or repair a computer, they can't be side by side with me. They don't get to learn that skill."

Tseng also adjusted his mentoring, taking extra care to check on his students' well-being during this strange and stressful time.

Another major goal was to preserve the First-Year Scholars Program, now in its second year. The program was widely popular in its first year and has grown from 10 to over 70 participants.

"About a dozen of the students have been accepted to the National Conference on Undergraduate Research—very rare for first-year students to be presenting at this conference, so we're really excited for that," Buddie said. "The earlier people get started on research, the better, because you can accumulate all these experiences that are going to help you with your future."

The staff also moved everything they could to a virtual format at the start of the pandemic, including office operations, the Symposium of Student Scholars, and the Undergraduate Research Club. It was a necessary move to keep everyone safe, but the staff quickly discovered other benefits.



Symposium of Student Scholars

Buddie explained that the pandemic provided an opportunity to rethink how to organize events and utilize funding. For example, being forced to move events like the spring 2020 Symposium of Student Scholars online not only protected attendees from potential exposure to the virus, but also allowed organizers to try something students had been clamoring for: hosting an additional symposium in the fall.

"The inaugural fall 2020 edition was a success," she said. "I didn't know what to expect, but it was really popular. We had over 100 projects, which I thought was pretty good for our first time doing it in December."

The success of the virtual symposiums offered Buddie and others new information about the potential future of research conferences.

"I don't believe we had any great difficulties. We had a lot of upper administration in attendance, including the president and the provost," Tseng said.

Tseng also noted that, even post-pandemic, a lot of research conferences may opt to continue online, as the pandemic has indirectly revealed a variety of benefits.

"I also might consider hosting virtual workshops in lieu of face-to-face workshops because they are more well-attended as they offer participants flexibility with their schedules," Buddie added. "And then we can record the workshops and post them online for later viewing. All of this gives more opportunities for strictly online students to do more."

Tseng agreed and further explained the various quality of life improvements that the virtual medium has offered to long-distance commuters.

"One of the things I was thinking about is that we have a lot of students from IT and computer science who are actually not local," he said. "I've had students who have lived two and a half hours away from campus. The virtual conference is nice because they can join us."

Another benefit to increased event accessibility is the opportunity for students to network with potential investors for their research.

"One of my hopes is that we can invite people from outside the university to see what we have done," Tseng said. "Hopefully, we'll get better support from the community, and people will be interested in investing their time and money into our students if they see something cool."

Undergraduate Research Club

The Undergraduate Research Club (URC), a popular registered student organization that promotes undergraduate research through team-based research projects, also adapted by moving online this year. Buddie said this effort was led by the club's current president, Patrick Kielly.

Previously, the club hosted one in-person meeting per month of the academic year and supported up to five research teams, each led by one of the club's officers and advised by Buddie. Kielly's main goal as president was to expand the number of projects, this year totaling 12, and bring in other faculty to help mentor the teams.

"The most I can really do is five projects, and that limits the number of students who can participate," Buddie said. "So Patrick recruited other faculty to supervise projects. We have way more students participating in URC projects than usual, and the teams are smaller. I think those are two really good changes."

To make it happen, Kielly and URC Marketing Officer Angel Jaimes quickly got to work emailing as many faculty members as possible.

"We ended up getting around 20 responses, which has been great because we've been able to have a lot more projects and outside opportunities for students to get involved in the labs," Kielly said.

The club has relied on Microsoft Teams to collaborate on projects, record meetings and guest speaker lectures for future viewing, and communicate about various research opportunities on campus. Additionally, the officers utilized OneNote to create a resource for members to find professors in need of undergraduate research assistants and conferences to which they could submit abstracts to deliver presentations of their work.

"From an early period, we said we're just going to take the club fully online and move forward from there," Kielly explained. "I think the decision to go fully online was good because we could just focus on getting it to work the way it is."

> **"I also might consider hosting virtual workshops in lieu of face-to-face workshops because they are more well-attended as they offer participants flexibility with their schedules.**
>
> Amy Buddie

Club president works to increase undergraduate research opportunities

When Patrick Kielly switched his major from public relations to psychology during the 2018-2019 academic year, he was eager to get research experience under his belt.

Kielly struggled at first, as he lacked research methods and statistics courses that most Department of Psychological Science faculty required for students to work in their laboratories. He sought advice from one such faculty researcher, Katherine White, who is an associate professor of psychology. White encouraged him to get involved in the Undergraduate Research Club (URC), where he became the marketing officer and then president.

"I felt as though I could grow the club out more. I had a bunch of ideas as the marketing officer, and I didn't think I would be able to put them into action unless I ran for president," Kielly said.

Under Kielly's leadership, the club's membership grew, as reflected by an increase from five to 12 research projects and large numbers of newly affiliated faculty who were recruited to serve as advisers for their members' projects.

"Another thing I really wanted to do was have an in-person meeting with other clubs. Last year I was trying to get us together with a bunch of different clubs and have a huge networking meeting, but we had to cancel that because of the pandemic," Kielly said.

In the long run, however, Kielly and the club are determined not to let their core mission be deterred: to get as many undergraduates as possible involved in research.

"Patrick is just full of ideas. Recruiting the faculty and organizing the teams—that was all him, largely on his own, doing this because he cares so much, " said Amy Buddie, director of undergraduate research. "I knew last year that great things were ahead, but I honestly could not have imagined that he would explode undergraduate research like he has."

INNOVATIVE INTERDISCIPLINARY RESEARCH

President Pamela Whitten discusses transformative initiative

By Joëlle Walls

With Kennesaw State's elevation to an R2 institution, President Pamela Whitten's vision for the university's research identity is one in which instruction, discovery, and service are intertwined to support students and faculty in attaining new heights. Over the last year, these efforts have translated into multiple programs focused on KSU's signature research themes - Biomedical and Health Services, Computing and Technology, Human Development and Well-Being, and Sustainable and Safe Communities.

One of those initiatives was the recent launch of the Interdisciplinary Innovation Initiative (I^3), an internal funding program sponsored by the Kennesaw State University Research and Service Foundation (KSURSF). In an interview with The Investigator, Whitten discussed how I^3 is a transformative opportunity to grow KSU's level of research, collaboration and innovation even further.

Q: What is the purpose of this initiative, and how do you hope it will strengthen KSU's research enterprise?

A: We recognized the potential for encouraging new areas of research. To capitalize on this, KSU's Office of Research established the Interdisciplinary Innovation Initiative that encourages collaboration between different departments on campus and external partners, as well as opening new avenues of collaboration for our faculty with their undergraduate and graduate students. Each team receives between $50,000 and $75,000 in grants to focus their research around the interdisciplinary research themes and then later seek external funding. As a result, this new initiative is opening up many opportunities for groundbreaking work at KSU.

Q: This is the first time KSURSF has sponsored an internal grants program of this magnitude. Why was now the right time to introduce such an initiative at KSU?

A: The timing is tied to our change in R2 status in December 2018. We have the vision, talent and momentum to continue developing our research capacity and become a top tier R2 university. With this goal, Dr. Phaedra Corso and the Office of Research are leading the way by committing significant resources through this funding program to bolster our faculty's initial research ideas internally so that they can be more competitive externally when seeking funding.

Q: There has been an increased emphasis on interdisciplinary research collaboration, especially focusing on the university's signature research themes. What faculty and student goals do you hope will be achieved with this approach?

A: The challenges that we face as a society are complex, requiring a collaborative approach. Since KSU's focus is on conducting research with relevance, we are trying to bolster our academic research culture by encouraging and rewarding interdisciplinary approaches and teams across the four themes.

In addition, increasing interdisciplinary research opportunities for our current and future undergraduate and graduate students not only enhances their research experiences, but also better prepares them for their future careers.

This type of university-wide support demonstrates that Kennesaw State is committed to creating the appropriate infrastructure and culture that facilitates the success of faculty and student scholars in their work.

Class assignment turns into research publication

By Jacob Segura

When Yuri Feito, associate professor of exercise science, taught a graduate class in cardiovascular and clinical physiology, he could have never imagined that a group class project assignment would turn into a fully published research manuscript. The groups were asked to delve into literature regarding either high-intensity training or blood flow restriction and its effects on a clinical population of the group's choice.

Matthew Lee, Brent Uken, and Gage Wright, all pursuing master's degrees in applied exercise and health science, chose to conduct their research on the efficacy of high-intensity interval training on individuals with hypertension, also known as high blood pressure. Feito encouraged them to publish the resulting paper, which was accepted in a special-themed issue of the American College of Sports Medicine (ACSM) *Health & Fitness Journal* coming out in late spring.

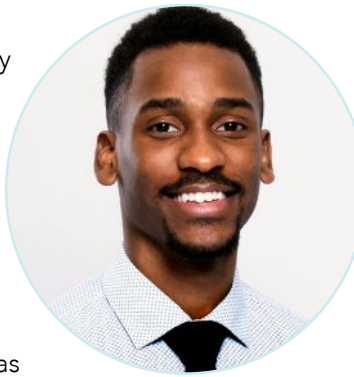
The team searched for data and information on the benefits and risks of high-intensity training. Although there was an understanding that, for many, exercise is helpful, there were some reservations as to whether high-intensity training would help those with hypertension.

"While we were performing our review of the literature, I wondered, How can high-intensity exercise be considered beneficial for somebody with hypertension, let alone somebody who's had a heart attack or major cardiac surgery?" Uken said. "The findings surprised me."

Even in the past few decades, medical and exercise science experts traditionally believed that people suffering from hypertension or a similar state are highly fragile and must be very careful when participating in any strenuous activities. According to the group's review, however, this is not entirely the case.

The group's research found that there is a myriad of benefits to the activity when exercising caution. There is a great deal of subjectivity in terms of the results. However, there is a significant similarity between the blood pressure levels of high-intensity exercise cases and those who take blood pressure medications.

This soon-to-be-published work offers a significant career foothold for the students' professional careers.



MATTHEW LEE

Lee, for example, plans to become an orthopedic surgeon. He already has his bachelor's degree in exercise science from KSU, and in May he will earn his master's degree as well as a bachelor's degree in biochemistry. "I was always pre-med, but I wasn't sure about my focus until I coached basketball for a while and did some personal training on the side," Lee said.

GAGE WRIGHT

Wright recently graduated and is currently pursuing a career as an active military physical trainer in the U.S. Navy, with plans to conduct research with U.S. Army researchers. "Being able to put a research publication on my resume has been one of my proudest moments of my academic career," Wright said.

BRENT UKEN

Uken is working on his second career as a personal trainer, having already retired from finance. "Completing the master's program is allowing me to elevate the coaching I provide to my clients, but more importantly, to contribute to the broader body of knowledge through research efforts and article authorship," Uken said.

Storyteller

presents performance studies scholarship at KSU conference

By Jacob Segura

As the audience sat down in preparation for the performance, Charles Parrott, associate professor in the Department of Theatre and Performance Studies, stood up and began to recount stories of his youth. However, this was not an ordinary theatre event. He was presenting his storytelling performance at the Research in the Arts Colloquium, hosted by the College of the Arts last fall.

Parrott's research is derived from the telling of his own experiences and its application to the human experience with his work constructed from his own natural way of speaking. Parrott's specialty is in performance studies, a highly interdisciplinary field that draws from the performing arts, communication studies, sociology, anthropology, cultural studies, and more. It is within this field that he studies his true passion, storytelling.

"I never get tired of thinking about the intersection between communication and culture," said Parrott. "I also enjoy all the different possibilities available in performance. When I found the academic discipline of performance studies, that all clicked into place for me."

Since the colloquium's theme was on art, human development, and well-being, Parrott's research presentation fit right in. He performed a personal narrative entitled "What Comes After the Accident," which recounts a car accident that happened when he was a teenager, resulting in a traumatic head injury, the loss of his best friend, and two others.

"I was a little nervous about it at first because my work is performance-oriented scholarship. I'm talking about real-life cultural events but framed through personal narrative, storytelling," said Parrott. "I think this type of scholarship presents an alternative epistemology, or an alternative way of knowing the world, as opposed to a highly quantitative or data-driven set of knowledge."

Parrott noted that the opportunity to present research face-to-face at a socially distanced conference during the pandemic provided faculty with a refreshing and rare experience, as many conferences have been relegated to online formats.

"It was a very moving experience to be in a room with other colleagues, listening to their research presentations," Parrott said. "It was one of the things that I had taken for granted over the years because it was just a normal part of conference attendance. However, with the pandemic, I have come to appreciate what physical presence can do to enhance the audience's connection to the speaker."

To Parrott, research is a process of creating new knowledge, and he aspires for his students to be able to create their own new knowledge, as well. Parrott has worked with dozens of students in his 10 years at KSU, aiding students in research projects that typically result in stories of their own.

> "Storytelling is about helping an audience see the world the way you see it. Mentoring is like that, too. I want to show my students what and who they can be. It is very rewarding to do that.
>
> Charles Parrott

That is why Parrott was the 2020 recipient of the Council on Undergraduate Research's (CUR) Arts and Humanities Faculty Mentor Award, which recognizes undergraduate research mentorship excellence nationally.

"Dr. Parrott's innovative work has involved undergraduate researchers in new interpretations of folktales, fairy tales, literary works, personal narratives, and other story forms, as well as empowered diverse students, faculty, and communities," said Lindsay Currie, executive officer of CUR.

One of Parrott's favorite mentor roles is serving as the director of the KSU Tellers, a storytelling student troupe. When possible, Parrott often takes his students to various storytelling festivals, many of which are academic in nature, to further broaden their horizons in the field of theatre and performance studies.

"Storytelling is about helping an audience see the world the way you see it. Mentoring is like that, too. I want to show my students what and who they can be," said Parrott. "It is very rewarding to do that."

Birla Carbon supports student research successes

By Heather Hankins

DESTINY PAIGE

Birla Carbon, the world's largest manufacturer and supplier of carbon black, has partnered with the College of Science and Mathematics (CSM) since 2014 to provide undergraduate research opportunities to 72 CSM students.

Birla Carbon extended the commitment for another five years in 2019, adding $275,000 in support of the program.

"Each year, Birla Carbon sponsors 11 Birla Scholars to perform research of their choice," said Terrance Norman, director of human resources at Birla Carbon. "While providing a platform for each student's growth and development is the most important objective, a win/win/win is actually realized by the three entities – what a wonderful feeling."

Birla Carbon Scholars receive a summer stipend while conducting 10 weeks of research under the guidance of a CSM faculty mentor. They will ultimately present their projects at the Birla Carbon Symposium where the top presenter is awarded travel funds to make a regional or national conference presentation.

Biology major and Honors student Trae Dunn was the first freshman to participate in this prestigious program in 2018, making it also his first conference presentation. Under the mentorship of Martin Hudson, associate professor of biology, Dunn investigated the relationship between the DNA transcription factor of a specific protein and the nervous system development in C. elegans, a nematode (worm) model often used for genetic research.

Dunn was responsible for developing the specific C. elegans strains needed for experiments, but the most important thing he learned was how research was conducted and how often researchers fail.

"That is the beauty of research. You can take your failures and learn from them to design a better experiment next time," said Dunn, who aspires to be a physician-scientist. "Every young scientist will need to learn how to handle and overcome their failures."

Since then, he has presented at over 10 conferences and was awarded a 2020 Goldwater Scholarship, which recognizes the nation's top science, mathematics and engineering undergraduates.

Destiny Paige, a biology pre-med major and Honors student, was encouraged to apply for the 2019 program. Under the guidance of Rajnish Singh, associate professor of chemistry, she focused on testing the bioactivity of novel borate glass doped with cerium oxide nanoparticles.

Paige's research led to a discovery that the novel glass, with some modification, could potentially promote tissue recovery for tissue implants and provide further applications on oxidative stress diseases. She received the Top Poster Award.

"I was extremely happy when I won because it felt as if all my hard work and practice had paid off," said Paige. "I feel as if my presentation stood out because of my enthusiasm and my ability to engage the audience. I also made sure that my presentation had a clear hypothesis and told a chronological research story."

She then presented at the Annual Biomedical Research Conference for Minority Students and at the Posters at the Georgia State Capitol. Paige plans to continue biomedical research and perhaps pursue a career that incorporates it.

Burruss Institute partners with Atlanta Regional Commission on Metro Atlanta Speaks survey

By Emily Berreth

For over 30 years, KSU's A. L. Burruss Institute of Public Service and Research has provided a variety of research services that contribute to building stronger communities in the Atlanta area and Georgia.

One example that illustrates the broad scope of the work of the Burruss Institute is its collaboration with the Atlanta Regional Commission (ARC) on the "Metro Atlanta Speaks" (MAS) public opinion survey, the largest of its kind in the Atlanta region. Terry Sloope, assistant director of survey research, developed the institute's proposal for the first iteration in 2013. The institute has implemented the survey in seven of its eight-year existence.

"The ARC has been very enthusiastic about the results of the yearly survey and has used the data as a foundation for shaping internal and public discussions of issues related to transportation, housing, growth and other quality-of-life issues affecting the metro Atlanta region," he said.

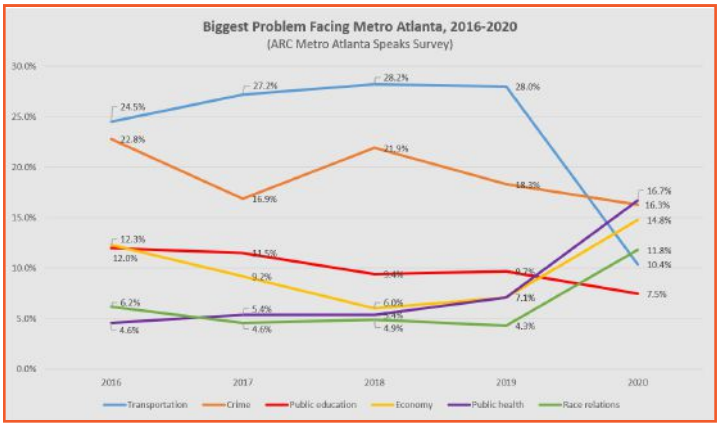
The ARC modeled a similar study of the Houston area by Rice University's Kinder Institute for Urban Research, which has been ongoing for almost 40 years. The MAS survey has evolved over the years since to reflect the changing landscape, but always retained a significant core of questions each year.

The 2020 survey included new questions related to the coronavirus impact on Georgia residents as well as new questions on race relations and the role of the police in public safety. A combination of telephone and online surveys was utilized to obtain the opinions of 4,400 residents of the ARC's 10-county service area.

One in four individuals indicated that they had been laid-off, terminated or furloughed due to the pandemic. One-third of participants also said they had worked from home as a result of the pandemic.

"What's the biggest issue facing metro Atlanta?" has been on the survey since 2013. In 2020, public health (17%), crime (16%) and the economy (15%) were selected by the most respondents as the biggest problems facing the region, but there have been differences over time in responses. Transportation, which has typically been viewed by more people as one of the biggest problems, was chosen by far fewer people this year (10.4%) compared to previous years. Public health, which historically has received far fewer mentions, spiked in 2020 to 16.7% – a higher percentage than any other issue.

Results are statistically valid for each county surveyed and available online: http://bit.ly/MetroAtlSpeaksDashboard.



Researchers secure NSF grant to revolutionize math and computer science education

By Kaelyn Ireland

Three Kennesaw State University faculty and an external collaborator were recently awarded a half-million-dollar grant (award number 2031490) from the National Science Foundation (NSF) to bring computer science instruction to middle school students by introducing it to their mathematics curriculum.

Alan Shaw, assistant professor of computer science, brought together KSU colleagues Brian R. Lawler, associate professor of mathematics education, and Deepa Muralidhar, instructor of computer science, to combine their expertise with the goal of designing and implementing the project, along with long-time associate Bill Crombie, director of professional development for The Algebra Project, **(https://algebra.org/wp/),** a mathematics education initiative in which Shaw and Lawler are actively involved.

Shaw started volunteering with The Algebra Project as an undergraduate and has continued throughout his career. As a graduate student at the Massachusetts Institute of Technology, Shaw wrote his thesis on using computer science in an inner-city community to address social issues. This sparked an interest in bringing technology, particularly computer science, into classrooms that has stayed with him ever since.

"All kids take math, but not all kids take computer science," he said. "We want all kids to know about these opportunities in STEM."

The Algebra Project's founder, Bob Moses, was a mathematics teacher in New York City who became a prominent figure in the civil rights movement of the 1960s. His goal was to help empower minority students by teaching them how to speak confidently about mathematics in their own words—which, in turn, empowered them to discuss any issues that impacted them and their communities.

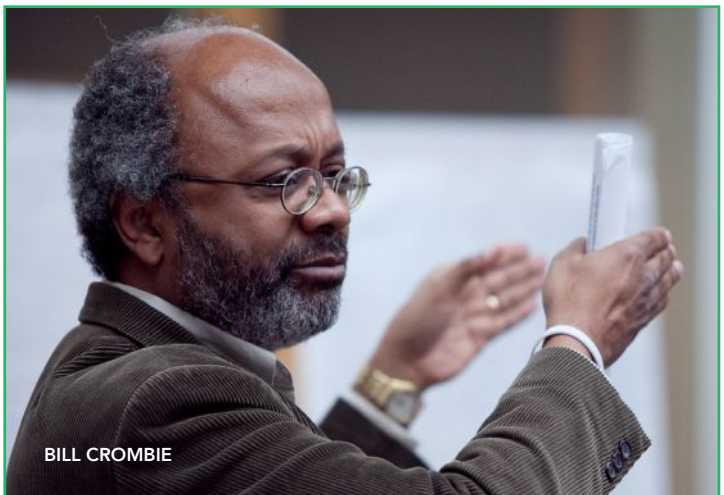
In the classroom setting, the bottom quartile of Moses' students would work together in groups to discuss algebraic concepts using their own language rather than the formal language of algebra, thus aiding their understanding of the subject.

"Someone in the small group discusses the ideas they talked about with the large group—that person may never have spoken in front of a group before, but they've become a leader just by doing that," Shaw said. "The idea is that, slowly but surely, as you get more and more kids presenting ideas that they discussed to the group, they become better and better at discussing the ideas and become more articulate about the ideas."

Like Shaw, Crombie was drawn to the project for its vision as well as its methodology. The project's alignment with his own interests was highly attractive to him.

"The Algebra Project, for me, was a way to bring together my interests in mathematics, science, and physics, and this kind of social justice agenda," Crombie said. "The thing which really attracted me to the mathematics was that, in The Algebra Project, the mathematics is done the way I feel we do mathematics in physics. It's not a formal, abstract system—it has an experiential base to it."

Muralidhar, who was a K-12 teacher and co-founder of the Georgia chapter of the Computer Science Teachers Association before coming to KSU, explained that this experiential base is crucial for students to engage with the material.



BILL CROMBIE


BRIAN LAWLER


ALAN SHAW


DEEPA MURALIDHAR

"Students say they can't connect what they learn in a math class to the real world," she said. "What I'd like to see happen is students do computational thinking activities and realize learning applies to day-to-day living."

These key aspects of The Algebra Project's pedagogical style informed the researchers' current project, which is an extension of Shaw and Crombie's previous work. Lawler, with nearly 30 years of experience as a mathematics educator, is excited about what he considers a revolutionary way to teach the material.

"This NSF grant is giving us an interesting opportunity," he said. "Alan and Bill's work has established that we can design the curriculum. Now the question with this grant is whether we can make it happen in a school, with the teachers and other factors of that setting."

Another important piece is the near-peer model that will be utilized in the classrooms, which allows the adolescents to work with college students and learn from them. "They see a peer, or a near-peer, who is excited about computer science or mathematics, and they believe that they can do it, too," Lawler said.

By blending students' existing interest in technology with their need to learn mathematics, the team hopes not only to improve students' mathematics grades and test scores, but also to instill in them a sense of confidence that will extend beyond the classroom.

"What I hope to see is engagement in the students," Muralidhar said. "One of the things that we have struggled with is confidence, particularly in children of underrepresented minorities, as well as gender disparities. They are the ones who are quieter, who are ignored, and equity is certainly a focus for us here."

With help from their NSF grant, Shaw, Lawler, Muralidhar, and Crombie will introduce this curriculum to the entire student body of a local middle school and work toward their shared goal of inspiring the next generation of computer scientists and advocates to become empowered community leaders and changemakers.

KSU Mini-Pavilion

Building community through research and education

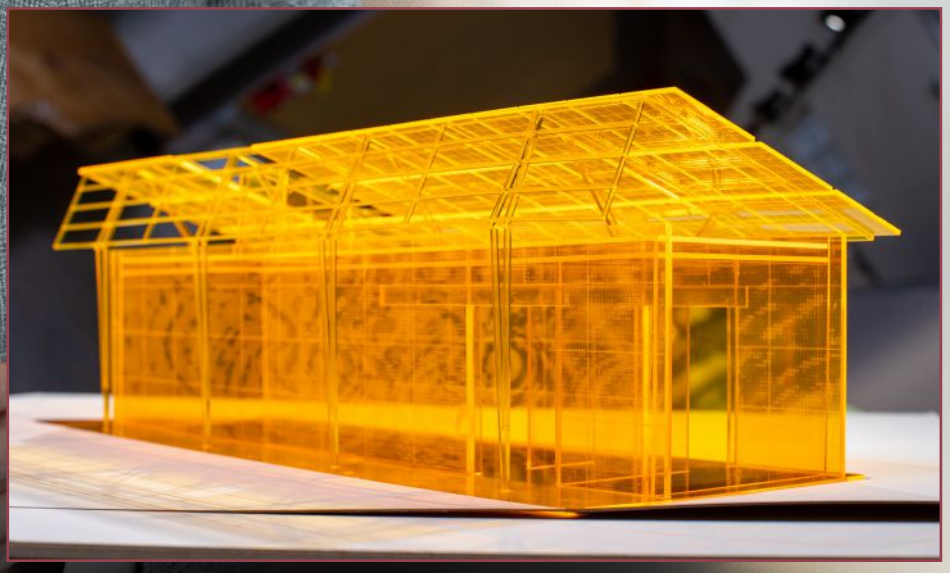
By Dorothy Corbett

Kennesaw State's Southern Polytechnic College of Engineering and Engineering Technology is making progress on the KSU Mini-Pavilion, a component of the college's partnership with the Cobb County Safety Village (CCSV) to build a structure that will serve as a learning facility for visitors of the CCSV and support interdisciplinary research by both faculty and students.

The CCSV is an 8-acre interactive safety facility built in 2007 that replicates a reduced-size town, complete with miniature roads and traffic lights. The site serves as an educational tool for elementary school students and Cobb County residents to learn about subjects like fire safety and crime prevention.

Billy Kihei, assistant professor of computer engineering at KSU, is the project manager for the mini-pavilion and received a grant from Verizon to begin designing research infrastructure in October 2019. Since then, Kihei has maintained a research agreement with the safety village that allows him and his students to conduct wireless communications experiments on the property to enhance intelligent transportation systems, such as using smart sensors in traffic control cabinets to enforce physical security.

Kihei explained that once the mini-pavilion infrastructure is in place, a variety of research can be conducted, including everything from solar panel optimization to data collection using sensor technology. Additionally,



The KSU Mini-Pavilion, under construction at the Cobb County Safety Village, will serve as a learning and research facility.

students and faculty will be able to use the mini-pavilion and partnership with CCSV to competitively apply for grant funding from external organizations like the National Science Foundation (NSF).

"Just about every NSF grant has an outreach section," Kihei said. "The mini-pavilion provides access to Cobb County schools and the community, so faculty can build an educational outreach program out of their offsite research at the mini-pavilion, which may increase their chances for funding."

The structure will also elevate the KSU brand as it contributes learning opportunities to children throughout Cobb County. As a part of the safety village, the KSU Mini-Pavilion will focus on providing life safety skills to young kids in an interactive learning environment using augmented and virtual reality (AR/VR) technology.

"We're also looking at building a program that supports middle and high school students through an AR/VR experience," Kihei said. "When they put on the goggles, they could see a KSU dorm room and try to figure out basic life skills training. For example, if there's a grease fire, they'll learn how to put it out safely. It's a great opportunity to expose students to the university."

The KSU Mini-Pavilion will eventually serve as a launchpad for future partnership with the Cobb County School System that would connect children with college-level science, technology, engineering, and mathematics researchers. By creating partnerships within the community, Kihei hopes that the mini-pavilion will contribute to growth opportunities for KSU as a research institution and solidify the university as a leader in sustainability.

Although Kihei has only been at KSU for two years, he immediately took initiative and became involved on campus. He forged connections with faculty after joining the R2 Research Success Faculty Learning Community, a yearlong program sponsored by the Center for Excellence in Teaching and Learning and the Office of Research during the 2019-2020 academic year. Holding the safety and sustainability seats in the group, he was able to create green solutions that became a core factor in planning the pavilion's design.

"We're very focused on designing sustainable systems," said Michael Carroll, associate professor of architecture and project designer of the mini-pavilion. "For instance, I'm designing a solar chimney that will exhaust hot air from the pavilion passively just using energy from the sun."

In addition to solar technology, Carroll's main area of research is in materials with the KSU Department of Architecture's Materials Lab (MAT_Lab). The pavilion will contain different kinds of insulation in various parts of the building that can be tested over time for performance, durability and sustainability. One of the greatest considerations for Carroll has been trying to design a structure with the flexibility to meet the needs of current and future research. He sees the pavilion as an opportunity to test design elements in real time.

"Analysis is a large component that is missing in architectural research, and once something is completed, we usually don't do any post-occupancy analysis," Carroll said. "Unfortunately, there's a big separation between the discipline and the profession. We need to show students more connections between the two, and using this research infrastructure is one way we can bridge that gap."

Although Kihei's initial intention for the design was to create the structure out of a simple shipping container, his team was able to transform his expectations by adding layers of innovative elements to engage visitors. Carroll's vision is to create a didactic design that prompts guests to ask questions and become curious about each part of the structure. For example, he plans to build vertical green walls around the exterior that are covered with vegetation.

"An example lesson could be focused on rainwater capture that is used in irrigating the vertical wall systems," Carroll said. "These walls will also attract butterflies and insects and birds to the space, so it's not just seen visually. The green wall is a living ecosystem."

Daryl Rowe, a fifth-year architecture student and undergraduate research assistant for the pavilion, is excited to see this project come to fruition within the next year. Under Carroll's guidance, Rowe translated initial design sketches into 3D digital software programs like Rhinoceros and Revit. He was also responsible for the production of presentation boards and physical models that are on display within the MAT_Lab. Rowe believes these experiences with undergraduate research have impacted him in a very meaningful way.

"Doing research on this project and research on my own architectural thesis has helped me understand how to think and question the world around me," Rowe said. "It has led me to take everything I see and hear with a grain of salt and search for a deeper understanding with the topics that intrigue me."

Although the large-scale project is still in its funding stages, Kihei hopes that donors will see the opportunities this structure can provide KSU and the community. The team intends to lay foundation and build a waterproof shell for the KSU Mini-Pavilion by the end of summer/fall 2021, with a grand opening scheduled for fall 2022.

Professor partners with graduate student to earn innovation medal

By Kaelyn Ireland and Landon Mion

ALI KEYVANFAR

Every invention begins with an idea. Ali Keyvanfar, assistant professor of construction management, was a visiting professor in Ecuador when a construction project to build an underground subway tunnel across from a historic site under San Francisco Church in Quito generated public controversy.

"I came up with an idea to help the developer and the government make a software or app to help because $20 billion of people's money was in that project," he said. "We couldn't stop the project; we had to find a solution."

Keyvanfar envisioned a platform that would facilitate communication between residents in neighborhoods close to new construction sites and construction project managers so they could address residents' concerns and solve problems as they arise.

When Keyvanfar came to KSU, Sumit Gevaria, who completed his master's degree in construction management last summer, teamed up with Keyvanfar during a directed study course to invent the Construction Neighborhood Risk Mitigation (CNRM) platform.

"The CNRM platform was created to help architecture and construction management professionals in construction-neighborhood risk assessment, management, and planning," Keyvanfar explained.

He also said the system reports all the results in a series of dashboard outputs, meeting every stakeholder's needs. The biggest advancement of the CNRM tool would be contributing to the United Nations Sustainable Development Goals in promoting industry innovation and infrastructure and making cities inclusive, safe, resilient, and sustainable.

The team received a gold medal from i-CAN 2020, one of over 70 international invention innovation exhibitions, for innovation in the category of building and construction. These exhibitions are judged by the International Federation of Inventors' Associations. Receiving a gold medal signifies that an industry panel recognizes the work's creativity and commercial potential, which helps the inventors secure funding to continue development.

"KSU graduates deserve to have some exposure outside the university to test the merit of their intellectual properties," Keyvanfar said. "Securing a medal is nothing compared to the development of their entrepreneurship experiences."

"Participating in this innovative research and being recognized by industry was the best way to finish my degree at KSU," added Gevaria.

SUMIT GEVARIA

Anthropology: Paleoepidemiology of Bacteria

By Jacob Segura

As an undergraduate, it is important to take as many academic opportunities as possible to truly get the most out of your college experience. This is exactly what Ariel Owens did when she was able to transfer 40 credit hours to Kennesaw State in January 2020 from her dual enrollment studies. Now, Owens is a junior anthropology major with an enthusiasm for research.

"One of the most important steps I took in getting into research was to form connections and get involved on campus," Owens said. "By actively participating in my classes, I was able to form relationships with professors in the discipline. I also joined all the clubs that were relevant to my interests on campus, including the Undergraduate Research Club."

Owens began conducting undergraduate research when she made a connection with Tsai-Tien Tseng, associate professor of biology in the Department of Molecular and Cellular Biology. She first met him when he taught her Introduction to Biology lab class during her first semester. In discussing her academic goals with Tseng, he introduced her to the field of biological anthropology, which quickly became Owens' favorite subject.

"I grew up in one of the more rural areas of Georgia, so I was constantly surrounded and immersed in nature," said Owens, who is from Gainesville. "I believe that this part of my upbringing gave rise to my interest in the history of the people and world around us. That interest only grew as I got older."

Currently, the pair are conducting interdisciplinary research in the field of biological anthropology. The research in question concerns the identification of differences in Mycobacterium tuberculosis complex (MTBC) and Mycobacterium avium complex, particularly focusing on the bacteria's spread prior to the advent of antibiotics.

"Due to advancements in technology, we will be able to identify more bacterial species alongside MTBC than previous scholars in the field of paleoepidemiology," Owens said. "This approach broadens the potential scope of paleoepidemiology both to older, suboptimally preserved samples and to pathogens that are difficult to classify within a specific group of bacteria. These approaches could also be utilized in future disease diagnosis and control."

In conducting this interdisciplinary research, Owens hopes that this project may offer solutions to diseases of the future. "Interdisciplinary research breaks down traditional intellectual silos to promote collaboration among researchers from different fields," explained Tseng. "When it comes to discovery and new knowledge, no cost is too high."

Owens shared her project, entitled "Detecting Bacterial Species from Next Generation Sequencing Data Derived from Ancient Human Skeletal Samples," at the fall edition of the KSU Symposium of Student Scholars.

"It was my first time presenting our research, and I was pretty nervous," Owens said. "Although, when the time came, I enjoyed presenting and valued the opportunity to receive feedback from my peers and professors."

For her efforts, Owens was awarded first runner-up in the undergraduate presentation category at the virtual symposium, further advancing her long-term career goal of attending graduate school and entering academia.

Media and Entertainment: Forgotten Voices

By Dorothy Corbett

"I think it's so cool to write stories about the life around you," said Gabrielle Jones, a first-year media and entertainment major and aspiring director from Marietta. "I want to write and direct for people who are like 'I've never seen myself'– but they connect to a piece of something I have written."

Jones is only in her first year at Kennesaw State, but she is already diving into research as she collaborates with faculty mentor Anna Weinstein on a project studying women screenwriters and their contributions to film and television. She says one of their main objectives is to find women who have worked on projects in the industry but never received proper recognition for their work.

"People are saying we need more female writers but we also need to look at the work of past female writers, because they've already done so much," Jones said. "You can look back to the 1950s and see women writing about sex and abortion, but no one's talking about it."

Jones became involved with undergraduate research when she heard about the opportunity through KSU's Thrive Scholars Program, which assists first-year students in their transition to college. She decided to apply to the First-Year Scholars Program, an initiative that helps students gain early research experience. By using online databases like the Internet Movie Database and award show archives, Jones and Weinstein hope to create a new online archive of important work written by women that offers easy access to their accomplishments.

"The stories we consume have an enormous impact on us. We all deserve to see ourselves reflected back to us on screen," said Anna Weinstein, assistant professor of screenwriting in the Department of English. "There's a reason Greta Gerwig's films like 2017's *Lady Bird* are having such a huge impact on young women today, just like there's a reason Shonda Rhimes' television shows are having such a big impact."

Jones feels that working on this project has given her the opportunity to experience growth in her research and presentation skills, but it also has allowed her to learn more about the women who came before her and to find influences for future film projects.

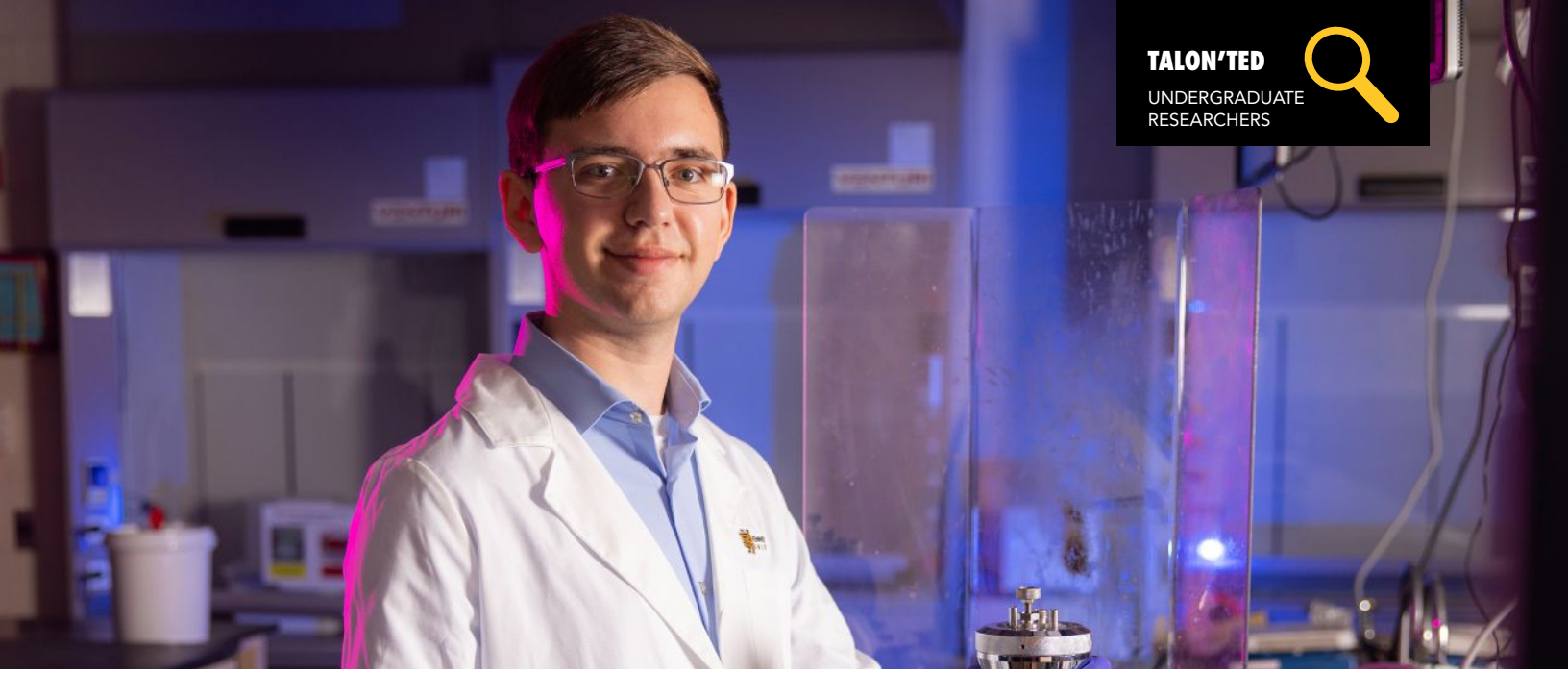
"I'm looking into the past and doing a deep dive on these women and what they've done, and I'm learning how I can continue their legacy," Jones explained.

Weinstein enjoys working with Jones as an undergraduate researcher, because she brings excitement and curiosity to their mentoring sessions, qualities that create a reciprocal learning experience that is mutually beneficial.

"She inspires me every week. It's a real gift to have a collaborator on this project who is so enthusiastic and engaged with the work," Weinstein said.

Jones believes that being passionate about a subject is key to creating a meaningful research experience, and she encourages other undergraduate students to try it out for themselves regardless of their disciplines.

"At first I thought, I'm in the social sciences and humanities. What project would be out there for me?" she said. "But then I found this and instantly clicked with it. If you're really interested in research, go find a project, because there's something out there for you to connect with."



Chemistry: Forensic Methodologies

By Jacob Segura

In the field of forensic chemistry, there is always a possible advancement or quality-of-life improvement for which to aspire, particularly when it comes to catching criminals. Oliver Erasmus is an undergraduate Honors student at Kennesaw State University who is working toward just that. Erasmus, a senior chemistry student with a concentration in forensics, is currently conducting research that would allow law enforcement of the future to detect organic gunshot residues found within heavy-metal-free ammunition.

There are certain environmental health risks associated with traditional, leaded ammunition. To alleviate these risks, there has been an increasing prevalence in heavy-metal-free ammunition, which seeks to fulfill the same use while lessening the risks. Although there are environmental benefits to the incorporation of such ammunitions, there is a concern regarding the detection of residues, as the ammunition lacks key residual components that play a large role in the identification of shooting suspects. Erasmus seeks to find solutions to this lack of components.

"We don't know if the heavy-metal ammunition is going to continue to be used because there's a little bit of a toxicity concern, and people may become more aware of that in the future," said Erasmus. "If that gets phased out of mainstream use, then we need a better way to identify gunshot residue, and I ultimately hope to find that method."

The impetus for this research was in a forensic chemistry class taught by Christopher Dockery, the assistant chair of the Department of Chemistry and Biochemistry. After Erasmus showed interest, Dockery encouraged him to pursue undergraduate research. Erasmus joined Dockery's lab in summer 2019. Additionally, this experience fulfills both the research credits required for Erasmus' chemistry major, as well as those required to graduate from the KSU Journey Honors College.

Erasmus continued this work in Dockery's lab when he was selected to participate in KSU's Birla Carbon Scholars Program, funded by Birla Carbon, a worldwide chemical manufacturer. In receiving this honor, Erasmus was one of 11 students in the College of Science and Mathematics to be recognized for exceptional scholarship in fall 2020.

"I felt nervous at first since I did not understand every aspect of the research, but Dr. Dockery was very welcoming and encouraging," said Erasmus. "When I began, I had an idea of what the research was, yet I'm surprised how much I've learned during the process in such a short time."

Dockery himself is no stranger to the work of researching gunshot residues, having conducted similar research since 2001. As Erasmus' mentor, Dockery offers his expertise as needed but otherwise allows the undergraduate to work independently.

"Oliver is more self-directed than previous students in the work that he brings to the lab and the ideas that he brings to the project," said Dockery, also associate professor of chemistry. "We spent some initial weeks together in the lab training on the equipment, the methodology, and making suggestions, but Oliver was ahead of the average student in how quickly he was able to work on his own within the project."

Erasmus intends to continue his research through this spring semester, as he will graduate in December 2021. After he completes his undergraduate degree, he intends to find a job at a crime lab within the Georgia Bureau of Investigation.

COMPUTER SCIENTIST

By Travis Highfield

Ask Kennesaw State University professor Mohammed Aledhari to describe graduate computer science student Rehma Razzak, and he will respond with one word: productive.

Her resume, on the other hand, speaks for itself. In her first 16 months of graduate study, Razzak authored and co-authored nine academic papers, with another four papers submitted for review.

"Simply put, she is the most productive graduate research assistant I've ever known in terms of her number of publications," said Aledhari, an assistant professor in the College of Computing and Software Engineering. "Her commitment to research is outstanding, and I believe her best work is yet to come."

After earning an undergraduate degree in computer science from Kennesaw State, Razzak was drawn to research and ultimately enrolled in the university's Master of Science in Computer Science degree program in pursuit of opportunities to apply her studies on something tangible. With a background in computer game design and development, the first research paper she submitted as a graduate student explored the use of machine learning in predicting which video game genres would become popular in subsequent years.

More recently, she has focused her research around healthcare applications of machine learning. One such project studies how machine learning can be a useful tool in predicting Alzheimer's disease before it appears in patients. Another project seeks a more accurate way to diagnose autism among females.

"Currently, the tests that are being used are effective in diagnosing autism in boys, but a lot of females are going undiagnosed or misdiagnosed," she said. "It's my goal to come up with a system that can help address those mistakes."

Razzak credits Aledhari and Mike Franklin, associate professor of gaming, for opening her eyes to the world of research. As a student, she was inspired by hearing her professors discuss their research and the benefits it can produce in the real world.

"As they spoke, I would start to think about my own ideas that I could explore," she said. "Now, it has snowballed to where I can see myself exploring a wide range of topics. I've become more open-minded the more involved I have become, and I'm becoming better at communicating my ideas."

Beyond research, Razzak said she is most proud of the community she has built during her time at KSU. After earning her master's degree this spring, she intends to pursue a Ph.D. while continuing her research.

"Kennesaw State has an amazing research community, and it's one where I feel welcomed," she said. "It's clear to me that the faculty here are not only invested in their research projects, but they are invested in their students as well."

TEACHER ADVOCATE

By Jacob Segura

Teaching was not always his plan, but for Robert Bice, it quickly became a passion. Bice is a recent graduate of the Bagwell College of Education's Ed.D. program in secondary chemistry education, finishing in December 2020.

"I was a biology and religion double major at Berry College and was pre-med when I was there. I knew all my life I wanted to go into medicine," said Bice. "I went to medical school for a year after I got married and then realized that I couldn't spend my life doing this."

After leaving medical school, Bice became a high school science teacher. He then pursued his teaching certification and gained a position as a high school chemistry teacher, allowing him to utilize his chemistry minor from college. Eventually, Bice became involved with the Georgia Science Teachers Association.

Bice met Kimberly Cortes, associate professor of chemistry education at KSU, at one such conference, though they would not work together until he later enrolled for graduate studies. Bice proceeded to get his master's degree from Western Governors University. Being drawn in by the opportunities for career and pay growth, Bice searched for education beyond his master's degree, ultimately resulting in him obtaining his education specialist degree and doctorate at KSU.

"It's been a huge blessing for me because I was able to see what research was like behind the scenes and learn the nitty-gritty details of the process, not just the final published paper," Bice said.

Studying for his doctorate allowed Bice many opportunities over the course of his academic career, including conducting research projects with Cortes. These research experiences ultimately culminated into his dissertation. Cortes, now his committee chair, advised Bice to pursue a topic that was important to him.

Bice's dissertation research involved surveying chemistry teachers in rural Georgia, like himself, and asking a variety of questions pertaining to the quality and methods of their work environment, with specific emphasis on inquiry learning. He wanted to know if experiential learning techniques could be easily employed in their classrooms when teaching science standards and if the available resources are enough for using such techniques.

"We found some amazing insight on what some districts are doing and what some are not, what the state is doing, what it can do better, and how teachers really interpret the standards that they have to teach," Bice said. "It confirmed some things, but it opened up some doors in other areas that would really allow the Georgia Department of Education to step in and do their part."

As Bice continues to work in Floyd County, his KSU research experiences have enhanced his teaching philosophy and pedagogical practice. "Throughout my journey, my dissertation committee's guidance provided me with important insights that I will carry on into my research career," he said.

FACULTY FOCUS

Engineer Involved in Research and Outreach Efforts

By Heather Hankins

Sylvia Bhattacharya, assistant professor of electrical engineering technology, is working hard to change the world by improving the relationships between humans and autonomous vehicles, increasing diversity in the STEM fields, and promoting innovative research.

Bhattacharya, who has been in the Southern Polytechnic College of Engineering and Engineering Technology since 2019, recently received two competitive grants for those efforts.

Bhattacharya will be working with the U.S. Army on her project, "Multimodal Inference of Human State Cognitive Processes in Risky Environments," which was funded for one year and has the option of two additional years, increasing the grant funding total to more than $486,000. This project will study the behavior of drivers and passengers in combat zones.

"By enabling vehicle understanding of passenger states and intentions, my objective is to begin to develop technologies that support and address Army challenges and solutions that bolster Army capabilities for achieving transformational overmatch in the evolving future of complex multi-domain operations," she said.

Additionally, this work will be useful for civilian life as the fully autonomous vehicle becomes the next generation of transportation. Bhattacharya's research will provide an important framework for the artificial intelligence body of knowledge.

The Google exploreCSR grant encourages under-represented groups to explore graduate studies and research careers in computing, and she will use the $18,000 in funding to build a one-on-one mentoring program. The program was offered to the entire KSU community, rather than engineering and computer science programs alone, as well as Florida A&M - Florida State College of Engineering students.

"We are providing hands-on research experience to the students through this program, and they will be able to directly interact with Google programmers and successful women from federal research labs and industries," said Bhattacharya.

Bhattacharya has been involved in outreach since her own graduate studies at Georgia Southern and Florida State where she was working to promote diversity and bridge the gender gap in STEM fields. "I would do work like this always, funded or not," she said.

The KSU Innovation Laboratory is an example of that drive. With the goal of working on multidisciplinary research projects with a diverse group of students, Bhattacharya has a research team composed of several undergraduate, graduate and postdoctoral researchers working in this laboratory. The lab currently is working with the Department of Psychological Science and the Department of Technical Communications and Interactive Design at KSU, as well as Pennsylvania State and Arizona State.

Bhattacharya describes herself as passionately committed and relentlessly ambitious, and she uses intense focus and time management to manage her workload and commitments. She advises students to work for personal curiosity and satisfaction, rather than just for employment.

For example, Bhattacharya is a trained Indian classical dancer and is very passionate about dance and choreography. She spends several hours a week on dance because it helps relieve stress and allows her to create work-life balance. She hopes to fuse dance and neural signal processing in her future research.

"It's important to pursue things in life that you really enjoy," she explained. "I take breaks, but my passion for the work that I do always drives me back with full enthusiasm."

Accountant Recognized for Audit Research Output

By Heather Hankins

Kennesaw State University has a diverse and talented faculty, but few are as well-respected and accoladed as Divesh Sharma, a professor of accounting in the School of Accountancy in the Coles College of Business.

He has been recognized for his profound research output by the Brigham Young University (BYU) independent ranking of research published in 12 top-tier accounting journals. Sharma explained that thousands globally are engaged in his specialty, archival audit research, but only about 1,200 are included on the list.

According to the BYU rankings, Sharma was recently ranked to be the 12th archival audit researcher in the world from his research published between 2014-2020 in the top three BYU archival audit journals. He is listed at No. 21 in the archival audit overall category. Across all topics and methods, Sharma has been ranked in the top 100 since 2008 and, for many years, has appeared in the top 25 for his research area of archival audit.

"As my motivation and incentive come from within, I do not work toward awards; I set my own goals," he said. "I am eternally curious to explore and how I can make a difference, how I can help someone achieve their dreams and goals."

Sharma describes himself as an eclectic researcher with a recent focus on corporate governance, audit, financial reporting and corporate social responsibility. He applies both empirical archival and behavioral/experimental methods to his research.

"As an undergraduate, I started with an interest in auditing because of the required comprehensive knowledge base, which provided insight into how accounting works," he said. "To be an effective auditor, you must know 'how' the accounting information production system works, and this excited me because I was excellent in my accounting, and I wanted to take it to the next level."

Sharma worked as an auditor for KPMG and the government audit office in New Zealand, where he completed his bachelor's and master's degrees at the University of Canterbury. He earned his doctorate from Australia's Griffith University. While developing his understanding of the field, he also developed questions regarding the independence of auditors, especially when receiving lucrative consulting fees from the same companies they audit.

"I raised an uncomfortable possibility that the watchdogs of corporate financial information may succumb to economic wealth effects and acquiesce to the executives who paid them lucrative fees," Sharma said. "Enron, WorldCom and other unprecedented scandals had not yet occurred; I was ahead in my thinking."

As a result, Sharma was one of the first researchers to explore these taboo questions and today continues to research auditing and other related issues like corporate governance. His academic experiences span five countries and eight cities, including the last 11 years spent at KSU. He also serves as the accounting concentration discipline coordinator for the doctoral program in business administration.

Sharma appreciates the collaborative atmosphere and collegiate support he has found at the university. He said that the robust databases available to him have played a pivotal role in his successes since much of his research is dependent upon those data sources. He also enjoys mentoring and supporting students, including those who are from his home country of Fiji as the island nation's support network for prospective accounting research professionals is not well-developed.

Sharma has received many awards and recognitions over the years, for both his original research and innovative teaching. However, his most prized award was being named the KSU Foundation Distinguished University Professor for 2016-2017.

"The message I want to convey through my research achievements is to motivate others," Sharma said. "My passion as an educator has meaning only when my students and other researchers I mentor realize their full potential and attain their goals and dreams."

History-Making KSU Graduate Becomes Forward-Thinking Professor

By Kaelyn Ireland

EDWIN BAIDOO

Edwin Baidoo earned his Ph.D. in Analytics and Data Science from KSU in May 2020, making him one of the first African Americans to graduate with a doctoral degree in data science, according to Jennifer Priestley, director of the Ph.D. program in analytics and data science.

He was part of the first cohort of students to enter the doctoral program launched in 2015 by KSU's Analytics and Data Science Institute (now the School of Data Science and Analytics) as the first of its kind in the U.S.

Baidoo, who loved mathematics from a young age, credits his father, an accountant, for igniting this passion. Baidoo's father encouraged his interests in math and science by asking him what concepts he was learning in school and teaching him new information.

"The one person I could always go to was my dad," Baidoo said. "He knew almost everything. I could come home with a physics question, and he would know. Trigonometry, algebra, chemistry, biology, he would know. I thought that was the coolest thing in the world."

Peers looked up to Baidoo when teachers would put problems on the board, and he would solve them using methods they hadn't covered yet—all thanks to conversations with his father.

"I was an immigrant from Ghana. I didn't know how to speak that much English, and kids can be insensitive," he said. "But in high school, I went from the guy that people would probably pick on to being protected because I'm that guy who helps with math problems!"

Baidoo went on to study mathematics in college, ultimately focusing on quantitative finance and adjacent topics. During his last year as a doctoral student, Baidoo began working as an assistant professor of business analytics at Tennessee Technological University, where he continues to work today in the College of Business.

Much like his educational background, Baidoo's research emphasizes collaboration. For example, Baidoo is working with colleagues and students at Tennessee Tech to make data science accessible to rural communities. They plan to partner with local industries, such as banking and healthcare, by offering their services to analyze the company's datasets and provide recommendations that would enhance their customer relations.

"Our biggest goal for the project is to expose students to different sets of ideas, especially in mathematics, computer science, statistics, and other related disciplines," Baidoo said. "I want my students to have these types of research opportunities because I had similar experiences in my Ph.D. program."

One aspect of the project that Baidoo hopes to implement is having students create chatbots for business websites, connecting the students to a real-world, practical application of their research.

"Students are really interested in participating in tangible projects, opportunities in which they can actually create solutions for companies," Baidoo said. "Many industries are moving toward that framework, and as a student, it gives you a mental leg-up."

As a professor, Baidoo challenges his students to tackle difficult problems. In one course he teaches, he developed a project that requires students to work in groups to solve a problem, and at the end of the semester, the students deliver a presentation discussing the methods they used and the solution they developed.

"Projects like that prepare my students for research, because that is essentially what research is: a big project with different parts that you then bring together in the development of a solution that you then present to affected stakeholders," Baidoo said.

The future looks bright for Baidoo, whose profound love of mathematics continues to propel him forward in his teaching and research career. "I'm very grateful for all the experiences I have had at KSU and the opportunity I was given to be able to live my dream," Baidoo said.

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