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Spring 2019

Spring 2019

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The Investigator

RESEARCH MAGAZINE

SPRING 2019

Kennesaw State University

A woman with dark hair and glasses, wearing a red patterned shirt and blue nitrile gloves, is focused on her work in a laboratory. She is holding a grey pipette in her right hand, which is also wearing a green wristband. Her left hand, in a blue glove, holds a small clear microcentrifuge tube. The background is a blurred laboratory environment with various pieces of equipment and shelves.

KSU'S RESEARCH AGENDA

A conversation with President Pamela Whitten about the future of research at KSU

SENSE, THINK, ACT

Mechatronics students engineer automation solutions for Mohawk

SPOTLIGHT ON RESEARCH

National Conference on Undergraduate Research debuts at KSU

NEW ECHOTA BIOTECHNOLOGY

Paving the way to deliver therapeutics to living cells

Pamela Whitten, KSU President

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On the Cover

NEW ECHOTA BIOTECHNOLOGY

KSU alumna Stephanie Hill works as a research associate alongside her former undergraduate research faculty mentor Jonathan McMurry at KSU's first incubator company. Co-founded by McMurry and the late John C. Salerno, New Echota Biotechnology is engaged in research activity that would help in the advancement of drug development and disease management.

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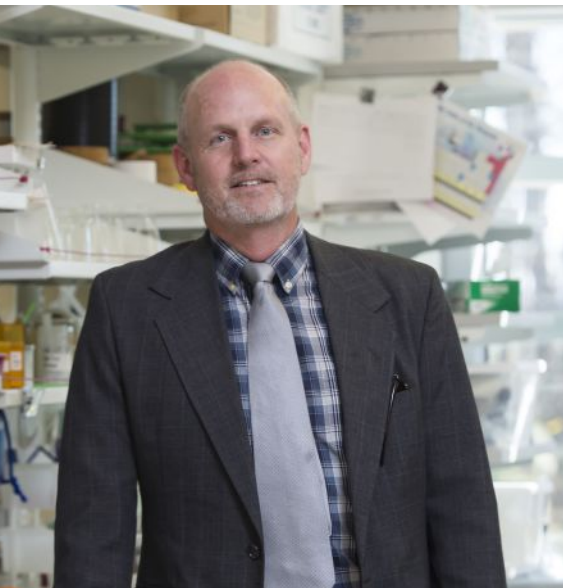
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Dr. Donald McGarey, Interim Vice President for Research, (July 2017 - Jan. 2019)



Dr. Phaedra Corso, Vice President for Research, (Feb. 2019 - present)

Dear readers,

Kennesaw State University has experienced significant growth in research activity over the past decade, reflecting both the University's growing emphasis on research and the breadth of expertise represented in our campus community. It is an exciting time to be a part of the research community here, and a privilege to serve our research-active faculty, staff and students engaged in those efforts.

Most recently, KSU was also elevated to an "R2" designated institution – doctoral university with high research activity – in the revised 2018 Carnegie Classification of Institutions of Higher Learning, the second-largest classification for research institutions in the U.S.

KSU remains a student-centered institution where innovative teaching and learning are at its core. However, we have taken it up a notch as research has become an integral part of the KSU mission and identity. We are a research university with faculty, staff and students involved in life-changing discoveries and innovations, which can also serve as catalysts for economic development.

Research is a high-impact educational practice and is part of the educational experience for many KSU students. Working side-by-side with scholarly faculty, students move beyond the standard classroom experience and are transformed from consumers to producers of knowledge. Our researchers are addressing pressing problems related to transportation, cybersecurity, communication, healthcare, education, energy, societies, the natural and built environments and more to improve the quality of life for everyone. This publication, *The Investigator*, offers a small sample of recent activities to illustrate the wide variety of the University's scholarship.

As we move forward to expand the University's research opportunities for faculty and students, we also would like to welcome Phaedra Corso to KSU as the new Vice President for Research. Dr. Corso will lead the University's research enterprise during this exciting transition to an "R2" institution.

We hope you enjoy this first edition of *The Investigator* as we endeavor to highlight our renowned research faculty, staff and students who drive discovery and creative activities at KSU.

Sincerely,

Dr. Donald McGarey

a NOTE from the EDITOR

Dear readers,

We are excited to launch *The Investigator*, a new magazine which will be produced annually by the Office of Research at Kennesaw State University. You will find stories that span the spectrum and which impact the community through the research, service and creative activities conducted by KSU faculty, staff and students.

One feature describes how Jonathan McMurry and John Salerno partnered to create KSU's first incubator company, New Echota Biotechnology. Another feature details the first year success of KSU Upward Bound programs, implemented in Polk and Paulding county high schools which help prepare students for college.

You will read how Lisa Lock uses her theater experience to make her choreography come alive for audiences, or how Matt Marshall guides his mechatronics engineering students as they are creating automation solutions for Georgia-based flooring manufacturer Mohawk. You will also learn how Emily Bechke, who recently earned her master's degree, is contributing to research in physiology and exercise health.

In our cover story, President Pamela Whitten discusses her plans for defining KSU's future in research, including the significance of hosting the National Conference on Undergraduate Research (NCUR) in April. KSU students Erin Ryan and Jay Strickland, who are profiled in this issue, will present their research at NCUR, the largest conference of its kind in the country.

These are just a few examples highlighted in *The Investigator* which shows how the work of our researchers is making phenomenal impacts in each of their respective fields that benefit our society in a multitude of ways.

I also encourage you to visit and bookmark the University's homepage - kennesaw.edu - as well as that of the Office of Research - research.kennesaw.edu. You can also find us on Facebook - facebook.com/KennesawResearch - and follow us on Twitter - twitter.com/ksuresearch - for the latest updates.

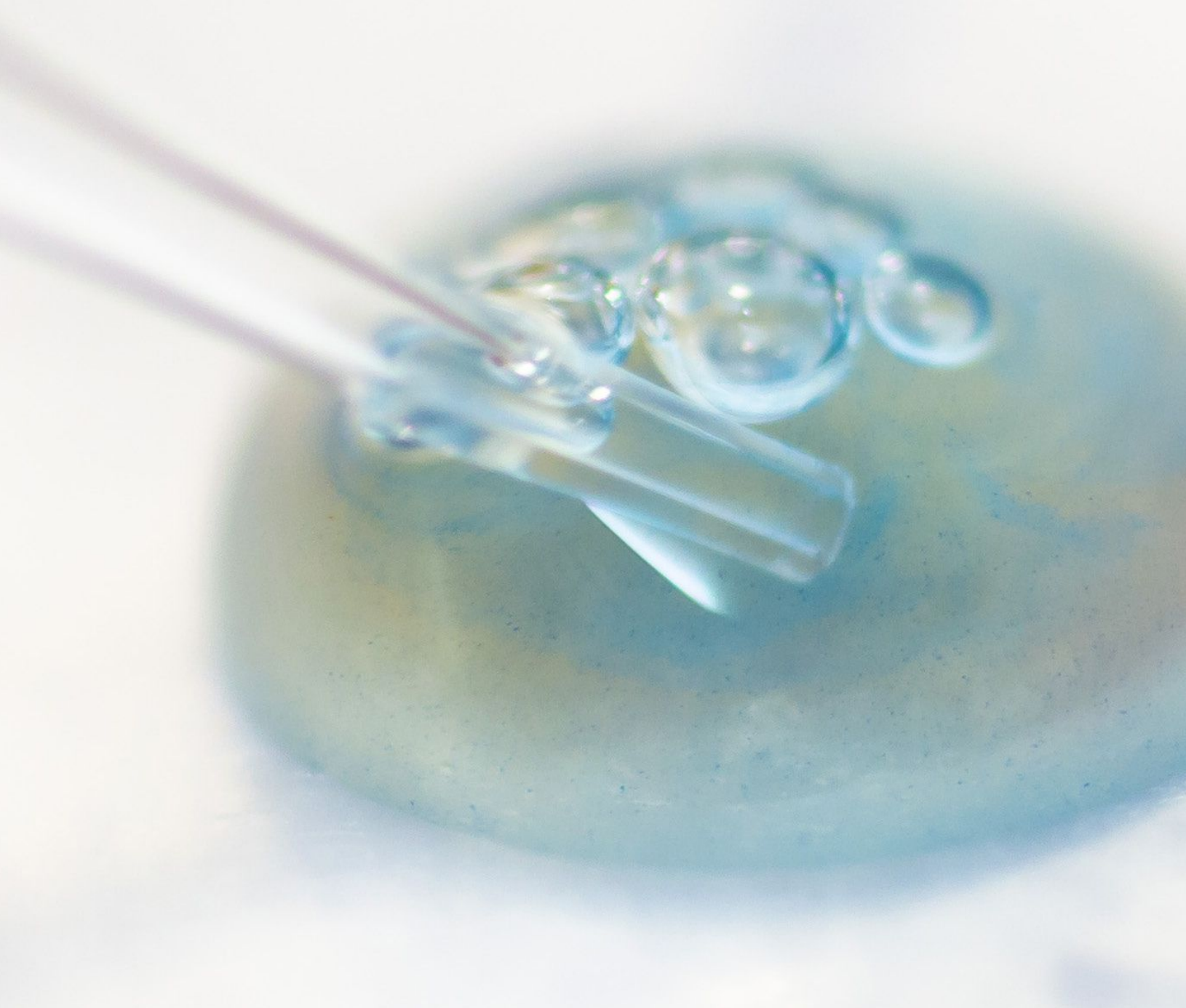
Happy reading!



Joëlle Walls



NEW ECHOTA BIOTECHNOLOGY



Paving the way to deliver therapeutics to living cells

By Joëlle Walls

What happened when biophysicist John Salerno and biochemist Jonathan McMurry joined forces at Kennesaw State University to confront challenges associated with combatting cancer and genetic diseases? They founded New Echota Biotechnology, KSU's first incubator company, which is paving the way to deliver edited proteins more effectively into living cells that could rewrite the code in suppressing the propagation of cancer cells or repairing a mutated gene that causes a genetic disease.

McMurry, also associate vice president for research at KSU, recalled how Salerno's impromptu visit to his lab in 2006 shaped the future course of his scientific career. At that time, McMurry had recently been hired as assistant professor in biochemistry, while Salerno, already a veteran researcher, joined KSU as the Neel Distinguished Chair in Biotechnology.

"While setting up my research program, John walked into my lab one day, introduced himself and from that moment on, we started collaborating," said McMurry. "John brought a quantitative focus to my research, and I became an expert on optical biosensing, which is a technique that helped him develop some research he was conducting. We published quite a few papers together as colleagues, but mostly with him in the mentor role."

Another impromptu visit by Salerno, this time to McMurry's office in 2013, put into motion the beginnings of New Echota

Biotechnology. McMurry said Salerno's original idea involved manufacturing specialty proteins for other companies that can be difficult to make since they both had experience purifying proteins in their academic labs.

"We had this business model in which we could sell enough of these proteins to generate revenue that would not only benefit the university, but support the development of intellectual property based on one of John's ideas," explained McMurry. "We have yet to sell our first protein, but we have been able to develop the core technology of John's idea – the cell-penetrating peptide adaptor protein."

The name of the company is derived from New Echota, the capital of the Cherokee Nation that was established in 1825 at the headwaters of the Oostanaula River. The logo for the company shows the confluence of the Coosawattee and Conasauga rivers that meet to form the Oostanaula River.

"The confluence of the two rivers also looked like a messenger RNA being translated into a nascent protein chain to John and I to reflect the company's original purpose of protein manufacturing," added McMurry.

While the company's staff scientist worked on potential sales of the specialty protein, McMurry and Salerno focused on writing proposals for Small Business Innovation Research (SBIR) grants, one of the largest sources of federal funding for early-stage capital for technology commercialization in the U.S.

“I really enjoy the fact that I am a central element in New Echota Biotechnology’s success and not a cog in an enormous pharmaceutical machine...”

In 2015, New Echota received its big break – \$227,000 from the National Institutes of Health SBIR grant program to develop the novel technologies of intracellular manipulation for research, diagnostic and eventually therapeutic outputs. The Georgia Research Alliance also supported the company through the GRA Ventures program, Georgia’s only non-profit catalyst for seeding and shaping companies around research at multiple universities.

Until then, technology delivering cell-penetrating peptides (CPPs) to the inner sanctum of targeted cells was not always successful. The CPPs are short chains of amino acids responsible for facilitating cellular uptake of various molecules such as large fragments of DNA or therapeutic proteins to fight infection. McMurry said the molecular cargoes transported would get trapped with the CPPs in undesired locations of the cell.

However, Salerno’s idea focused on using a CPP adaptor protein which would ensure that the targeted cargo would get delivered to a living cell’s core. Unfortunately, before he could see the fruits of his idea become a reality, Salerno passed away in December of 2015.

“We had the grant for about two months before John’s passing and so essentially the face of the company became me as CEO and John’s estate as co-owner and two employees, a staff scientist and a technician,”



Daniel Morris (left) and Jonathan McMurry are currently licensing the CPP-mediated technology from KSU to develop other ideas.

said McMurry. “In John’s memory, we continued to pursue the aims of the grant and were very successful in developing the technology, showing that it works and can be generalizable for other purposes.”

“This is the first business I have been a part of, and I still do not know everything about running a business,” he said. “I think the stunning difference between academia and industry is that more ideas are acceptable for academic research, while one idea is all you need in industry because to bring a single drug to market now costs about \$3 billion.”

With McMurry leading a team of KSU faculty and students, including biologist Scott Nowak and chemist Carol Chrestensen, he said that the issue of “getting into a cell but not getting out into a cell” was solved with the novel CPP adaptor protein. McMurry explained that instead of attaching the molecular cargo to a CPP, the cargo would be attached to a CPP adaptor protein created by mixing a viral protein fragment with the human protein Calmodulin.

This CPP adaptor protein, called TAT-CaM, would get taken up by the cell and also be trapped in an undesired location of the cell. However, TAT-CaM would release its cargo of DNA or therapeutic proteins upon entering the cell membrane. Thus the cargo would be efficiently delivered to the requisite location



– the cell's inner core such as the nucleus.

"The Kennesaw State University Research and Service Foundation has supported our patent applications for this technology and others in the works," said McMurry, whose team is currently licensing the CPP-mediated technology from the University to develop other ideas.

One of those ideas is improving the CRISPR/Cas system, a very rudimentary bacterial immune system which allows the bacteria to recognize an invading virus, saving a piece of the viral genome to use in future detection of infections, thereby forming acquired immunity.

"If you purify the system from bacteria and put it in a mammalian cell, you can specifically edit the DNA of a mammalian cell," said McMurry. "Rather than treat diseases such as cystic fibrosis with therapeutics or ameliorating the symptoms, delivering genome editing capabilities using our novel CPP technologies would in fact repair the mutated gene causing cystic fibrosis."

McMurry, along with current employees Daniel Morris, senior research scientist, and Stephane Hill, research associate, are conducting proof of concept experiments to improve gene editing efficiencies using CRISPR/Cas technology. They received another NIH

SBIR grant in early August last year to fund this recent project, to include hiring undergraduate students to assist in the research.

"If we can get CPPs to consistently deliver cargo proteins, DNA and RNA, to the correct compartments, essentially all of cellular biology is open to our approach," said Morris. "Indeed, medicine's inability to deliver large macromolecules to the cytoplasm and organelles within cells has been called the major problem in the biomedical sciences. I really enjoy the fact that I am a central element in New Echota Biotechnology's success and not a cog in an enormous pharmaceutical machine."

Morris, also an associate research professor of biology in KSU's Department of Molecular and Cellular Biology, is conducting independent research on the idea thanks to a recent three-year NIH grant. With a Ph.D. in biochemistry and enzymology, he joined New Echota Biotechnology and KSU in 2016.

"With Dan also having a basic science research grant from the NIH fits in well synergistically with what the company is trying to do and what the academic lab is trying to do," said McMurry. "We hope to get a mouse model, which is the typical mammalian model system used, to show our technology works in a living organism, hopefully by the end of the year."

Hill, who started working at New Echota Biotechnology last July, knows McMurry from her KSU days as an undergraduate researcher in his lab. She started out as a chemistry major, but after career advice from McMurry, she changed her field of study and graduated with a bachelor's degree in biochemistry in 2013.

"Working for a small company alongside my undergraduate mentor has been an amazing experience," she said. "I am helping build the company from the ground up and looking forward to watching it grow."

"I am happy that for the rest of my career, I am going to be able to come up with ideas and turn them into reality which is what you do in science – you want to make a discovery," added McMurry. "I love getting up every day and going to the lab and maybe have a one in 10,000 chance of curing cancer, but that is the sort of odds you follow up on in science."



DEFINING

President Pamela Whitten has been in higher education for over two decades. Through her professional journey, she has served in various roles ranging from professor and researcher to college dean and chief academic officer.

KSU'S

A Conversation with President Pamela Whitten

Research Agenda

By Joëlle Walls

Whitten's extensive research on telemedicine, the access to medical care via telecommunications technology, has been published in more than 100 peer-reviewed scientific articles and book chapters. She has also co-authored two books on the subject. Whitten has received research funding from sources such as the W.K. Kellogg Foundation, the National Institutes of Health and the U.S. Department of Commerce.

Now as president of Kennesaw State University, the third-largest institution in Georgia, Whitten is poised to take KSU to new heights in the realm of research and creative scholarship produced by faculty and students. In a conversation with The Investigator, she shared her thoughts as a researcher and outlined her vision for the future of KSU's research enterprise.

What sparked your interest in higher education? How did your research interests progress from communications studies to more specifically telemedicine?

I have always been interested in healthcare and technology, even

before I entered academia when I worked in communications for the private sector in the early '90s. As I was finishing my Ph.D. program at the University of Kansas and seeking out dissertation topics, I became aware of a fledgling program in telemedicine at the University of Kansas Medical Center.

I set up appointments with various personnel to discuss the program along with my interests in the use of technology to deliver health services. Since not much research had been conducted into the opportunities and challenges of telemedicine at the time, I offered to pursue that line of inquiry and received funding to support my work.

Then I was invited to serve as the first director of the medical center's telemedicine program to develop clinical service delivery throughout the state and launch the program's research portfolio. When I later joined Michigan State as full-time faculty, my research focused on healthcare interventions via communications technology as well as health costs and outcomes related to telemedicine.



President Pamela Whitten listens to a presentation while touring the lab of the Southern Polytechnic College of Engineering and Engineering Technology.

The Carnegie Classification is important because it helps a university define its mission. When you embrace this classification, you are informing the world that your university possesses a deep commitment to providing world-class instruction that helps undergraduate and graduate students reach their career goals. The university is also demonstrating a deep commitment to transforming lives and furthering public outreach and service through the successful application of academic innovations. It would not be fair to delineate between “R1” and “R2” universities because there will always be variability across program purposes. Thus, the

research atmosphere is driven by the university's mission of successfully integrating teaching, research and outreach in all areas of focus specific to that institution.

What would you consider your most significant research project and why?

There is not one project that stands out to me, but a mix of activities that have represented my interests in telemedicine. When I began my research, there was a rapid rise in advancements in technology, which led to questions on how to harness that technology for communication purposes.

Therefore, I sought out research grants that highlighted trying to use different technology in different settings, such as home healthcare via telepsychiatry and telecardiology. Through the culmination of all my projects, I saw that delivering care through technology is very beneficial to improving and increasing consumer access to medical services.

Kennesaw State was upgraded from an “M1” institution (larger master’s colleges and universities) to an “R3” classification (a doctoral institution with moderate research activity) in 2016 by the Carnegie Classification of Institutions of Higher Education. KSU was most recently elevated to an “R2” classification (a doctoral university with high research activity). Why is this classification important to a university? How is the research atmosphere different at an “R2” university compared to an “R1” university (a doctoral institution with highest research activity)?

You have spent most of your career at “R1” universities, moving up the faculty ranks to leadership positions at Michigan State, and most recently serving as provost at the University of Georgia. From a faculty researcher perspective, what insights have you gained from those experiences that you can apply to your current role as president of KSU?

With KSU now designated as an “R2” institution, the number of doctoral degrees conferred annually may be different, but the missions of all the universities are the same. It is important to set specific strategic goals for the university to advance its mission, bearing in mind what that means in terms of producing high-quality opportunities for graduate students. These opportunities can lead to meaningful discoveries.

I have learned personally how compelling it is to answer pivotal questions affecting people’s lives. That is a very satisfying purpose for a researcher. Also, there is a need to improve opportunities for undergraduates so that they can participate in the research as well as learn from direct lessons. Teaching and research are not mutually exclusive.

Since becoming president last summer, what are some of your initial observations about Kennesaw State and its role in the region?

Prior to coming here, I had read about how Kennesaw State has grown and evolved in a short time – 55 years since its founding. Once I set foot on campus, I gained a great appreciation for its new status. Students from almost every county in Georgia attend KSU, as well as students from other states and international students from 92 countries. We are now considered a national university. We have moved to “R2” status by Carnegie Classification and have been recognized as a comprehensive university with a focus on student engagement and research. These examples are all integral parts of what makes Kennesaw State the university it is today.

What do you see as some of Kennesaw State’s greatest opportunities in research and creative activity?

Developing a more robust infrastructure is essential in supporting the faculty currently engaged in research as well as the new faculty we are hiring whose portfolios include research and scholarship. It is critical to work with the Office of Research, in conjunction with the colleges, to advance KSU’s research enterprise.

At the institutional level as well as the college/ discipline levels, we need to identify niche areas that exhibit our research strengths and develop those targeted areas to their full potential.

We need to increase the amount of research grants and the opportunities for graduate and undergraduate students to participate in research.

We need to expand our scholarship in more comprehensive terms—in hard sciences, social sciences, arts and humanities. We need to provide the full package of scholarship in all disciplines to propel KSU forward.

What is your goal for enhancing the research culture at KSU, while maintaining high standards of teaching and service?

A great university integrates all three – research, teaching and service. By elevating innovative instruction and intertwining those lessons with related scholarship and outreach opportunities, we can offer more enriched and engaged academic experiences for our students.

“A great university integrates all three (goals) – research, teaching and service. By elevating innovative instruction and intertwining those lessons with related scholarship and outreach opportunities, we can offer more enriched and engaged academic experiences for our students.”

Kennesaw State is hosting the National Conference on Undergraduate Research in April – the first one hosted by a university in Georgia. What expectations and outcomes do you anticipate for KSU in hosting the largest undergraduate research conference in the country?

I believe the National Conference on Undergraduate Research is a wonderful opportunity for our students to see so much research across all spectrums simultaneously. This unique opportunity exposes our students to thought-provoking research questions in a non-traditional learning environment and provides a national stage for our students who are selected to debut their projects.

Our faculty are also taking advantage of this event by creating learning connections via conference-related assignments for their students enrolled in their courses. Students can also collectively engage in the research process at the conference by talking with student presenters about their research, reviewing research posters and visiting with faculty experts to truly gain a sense of the role of research and scholarship in an academic setting.

The conference offers our students a window to the world of research and creative activity that cannot be fully appreciated without this scope and magnitude. The conference also affords us the opportunity to highlight the vast outlets of the undergraduate research experience at KSU and showcase our academic programs and initiatives to our peers in higher education.

What is the value of undergraduate research? How do you consider growing those opportunities at KSU?

Increasing undergraduate research opportunities is a broad and current interest among colleges and universities across the country. Undergraduate students are naturally curious and inquisitive, and they want to understand how things work. These research experiences provide that outlet for inquiry and serendipitously provide skill sets from assessing and analyzing the research problems. These skills can be transferable to the workforce as well as to academia for those who choose to pursue research-based graduate degrees. Since undergraduate opportunities depend so closely upon our faculty, it would be advantageous to identify the opportunities already available in the various disciplines and increase those opportunities by supporting our faculty in growing their research endeavors.

Graduate education and research usually are interdependent. What trends do you see in higher education regarding the future of graduate research?

Nationally, there has been an increase in the number of people pursuing graduate degrees, either for job promotion in their fields or entering careers that require more than bachelor's degrees. According to 2017 data from the Bureau of Labor Statistics, weekly wages for professional, doctoral and master's degree recipients, respectively, are the top three earning groups when measuring the value of education. With these expectations, we need to ensure our graduate students have opportunities to conduct research and apply those skills as part of a well-rounded education.

How do you envision Kennesaw State's research profile five to 10 years from now?

I would look at this on two levels. First, it is important for us to build out our core programs and infrastructure to be successful in our research endeavors. Then we need to strategically choose and outline signature areas to pursue that we would like to bolster in KSU's research portfolio. We are currently working on both approaches for the next couple of years. In this way, five to 10 years down the road, we can be more focused on the research and development of the strategic areas identified in our initial plan and start reaping the benefits of our goals.

As a very successful scholar and mentor, what advice would you give to a new faculty member making the transition from a recent Ph.D. graduate or post-doc fellow to an independent researcher at KSU?

Collaborate. Collaborate. Collaborate. KSU researchers should collaborate to the extent of finding research partners in other disciplines who can complement their work. When seeking funding, collaboration allows a researcher to be more competitive among peers, and increase opportunities to be funded from multiple sources that may promote interdisciplinary scholarship. Applying diverse perspectives to often complicated research questions also leads to greater understanding of the topic and to finding innovative ways to address the issues.

HONORING AN ACADEMIC LEGACY

By Joëlle Walls

The Kennesaw State University community gathered for a research symposium in late September to honor the memory of John C. Salerno, who was the Neel Distinguished Chair in Biotechnology prior to his death in 2015. The Office of Research organized the inaugural John C. Salerno Memorial Research Symposium, showcasing a cross-section of KSU faculty research.

Jonathan McMurry, associate vice president for research and professor in KSU's Department of Molecular and Cellular Biology, explained that this symposium was a celebration and a formal recognition of the growing research portfolio of KSU faculty.

"John's legacy at KSU is to be found not only in the discoveries he made and his contributions to building the research environment, but also to the mentoring of young faculty who have now come into their own as independent researchers," McMurry said.

"John's contribution towards elevating the research environment in KSU's College of Science and Mathematics cannot be overstated," added Donald McGarey, interim vice president for research. "John was not only a highly respected researcher, he had a passion for teaching and was a mentor to many students who worked on various research projects in his lab. This memorial symposium is yet one more way to celebrate John's life, his influence and important contributions."

The idea for the symposium came to fruition when McMurry, also Salerno's research colleague, and Natasha Williams, assistant director of preaward services in the Office of Research, were individually seeking ways to honor Salerno's memory, and promote KSU faculty research, respectively. They decided to combine efforts after realizing their common mission. McMurry also gained support from KSU researcher and Salerno's spouse, Susan M.E. Smith.



Office of Research hosted fall symposium in memory of pioneering researcher

“John gave so much to so many people, and he’s still giving even after he’s gone,” said Smith, professor of biology and Foundation Fellow. “The family is pleased to see his legacy of research and teaching honored by the university.”

The symposium, also sponsored by the Kennesaw State University Research and Service Foundation, began with welcoming remarks from KSU President Pamela Whitten. Then McMurry provided a brief remembrance of Salerno’s biophysics and enzymology career, also noting his interests in fiction writing and musical performance.

“It’s entirely appropriate that we celebrate research and scholarship from all across the spectrum of academic endeavors here,” McMurry said in his remarks. “I think he’d like that we are not only going to hear today from chemists and biologists and physicists too, but also a music theorist, demographer and an engineer.”

“John gave so much to so many people, and he’s still giving even after he’s gone... The family is pleased to see his legacy of research and teaching honored by the university.”

For example, Benjamin Scafidi, professor of economics, discussed the joint research work he produced with colleague Aniruddha Bagchi, associate professor of economics in the Coles College of Business. They focused on whether the number of domestic terrorism incidents change with the level of a country’s human capital. Human capital was measured in various ways such as educational attainment of adults and by average test scores on international exams.

In another instance, Muhammad Salman, assistant professor of mechanical engineering in the Southern Polytechnic College of Engineering and Engineering Technology, presented his work on using surface-wave elastography (SURF-E) as a cost-effective noninvasive approach to quantify spatial variations of mechanical and structural properties of a tendon when assessing Achilles tendon injuries.

During the reception participants were recognized and cash prizes awarded for best research presentations. Attendees had the opportunity to select their favorite presenter for a “People’s Choice” Award. Prizes were supported through the John Salerno Memorial Fund, which was established in 2016 by the College of Science and Mathematics as a tribute to Salerno’s prolific

research contributions to his field and to support research at KSU.

Jeff Yunek, assistant professor of music theory, earned the John C. Salerno Prize for Research Achievement with a \$1,000 cash prize.

“It is truly humbling to receive this award,” he said. “My fellow scholars presented research that will save our environment, improve the health of children, and help defend our nation. Winning within the arts acknowledges that our university not only strives to provide research that prolongs our lives, but seeks out the beauty, creativity and wonder that makes our lives deeper, fuller and more meaningful.”

Through examining the music mashups of DJ Earworm, Yunek said that he wanted to challenge the idea that mashups are a derivative and subversive



Jonathan McMurry (left) congratulates Jeff Yunek (top right) and Jeremy Gulley (bottom right) who were individually recognized for best research presentations.

musical genre. A music mashup is a creative work, usually in the form of a song, by blending together two or more pre-recorded songs.

"I reveal how the composer's intricate splicing of the lyrics, music and video from an average of 25-50 sampled songs produced original narratives that captured the major cultural themes occurring when these songs were released," he said.

His presentation at this conference focused on DJ Earworm's mashup *No More Gas*, which conveyed national concerns regarding American over-reliance on gasoline needs during the gas crisis of 2008.

Jeremy Gulley, associate professor of physics, received the People's Choice Award for Best Presentation with a \$500 cash prize.

"At the symposium, half the presenters and much of the audience were not scientists. Winning the People's Choice Award suggests that I was able to reach most of them with my ideas and findings. That is very gratifying, and I hope Dr. Salerno would be pleased," said Gulley, who knew Salerno when he joined KSU in 2010, often seeking advice from him about his research.

Gulley's work focuses on laser light propagation and the interaction of laser light with matter. He presented the calculations he performed with Air Force Research Laboratory collaborators on what can be expected when state-of-the-art imaging-sensor components are struck with powerful laser pulses.

For almost 30 years, Gulley said that high-power lasers have been used to track satellites in orbit around the Earth. However, there is increasing concern that these same types of lasers could be used to temporarily blind or permanently damage the optoelectronic sensors of U.S. imaging (or, more familiarly, "spy") satellites.

The other presenters included Steven Gayle, Ph.D. candidate in international conflict management; Tom Leeper, assistant professor of biochemistry; Scott Nowak, associate professor of biology; and Altug Poyraz, assistant professor of chemistry. They each gave 15-minute talks followed by a question-and-answer segment with the audience.

Faculty from across all disciplines were invited to submit research abstracts last summer to the Office of Research to be considered for inclusion in the symposium. Final selection of presenters was determined by a committee of faculty peers headed by McMurry.

QUICK FACTS ON JOHN C. SALERNO

Having **published more than 200 scientific papers**, Salerno came to KSU in 2006 as professor of biology and chemistry. He previously served as professor and chair of the Biology Department at Rensselaer Polytechnic Institute in New York for 26 years.

Many of **Salerno's innovations were in enzymology**, particularly the properties and **activity of nitric oxide synthases**, a family of enzymes that produce nitric oxide. This important cell-signaling molecule is **beneficial to cardiovascular health** as it regulates blood vessel expansion in the body's circulatory system.

His **work also focused on spectroscopic methods** or approaches to study the interactions between various types of radiation with biological matter, thus allowing for the **investigation of complex macromolecules** in novel ways.

Through Salerno's association with McMurry as **co-founder of KSU's first incubator company, New Echota Biotechnology**, several patents have been filed on the potential uses of compounds and methods that would **help in the advancement of drug development and disease management**.

In addition to his research productivity, Salerno also was recognized with the University's prestigious **"Distinguished Professor" award in 2015**. The top faculty award, presented by the Kennesaw State University Foundation, was established to **acknowledge sustained excellence in and integration of teaching, research and creativity activity, and professional service**.

SPRING SPOTLIGHT

ON RESEARCH

In April 2019, Kennesaw State University will host the National Conference on Undergraduate Research (NCUR). This event will bring students across the nation to KSU to exhibit their work in presentations and posters as well as performances and visual arts displays.

While NCUR coming to KSU is new, KSU students have presented their extensive research at previous conferences. Theater and performance studies major LaTausha Carter presented during the 2018 NCUR in Edmond, Oklahoma, speaking about how the patriarchy affects women. The name of her work was "Acting Like a Woman: Patriarchy and the Performance of the Female Athlete."

When discussing her research and its importance, Carter said, "As human beings, we are constantly performing and watching how others perform throughout society. It takes a lens like theater to recognize how patriarchy is currently working in one's personal life. I truly loved working on this project, and I can't wait to see how far I will take it or it takes me." Similar to Carter, many students will have the chance to showcase their passion.

"Institutions that are chosen to host NCUR have a demonstrated track record of excellence in undergraduate research," said Amy Buddie director of KSU's Office of Undergraduate

National Conference on Undergraduate Research debuts at KSU

By Emily Deibler

Dylan Carter, a senior theater and performance studies major, is among a group of over 500 KSU students selected as 2019 NCUR presenters.



Research. "It is an honor that the Council on Undergraduate Research chose KSU as the host for NCUR 2019 – it's a testament to the hard work of countless faculty and students at KSU."

Beyond NCUR, undergraduate research has always been a crucial part of KSU, including providing support and guidance to students and their faculty mentors.

"We aim to make hands-on research and creative activity an integral part of the undergraduate experience at Kennesaw State University," explained Buddie. "For example, there is funding available to support undergraduate research, and the Kennesaw Journal of Undergraduate Research in which KSU students can publish their scholarship."

Another way for students to get involved is through the Undergraduate Research Club (URC), a popular registered student organization which promotes undergraduate research and creative activity at the University through team-based research projects. Many of the members have also presented at NCUR and plan to participate in April.

KSU student Sharon Kaur has worked on obesity research, and the experience she gained helped her secure her position as URC secretary and then as president. This led to her studying the health behaviors of KSU first-year students and how their well-being correlated with their grades through a survey. Though Kaur was not able to get a sizable sample (she has estimated there were only about 40 students surveyed), this experience served as a learning moment for how to gather research information.

The following year, with the help of Buddie, Kaur learned how to engage with students through Sona, an online participant recruitment program available through the Department of Psychological Science website, which tremendously improved survey participation. She took her findings to NCUR, and described seeing the number of students there as "amazing"

since there are usually at least 3,000-4,000 attendees.

Anjie Adeyemo, current URC secretary, presented her work at KSU in spring 2018 on how race and geographic location affect the rates of infant mortality. Making her first appearance at NCUR 2019, Adeyemo believes research experience is vital, saying it has been valuable "being able to learn something new and being able to present something that you're passionate about."

Robbie Cronin, a chemistry major who serves as URC treasurer, presented at NCUR in 2018 over "phubbing," which means snubbing—ignoring—someone while on your cell phone. Through this survey-based URC project, he discovered that "phubbing" was more common in friendships than in romantic relationships. In addition, participants perceived that their friends and partners engaged in phubbing more than they did.

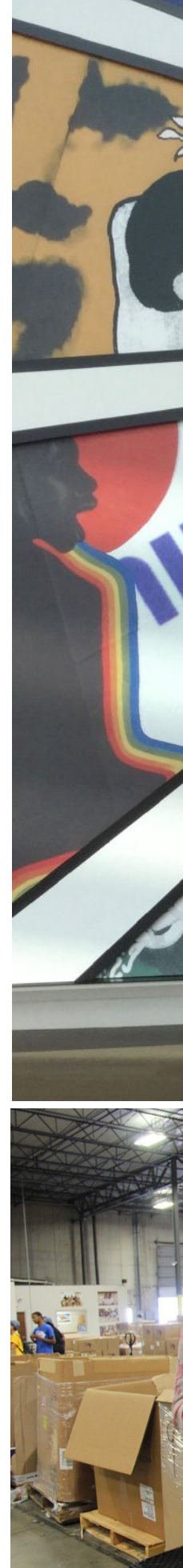
Now Cronin is working on researching whether activated charcoal can absorb organic components of gunpowder residue, which could help identify different types of residue. He is presenting on this topic at NCUR, though the research is in its beginning stages. With this work, he hopes to go to graduate school to study forensic chemistry.

URC Vice President Alyssa Venn loves reading about and conducting research, even changing her major from psychology to statistics because, with experience in statistical data, she can research anything. She has been to NCUR many times, and recommends that people attending should look at everything from the posters to the art displays, and encourages students to participate as presenters or viewers.

Already, many KSU students have shown their passion and drive at NCUR. In April, NCUR will bring many interesting research projects to the campus, and KSU's students will show off their hard work, much like they have in past years.

“UPWARD BOUND”

TO A UNIVERSITY DEGREE



KSU's Paulding Site celebrates first year of success

By Joëlle Walls

In fall 2017, Kennesaw State made institutional history in external research funding. It was the first time KSU was awarded not only an Upward Bound (UB) grant, but three of them from the U.S. Department of Education, thanks to the work of KSU Paulding Site Director Anita VanBrackle and Associate Director Dalton Lemelle, Jr.

Totaling more than \$3.9 million over a five-year period, the grants provide academic and cultural enrichment opportunities and mentoring support to participating high school students from Polk and Paulding counties so they can successfully pursue and earn college degrees. Students in the program include those who meet the economic requirements set forth by the U.S. Department of Education or who would be first in their families to attend college.

The UB grants are part of the TRIO programs, federal outreach and student services programs in the U.S. designed to identify and provide services for individuals from disadvantaged backgrounds.

“What a delight to see college dreams begin to develop for students who had never thought

of going to college,” said VanBrackle, who also is professor of elementary and early childhood education. “These three Upward Bound grants promise to help KSU have a lasting and permanent impact with many generations of families, now and in the distant future.”

In the first year, the two Upward Bound programs had a total of 116 students who attend Hiram, Rockmart and Cedartown high schools. Fifty-six students from East Paulding High School were enrolled in the Upward Bound Math-Science program. This grant has the same purpose as the other two, but focuses specifically on strengthening the students’ math and science skills with the aim of them ultimately pursuing degrees in these subjects.

“My son had the fortunate opportunity to be a part of two TRIO programs, one in middle school and one in high school. Both programs prepared my son for college opportunities that I did not know he was capable of accomplishing,” said Lemelle, who is also retired from the U.S. Air Force. “I am so proud of him, and I credit the TRIO programs in his success as he graduated with a bachelor’s degree in aerospace engineering from Tuskegee University.”

Lemelle said that he and VanBrackle handle many of the administrative and reporting tasks associated with managing federal grants, so the directors of the programs can focus their efforts on the high school students along with the academic advisors. In this way, the UB staff has been able to be in the schools, interacting directly with the students during school hours five days a week.



Photos courtesy of KSU's Upward Bound and Upward Bound Math-Science programs





East Paulding High School students attended the Atlanta Science Fair Expo at Piedmont Park.



Upward Bound students participated in a summer academy at KSU to simulate a college experience.

"Being a part of the high schools' cultures has tremendously impacted our overall success thus far and helped us quickly develop relationships with not only the students, but also the faculty and staff," Lemelle explained. "Students seeing the UB teams every day gives them a piece of mind that these are people they can count on for guidance. These visits also allow the schools to observe our staff in action so that they know we are all on the same team with one goal – student success."

"Both the directors and advisors work closely with the students, keep accurate records of each student's progress and stay in continuous contact with the parents," added VanBrackle. "Since each Upward Bound program will continue to track the students from college entrance to graduation, we must know each student's wishes, dreams, problems, and mountains they have to climb. We are a family."

While the three programs have similar objectives to guide the students on the path to post-secondary education, each director and academic advisor tailors the programs according to the needs identified during their interactions with the students.

"There are no two days alike. We have what's on our schedule for the day and what is really happening with

students that day," said Stephen Burns, UB director at Hiram High School. "We work hard to find a balance to give each member the support they may need."

Christine Smith, the UB academic advisor at Hiram High School, has rearranged her schedule to campaign for students running for student club officer positions, or reviewing and editing student essays on a deadline.

"Upward Bound is more than just a program that meets after school and on weekends," she said. "It is a personal development tool that guides students to the path of self-discipline, self-worth and an investment in their academic future."

During the 2017-2018 school year, students participated in workshops on test preparation and career readiness. For example, the Georgia State Finance Commission held a Saturday workshop on financial aid and scholarships. The University of Georgia Testing Services provided a free SAT preparation workshop, which included students taking a mock exam, and learning how to effectively use graphic calculators.

Individual and group advising sessions comprise the heart of the programs. These sessions, lasting between 20 minutes to an hour, provide critical student feedback from grade reviews, goal-setting activities, and career interest surveys.

"I had no one to guide me during my high school and college career and had to financially support myself through that period in my life," said Christine Murphy, UB director for Rockmart and Cedartown high schools. "This program is a perfect fit! It truly allows for life-changing opportunities for underrepresented students and their families that will open up many doors and ensure success."

Mary Turner, who serves as the UB academic advisor for the two schools, has seen between six to 20 students in a given day. The conversations have varied from helping students complete college and scholarship applications to candid conversations about academic challenges they faced.

"I try to show my students daily that your history does not define your future," she said. "No matter who your family is, everyone can achieve their goals if they have the right drive and motivation. There is nothing I want more than for every student I have in my program to achieve their dreams."

Each program also implemented tutoring, either in-person or online, for the students to help them not only improve grades, but also learn valuable study habits. East Paulding High School, which is the site for the UB

Math-Science program, received additional tutors as a result of the grant to supplement their already existing program taught by the high school teachers.

"The most important thing about Upward Bound to me is meeting the needs of the students. The student always comes first," said Krystina Leverett, who serves as academic advisor for the UB Math-Science program. "Even if I have to bend over backwards to make sure they are safe and have what they need to be successful, I will make sure it gets done."

Each program also provided field trips such as East Paulding students attending the National Collegiate Fair in Atlanta, which was sponsored by the National Association for College Admission Counseling. The students conducted preliminary research on their college choices before speaking to representatives from more than 200 colleges and universities.

"It's only been one year, and we already see positive changes happening with our students," said Cheryl Thomas Hill, UB Math-Science director. "They are moving out of their comfort zones and showing more confidence in and outside of the classroom. They are on their way to becoming our next generation of leaders in STEM fields and other disciplines."

Other trips included Hiram students visiting the National Center for Human and Civil Rights and Rockmart and Cedartown students attending the University of West Georgia's Preview Day.

The students also participated in a six-week summer academy held on KSU's Marietta Campus to simulate a college experience. The students received academic instruction in math, science and English to help them prepare for the next grade level. They also were exposed to electives such as photography, robotics

and independent research, and had the opportunity to tour sites in Washington, D.C. at the end.

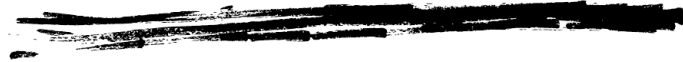
"The summer academy instructors did an exceptional job in preparing the students for their upcoming school year," said Lemelle. "Ending the academy with the Washington, D.C. trip was phenomenal. It was wonderful to see the enthusiasm and excitement of the students, some of whom have never traveled overnight across several states without their families."

As the initiative is halfway through its second year, VanBrackle and Lemelle received additional funding for science, technology, engineering and mathematics (STEM) programs for all four high schools. Each program was awarded \$40,000 to spearhead activities such as computer repair and computer science training and a curriculum-based introduction to robotics and coding.

Juniors and seniors from each program also have the opportunity to be involved with a STEM or STEAM (science, technology, engineering, arts, mathematics) internship program during the summer. Part of the program includes workshops

that will help prepare them for competing in internships/research opportunities with federal agencies and/or universities from across the U.S.

"We must say a special thanks to KSU for providing support to our three TRIO programs, and to the many unsung heroes who have so graciously helped as we have worked our way through the process, including Dr. Ken Harmon who gave us the approval to seek grant funding, and Tonja Lark from the U.S. Department of Education," said VanBrackle. "This support was essential in allowing us to offer so many resources to our students so they can reach for the stars."



*"This program is a perfect fit!
It truly allows for life-changing
opportunities for underrepresented
students and their families that
will open up many doors
and ensure success."*



KSU ALUMS WORKING WITH

UPWARD BOUND

By Heather Hankins

Coming back home

Christine Smith is a Kennesaw State University alumna and currently serves as the academic advisor for Hiram High School in the University's Upward Bound (UB) program. Smith's job includes recruiting UB participants who meet the program requirements; providing academic and personal counseling; planning, implementing, and chaperoning workshops and trips; advising on college admission and financial aid; recruiting and training summer staff; and completing written student evaluations.

Smith is originally from Paulding County and is a 2012 graduate of Hiram High School. When Smith was younger, she did not think she would return to her high school. Things changed during her attendance at KSU.

"Being a Hiram graduate and now working in the school, for me, feels like I am helping make a difference in the school but also stepping into a time capsule full of memories," said Smith. "Having been a first generation student at Hiram helps when talking to the students because I can relate and sympathize with them in regard to the culture of the school and community in which we live."

Smith started her college experience at Georgia Highlands College (GHC) and graduated with an Associate of Science degree in General Studies in 2016. She then enrolled in the KSU Paulding Site's 2+2 program, which is a partnership between the two institutions in which students complete their first two years at GHC and then transfer to KSU to finish a four-year bachelor's degree. Smith describes this program as "the turning point in my life."

During her time at KSU, Smith worked as a student assistant at the Paulding Site as well as with the UB program at her high school. Smith graduated with



a Bachelor of Science degree in Psychology in 2018. After graduation, Smith joined UB as the academic advisor for the program at Hiram High School. She advocates for her less-than-traditional path.

"Choosing to go to a community college first and then transition to a four-year university, for me, is the reason for my success," said Smith. "It's what I encourage students who aren't 100 percent certain where they want to go to school, how they will be able to afford it or plan to work while in school."

Smith also attributes a strong support team, including Bentley L. Gibson of Georgia Highlands, and Dalton Lemelle and Anita VanBrackle of KSU for her success.

Smith loves research and working with students. She credits KSU for developing her interest in both. When she chose a major in psychology, Smith was initially told that she would never get a job. This attitude lasted until her courses with Teresa Neal and Kimberly Watkins at the KSU Paulding Site. She still refers to notes from those courses during her current role.

"Dr. Neal's courses began my newfound love for research, choosing to finish pursuing my bachelor's in psychology, and seeing that there are endless job opportunities with that degree," Smith said. "Aside from the research, seeing the students' progress and desire to pursue degrees in a field they are passionate about is what I love most about my job."

“I think that my ability to connect with students owes a lot to my degree from KSU...”

Using your past to help the future

Mary Turner, a 2017 alumna of Kennesaw State University's 2+2 program, now works as a project advisor for KSU's Upward Bound (UB) program at Rockmart and Cedartown high schools. Turner's role with UB addresses many aspects of student life leading up to college – career interest clarification, school applications, SAT preparation, college evaluation and admissions interview preparation.

UB works to give every student an equal opportunity to succeed. Turner believes her students are exceptional, and that their generation will one day change the world.

Turner's background informs her work. She grew up in the Marietta area, and while most of her community was affluent, Turner's family often struggled to get by. Her parents did not have degrees, but emphasized the importance of Turner earning one. Turner was homeschooled throughout high school.

Then, at 16 years old, she decided to obtain her GED certificate and start college. She chose to attend Georgia Highlands College because it was close to home and affordable. While there, Turner completed her associate's degree in psychology and enrolled in the KSU Paulding Site 2+2 program to pursue her bachelor's degree in psychology.

“Upward Bound is really close to my heart because I was one of these students,” said Turner. “I felt like college was unattainable because no one in my family had even graduated high school. However, I came out the other side, and I love working with students and showing them that it is possible to go to college and succeed. When I saw the opportunity to work with students like myself and help them get into college, I knew it was something I needed to do.”



Turner's job as a work-study student at KSU helped her to develop in areas such as public speaking, connecting with students, as well as managing student files and information effectively. In addition to

professional skills, she gained self-confidence, strong relationship skills, leadership qualities and research abilities. Turner is now earning her Master of Science in First-Year Studies and working on her thesis at KSU.

Before her time at Kennesaw, Turner was uncertain about the prospect of research. She had not been exposed too much in the past and did not understand the process. Yet Turner developed an understanding and appreciation of research through her class assignments, her work at the KSU Paulding Site, and her independent research project during senior year.

“I think that my ability to connect with students owes a lot to my degree from KSU,” said Turner. “Understanding developmental and educational needs of students at this stage is something that I owe to my psychology degree.”

SENSE, THINK, ACT

Mechatronics students engineer automation solutions for Mohawk

By Joëlle Walls



KSU students Kayleb Garmon (left) and Patrick Yelverton (middle) observe their robotic gripping solution handling product with faculty mentor Matt Marshall.



The sense-think-act paradigm is used in robotics research to describe how sensory data is processed and distributed through the system so that the robot can make the appropriate action decisions based on the data. Mechatronics engineering students in KSU's Southern Polytechnic College of Engineering and Engineering Technology are using this mental model as they are designing automation solutions for Mohawk Industries, the largest flooring manufacturer in the world.

"Industry-leading companies are always looking for process improvements to drive productivity and stay competitive. Some of this improvement has been limited due to lack of technological applications," explained Chris Behrends, vice president of supply chain and logistics at Mohawk Industries.

With a three-year \$250,000 grant from Mohawk, including student scholarships to cover tuition, Matt Marshall, assistant professor of mechatronics engineering, is leading a team of students to improve elements of the company's flooring manufacturing processes with the latest industrial technology.

At the center of this collaboration are two Universal Robots (UR-10) mechanized arms, each weighing 63 pounds and outfitted with six pivot points and a 51-inch reach. Mohawk purchased these cobots or collaborative robots, which are more conducive to work in shared spaces with humans, to loan to the University for use in the Marietta Campus lab.

"The mutually beneficial partnership helps the College provide educational opportunities to engineering students that will enable them to serve our society as it changes," said Marshall.

"Dr. Marshall is handpicking projects and giving his students the opportunity to experiment with new technologies like vision systems and collaborative robots

to simplify work. We love the ideas and enthusiasm from both the KSU teams and the Mohawk teams collaborating on these projects," added Behrends. "Mohawk is excited about this program not just for bringing real solutions to the table, but also for providing a connection with our future leaders as we continue to grow our team."

Since the project began in fall 2017, the students have been engaged in various aspects of three tasks requiring automation. These tasks included improving a specific step in the carpet production process; the making of machining parts in-house for Mohawk's operations; and automating the process of producing carpet sample books that consumers peruse in retail stores.

Marshall organized the students into three sub-teams to work on the tasks. Martika Johanson-Murray, a senior from Atlanta, was part of the team focused on automating the operation of a computer numerical control (CNC) machine. The CNC machine is responsible for the automated control of machining tools such as drills and boring tools via a computer in which the CNC machine transforms a piece of material such as metal or wood to precise specifications.

"The project was centered on having a UR-10 load and unload raw rectangular blanks of aluminum into/out of a CNC machine," explained Johanson-Murray. "Mohawk could fabricate parts they currently order in-house to cut back on costs since those parts break frequently with use."

Last November, the team, in collaboration with KSU mechanical engineering technology students, had the opportunity to demonstrate their project at FABTECH, the largest event in the U.S. for the metal fabricating industry. The event is attended by manufacturing and engineering professionals and business owners from major industries such as aerospace

and construction as well as high school students interested in career opportunities in the field.

“At the FABTECH demo, we showed exhibitors our research and explained our solution to other major material companies handling raw materials similar in nature. The MET department helped us with fabrication of parts for the booth at the expo,” said Johanson-Murray, who would like to pursue a career working for an automotive group with their robotic systems on assembly lines.

“Undergraduate research gives me a means to use what I have learned in my mechatronics engineering courses in realistic applications that I can then share with potential employers during job interviews,” she added. “This was the first research-related team I have been a part of and have really enjoyed the experience. Working with Mohawk has opened my mind to more opportunities for post-graduation.”

With the carpet samples team, KSU students Patrick Yelverton and Kayleb Garmon were able to go a step further and install their team’s automation system in Mohawk’s north Georgia factory. The system Yelverton and Garmon installed included adhering the identification labels on the back of the carpet samples.

“Seeing the students’ solution implemented was rewarding, both to them and to the sponsor,” said Marshall.

This university-industry partnership began in spring 2016 when Mohawk reached out to KSU with the purpose of involving students to work on some of their production-related projects. The first project centered on boosting the efficiency of their robotics assembly-line that created carpet sample boards. The boards are used in thousands of retail stores to showcase the various carpet collections Mohawk offers. For customers to accurately compare colors between carpets, Mohawk wanted all the piles or fibers of the carpet swatches on the sample boards oriented in the same direction.

Marshall coordinated with Mohawk to ensure the project would align with the college’s academic program and meet the company’s production needs. With a \$30,000 award from Mohawk, including an extra \$4,000 in student scholarships, Marshall then gathered a group of KSU seniors for the project that they completed through a 15-week directed study during that fall semester.

The students – Johnny Canazon, Cameron Clevinger, Flavio De Paula and Matt Hensley – developed two solutions for the already existing assembly line. One prototype involved a motorized sensor that touched the carpet to detect the direction of the pile. Another device used cameras taking pictures of all four sides to determine carpet pile direction. They also developed a more efficient carousel for even distribution of the carpet swatches to the assembly line.

Undergraduate research gives me a means to use what I have learned in my mechatronics engineering courses in realistic applications that I can then share with potential employers during job interviews.



Patrick Yelverton (left) and Kayleb Garmon installed their team’s automation system in Mohawk’s north Georgia factory.

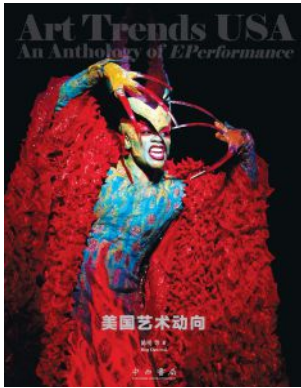
“In addition to meeting some of Mohawk’s technological needs, the partnership is helping the College to nurture Georgia’s engineers of tomorrow,” said Marshall. “For the students to get a head start in that, and see the fruits of their labor today, is something we all appreciate.”





NOTEWORTHY FACULTY PUBLICATIONS

By Elizabeth Friedly

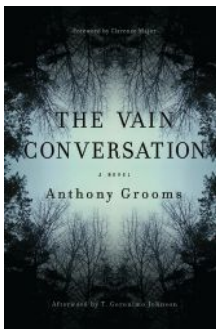


Arts Trends USA - An Anthology of EPerformance (2017)

Art Trends USA is a bilingual book on contemporary theater and performance designs available in Chinese and English. Art Trends USA has also received the KSU Foundation Outstanding Book Award in 2018.

“This publication was a culmination of my research and writings at least since 2013,” said author Ming Chen. “I intended to situate the works in their social, cultural, technological, political, and economic contexts, so as to provide an in-depth look at the arts and cultural scenes in contemporary America.”

Chen is a professor of theater and performance studies, as well as KSU’s resident theatrical designer.

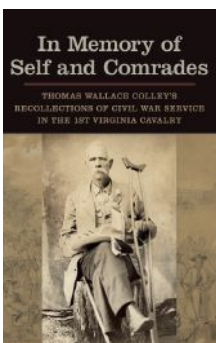


The Vain Conversation (2018)

Inspired by true events, *The Vain Conversation* reflects on the 1946 lynching of two black couples in Georgia from the perspectives of three characters—Bertrand Johnson, one of the victims; Noland Jacks, a presumed perpetrator; and Lonnie Henson, a witness to the murders as a 10-year-old boy.

“The Vain Conversation took 27 years, from conception to publication,” said author Tony Grooms. “Justice is a theme that pervades my work. Though I am interested in ideas about redemption, it is not redemption alone which I seek—rather, justice and salvation.”

Grooms is a professor of creative writing and directs KSU’s Masters of Arts in Professional Writing program.



In Memory of Self and Comrades (2018)

Transcribed from his first-hand accounts, *In Memory of Self and Comrades* takes you through the life of a Confederate soldier named Thomas Wallace Colley. Author Michael Shaffer was shocked when one of Colley’s descendants provided him volumes of unreleased journals.

“If readers will ‘listen’ to his observations, they may have a better understanding of... the struggles of all who wore the gray after the final stacking of arms,” said Shaffer. “This former Confederate, now a United States citizen, wrote as a man wishing to remember his comrades, but also willing to adapt to a new society without lingering hatred.”

Shaffer is an instructor in KSU’s College of Continuing and Professional Education. He also is the author of *Washington County, Virginia, in the Civil War*.



Roman Cult Images – The Lives and Worship of Idols from the Iron Age to Late Antiquity (2018)

In the ancient Roman world, the gods were encountered inside temples in the form of their cult statues. *Roman Cult Images* tries to view these artworks in terms of their original context and function.

“One of the biggest surprises was just how hesitant current literature on Roman art and religion is to discuss the place of worshipped objects, or ‘idols,’” said author Philip Kiernan. “Rather than focus on the style and iconography of these objects, it is important to understand their original function – which was to enable encounters between humans and the divine.”

Kiernan is an assistant professor of art history in KSU’s School of Art and Design and director of the university’s interdisciplinary program in classical studies.



NATIONAL GEOGRAPHIC SOCIETY

KSU faculty awarded grant for Green Card Youth Voices



Drs. McDaniel, Rodriguez and Smith-Sitton attended a fall campus event featuring three of the student authors.

KSU researchers Paul McDaniel, Darlene Rodriguez, and Lara Smith-Sitton – along with executive director of Green Card Voices, Tea Rozman Clark – have received

a research grant from the National Geographic Society.

The researchers' project, "Green Card Youth Voices: Immigration Stories from an Atlanta High School," borrows its title from the book of the same name. The book, published last April, is a collection of essays written by DeKalb County high school students, sharing their stories of migration and acclimation to the U.S. The grant is being used to continue efforts to extend beyond the book project into community-based education and outreach initiatives to increase understanding of Atlanta's migrant experiences.

Some of the planned activities include using the book and its multimedia resources in KSU classrooms; creating and implementing a curriculum and study guide at the undergraduate level; presenting at research and topic-related conferences; and spearheading book readings, panel discussions and a traveling exhibit with the student authors at community venues and local events.

Rozman Clark's Minnesota-based nonprofit organization, Green Card Voices, conceived the original idea. The group wanted to branch out nationally after focusing on immigrant narratives primarily in the Midwest. Through partnering with the University professors, the multi-year project has included the involvement of KSU undergraduate and graduate students from English and the professional writing program who helped complete the editorial process with the high school student authors.

NATIONAL SCIENCE FOUNDATION

Two KSU physicists earn individual grants

The National Science Foundation (NSF) awarded grants last fall to both KSU Professor Nikolaos Kidonakis and Assistant Professor Marco Guzzi for individual projects to improve theoretical predictions in particle production experiments.

For the last 25 years, experimental physicists in particle accelerator labs have utilized Kidonakis' work. Such labs include the Large Hadron Collider (LHC) at CERN (European Organization for Nuclear Research) near Geneva, Switzerland, which is considered the world's largest and most powerful particle accelerator.

In 2012, Kidonakis' calculations and the work of others were used to find the Higgs boson at the LHC. The Higgs boson, a particle believed to give mass to other particles, had been a physics mystery since it was first proposed in the 1960s.

Guzzi, who joined KSU in 2017, has worked in the U.S., the United Kingdom, and Germany where he was an affiliated theoretical physicist of one of the LHC experimental groups (CMS) based in Hamburg.

His research is focused on not only to improve the current knowledge of the distribution of quarks and gluons, the building blocks of matter in a proton, but also enhance the theory predictions to search for new physics interactions.



Marco Guzzi and Nikolaos Kidonakis study theoretical particle physics at KSU.



MANAGING MONEY & CRUSHING DEBT



Jason Brown described his book projects as "tremendous learning opportunities."

By Emily Deibler

Jason Brown graduated in December 2018 with a Master of Arts in Professional Writing (MAPW) from Kennesaw State University. He is currently a copywriter and copy editor at HNTB Corporation, a transportation consulting firm in Atlanta. In this Creative Activity Snapshot, he speaks about writing his budgeting book and working on a ghostwriting project.

What was writing your book like? How did you get started?

*My book, **Margin Matters: How to Live on a Simple Budget and Crush Debt Forever**, was created over the past 10 years. Before I was married, I paid off \$13,500 in consumer debt in thirteen months. When I married, my wife had \$60,000 of student loan debt. My wife and I paid off her student loans, credit cards, and car loan in 2 1/2 years. We paid off \$75,000 of debt in nearly 3 1/2 years — with neither of us making more than \$40,000 a year.*

*I wanted to document this experience. However, writing a book seemed daunting. It wasn't until my son was born in 2016 that I wanted to start writing down my thoughts, so I could present them to him one day. I was an MAPW student who had enrolled in Dr. Anne Richards' technical writing class and our assignment was to write a how-to book; I knew what I wanted to do! **Margin Matters** started in class and progressed into my capstone. Dr. Richards and Dr. Chris Palmer, my capstone committee members, provided excellent feedback and guidance. I have written about 100 pages.*

Over the decade leading into my MAPW work, I discovered leaders like Dave Ramsey, Clark Howard, and my pastor,

Andy Stanley. I examined their shows, sermons, and books, along with other books on the subject. I've interviewed individuals who have demonstrated wise financial choices in their lives.

What was ghostwriting like? How did it help your studies?

Years ago, Scott Whitlock, the former KSU head softball coach, asked me to help write his memoir. Whitlock, inducted into the National Fastpitch Coaches Hall of Fame

in 2005, has retired from coaching and is currently KSU's senior associate athletics director. I Wasn't Expecting All This is a whimsical look at his coaching adventures and all the people he met along the way—not to mention his success in the softball world.

The goal of ghostwriting was to chronicle his stories without losing his voice and unique sense of humor. You develop a strong personal and working relationship with the author. This was my summer directed study with Dr. Richards in 2018. We have more than 200 pages written and plan to have this ready for publishing by spring.

What are your current plans for publishing your book? Will you ghostwrite in the future?

*For **Margin Matters**, my goal is to have it published by the end of 2019. I will likely self-publish but will explore my options. My book is a starting guide for individuals on creating a budget, saving money, and getting out of debt—and STAYING out of debt. I am targeting 125 to 150 pages. I'm not opposed to ghostwriting in the future; however, it'd have to be the right opportunity.*



Workflow, Students and Research: A Dynamic Trio



By Heather Hankins

"Working alongside student-scholars in community-engaged research experiences has transformed my teaching as well as my research practice..."

There is a new way to conduct research at Kennesaw State University. Jeanne Bohannon of KSU's Department of English just finished her third semester of repurposing a workflow model to teach her students how to conduct meaningful humanities research while also producing high-quality research deliverables every semester.

Humanities research has a history of being siloed—picture a single researcher surrounded by primary sources only connecting with others through email. Not in this new workflow model—Bohannon's WRIT 3150 class works as a collaborative team split into sub-groups that focus on various aspects of research and dissemination of multimodal deliverables for the Atlanta Student Movement Project.

This research project, funded by a grant from the Rich Foundation, is headed by Bohannon, associate professor of English, along with Lonnie King, the project's senior community partner.

Through various digital storytelling methods, the project details the history of the Atlanta Student Movement, which included King as one of the leaders during the Civil Rights Movement.

Each student team for the project meets with Bohannon at the beginning of the semester to negotiate a contractor-client agreement. She prepares needed research goals which guide the work of her student researchers, and the teams choose what fits with their skills and interests. The contracts detail what each sub-group team will be responsible for producing throughout the semester and what is needed to obtain a grade of A, B or C.

The students are expected to manage their workflow and communicate within their teams and with the other teams to ensure that the highest

quality research is being developed. Teams use GroupMe, Slack, or other workflow platforms to effectively communicate throughout the semester.

“Working alongside student-scholars in community-engaged research experiences has transformed my teaching as well as my research practice,” said Bohannon. “Using collaborative

methods and workflow models create an atmosphere where students thrive in their emerging professional ethos. I have found that these iterative practices also dramatically increase student success.”

When implementing a new approach to research, there is always a chance of failure. However, the Atlanta Student Movement Project is flourishing with a fleshed-out approach to digital storytelling that has resulted in videos, podcasts, web content, and social media posts detailing the vibrant history surrounding the Atlanta Student Movement.

The student testimonies are universally enthusiastic. Students are engaged and excited about their work, stating that the project “feels more like a real job than a class” and that the clear expectations and lack of uncertainty regarding grading allows them to focus on the work.

Every semester, old students leave and new students join the project. But thanks to ongoing and archived workflow models, the project runs smoothly.

Students cite that any frustrations they have, such as waiting for other teams to finish before beginning their own piece of work, mirror common workplace frustrations. Students learning how to address and overcome such frustration only prepares them more for life after college.

For more information on the Atlanta Student Movement Project, visit: <https://soar.kennesaw.edu/handle/11360/2384>

Have a story to tell about the Atlanta Student Movement? Email: jeanne.bohannon@kennesaw.edu



Students learn how to manage their time and effort while gaining meaningful humanities research experience.

“The change in environment can be a shock to some students, but the lessons learned from the workflow model far surpass the acute struggles one could face at first.”

– Abi Marmurowicz, junior exercise science major from Milwaukee, WI

“Undergraduate research has substantial benefits besides the learning curve of it. This kind of research is conducted in a professional manner that ultimately prepares students for the work and demands of graduate school and even the professional world. It also gives undergraduates the opportunity to experience a different form of academia that could potentially introduce new career options for them.”

– Kiahna Kuykendall, junior English major from Woodstock, GA

“What I found to be most interesting about this project is that we are writing history. The project we are working is not just a checklist of to-do lists, but is helping tell forgotten stories of civil rights to multiple audiences.”

– Hannah Queen, senior English major from Woodstock, GA

“I would really like to be a social media manager one day so this project has definitely been beneficial to my career goals. I’m getting some practice and experience in now, so I can really determine if this is what I want to do when I graduate.”

– Allison Bashaw, senior communications major from Canton, GA



Launching the future biomedical Ph.D.s

By Jaden Austin (English '18)

Kennesaw State University's Peach State Bridges to the Doctorate Program, a project funded by the National Institutes of Health, is preparing the next generation of biomedical doctors. The program does so by bridging the gap between education and finances. Jonathan McMurry, associate vice president for research and professor of biochemistry, is the program director.

The program allows a select few individuals the opportunity to obtain their doctorates while completing individual scientific studies. Every year four individuals are chosen to become a part of the program. The class of 2020 recipients include Brandon Stewart, Janasha Goffigan-Holmes, Ofumere Omokhodion and Krista Barbour. Even though the students are a part of the same program, their individual career goals and personal objectives vary.

Stewart is from Gray, Georgia. His current goals include earning his doctorate and pursuing a career in pharmaceutical medicine. Through Stewart's studies, he hopes to better comprehend neurological disorders, such as Alzheimer's, Parkinson's, and Huntington's diseases. Stewart said he wants to learn how such disorders "interact with normal neurons' development and potentially find targets for therapeutics against those diseases."

Goffigan-Holmes is originally from Boston, Massachusetts. She plans to earn her Ph.D. in either developmental neurology or neuroscience. After graduation, Goffigan-Holmes wants to further her career by working in either government or private practice where she hopes to continue her research on how trauma and/or stress experienced at critical stages in one's development affect their neurological and behavioral norms.

"I hope my research will influence medical practices, pharmaceuticals and social and mental health professionals to better assist them in developing better practices and treatments," she said.



Omokhodion was raised in Nigeria and wants to further her career as a researcher at a research university. Through the Peach State Bridges to the Doctorate program, Omokhodion wants to study the biometrics of genetics and genomic editing techniques. The genetic research includes testing and studying DNA strands such as inherited traits found in an individual's heritage and family gene pool. Omokhodion hopes that her research helps "improve the world and our understanding of it."

Barbour was born in the Eastern Caribbean island of Saint Vincent and the Grenadines. She is currently experimenting with various diseases, such as yeast infections and other fungal diseases using cell-penetrating peptides linked to protein cargos. She believes the program is a stepping-stone, allowing her to enter a Ph.D. program in biomedical sciences. Ultimately her dream is to become a medical science liaison.

Many of the participants agreed that the Peach State Bridges to the Doctorate program has elevated their academic experiences. They are able to develop their research skills while advancing their professional goals. The opportunity will not only change their own lives, but also make a change in the lives of others through their research.

Increasing the number of African-American engineers through tutoring outreach partnership



By Joëlle Walls

Roneisha Worthy, assistant professor in civil and construction engineering at Kennesaw State University, is always seeking opportunities to involve KSU engineering students in community engagement and outreach. Her

latest research endeavor not only does so, but also fulfills the missions of two nonprofit organizations. As a member of the National Society of Black Engineers (NSBE), she wanted to help support its goal to graduate 10,000 African-American engineers by 2025.

In talking with a NSBE member who also is a part of 100 Black Men, she found a connection that would benefit both organizations. 100 Black Men is a civic organization and service club whose mission is to educate and empower African-American youth. The organization was looking for more tutors, especially college students for its Mentorship for Tomorrow program, which helps high school students strengthen their math and science skills.

Worthy and NSBE members suggested KSU engineering students could serve as tutors. They would also introduce the tutoring program participants to engineering careers through hands-on activities, preferably on a weekly basis. With leadership from both NSBE and 100 Black Men embracing the idea, Worthy is studying the effectiveness of the partnership over a two-year period with a control group – one tutoring locale without the activities—and one tutoring program with the STEM (science, technology, engineering and mathematics) activities.

“It is a wonderful opportunity for us to really evaluate a partnership between the two organizations to

determine whether or not these organizations can strategically focus on developing a pipeline of students interested in engineering who will ultimately graduate in that field,” she said.

KSU students, to include members of the student chapters of both organizations, will receive a stipend for tutoring thanks to funding provided by 100 Black Men. They will also help Worthy develop the hands-on projects that will feature the various sub-disciplines of engineering through a career-connected lens. Worthy said she is very excited about the collaboration between KSU students and community partners.

“When we can engage our students in any type of process related to research it is very important, even more so from a community engagement standpoint,” she said. “Not only should our students have opportunities to become academically exceptional, but they should also have experiences that support civic-mindedness to make them well-rounded professionals.”



KSU engineering students will introduce STEM-related careers to high school students through unique partnership.



Examining the health system barriers for pregnant opioid users in north Georgia



By Joëlle Walls

Evelina Sterling, assistant professor of sociology at KSU, conducts public health translational research as related to addiction disorders and mental health, most notably health disparities in north Georgia.

In support of her recent research on system barriers encountered by pregnant opioid users, she was awarded an \$18,000 grant in early fall of 2018 from the Georgia Health Foundation. The private foundation,

dedicated to improving the health of Georgians, presented the grant to Sterling at its annual awards luncheon in December.

She is using this grant to conduct qualitative research and a policy analysis, examining the system barriers for treatment of pregnant opioid users in north Georgia.

“When you look at the epidemiological maps in terms of opioid use, you can track the usage from West Virginia and Kentucky to Tennessee with north Georgia as the next area to be affected,” said Sterling. “Although there are policies and guidelines in place to protect opioid users and encourage them to seek treatment, the pregnant opioid users are falling through the cracks because nobody is interpreting those policies in the same way.”

Sterling explained that there are a number of other complex factors contributing to the lack of coordinated access of health resources for this underserved population. These women are not seeking prenatal care because they are afraid to be identified as opioid users.



In turn, drug treatment providers do not recommend that pregnant opioid users quit entirely at once because it can have an effect on the fetus or cause miscarriage. Criminal justice issues include possible punitive consequences for the women such as losing custody of their children during the transition to drug recovery.

Thus, she said her research is an essential first step to identify the barriers within this fragmented system and then develop a toolkit – a list of recommendations – to facilitate the appropriate processes in directing pregnant opioid users toward treatment options as quickly as possible.



Promoting institutional inclusion and diversity in STEM undergraduate education

By Joëlle Walls

Kennesaw State University was one of 57 recipients of the Howard Hughes Medical Institute's (HHMI) grants from its Inclusive Excellence initiative to help schools find ways to significantly increase their capacity for inclusion. The goal is for students from all backgrounds – especially those from underrepresented groups in the scientific fields of study – to excel.

HHMI is a nonprofit science-based philanthropic organization focused on supporting biomedical research and science education for all. KSU was the only Georgia institution out of 594 colleges and universities nationwide to receive the \$1 million five-year award from the two rounds of competition.

HHMI aims to engage awardee institutions with the implementation of data-driven strategies to transform the science, technology, engineering and mathematics (STEM) culture at the institutional level, as well as sharing best practices with the other grantees through its Peer Implementation Clusters.

The organization also wants awardees to have meaningful and honest conversations at their schools about STEM inclusivity and diversity and to start making changes specific to the institutions' environments. As part of the initial efforts, KSU hosted two members of the HHMI staff in early November to facilitate an inclusion workshop for College of Science and Mathematics (CSM) leadership.

Efforts to transform the institutional culture within the STEM fields are led by CSM, which already has implemented various programs under its own student success initiative.

"Our Inclusive Excellence program is part of a larger College of Science and Mathematics strategic plan intended to improve student outcomes success, especially in foundational, gateway STEM courses. This program is particularly focused on creating a culture where all students, regardless of background, can excel," said Mark Anderson, CSM dean. "To this end, we are focused on looking holistically at our degree curricula, providing professional development to faculty around high impact teaching practices and classroom culture, and building a supportive community among students and faculty."

Scott Reese, CSM assistant dean for curriculum and associate professor of biology, explained one of the ways to transform the institutional culture is to focus on how professors view their classrooms since it is the most direct impact on student success.

That is why KSU is growing the number of CSM faculty learning communities to increase the use of inclusive pedagogies in course design and integrate scaffolded research experiences throughout the degree programs.

"Science is a way of discovery that crosses boundaries of the STEM disciplines," said Reese. "We would like faculty and departments to rethink curricula to show students how all the pieces fit together."

Other important features of KSU's programs include first-year seminars and student learning communities based on the STEM fields, as well as peer-led team learning exercises built into introductory gateway courses. These programs are geared toward creating a sense of belonging and community for students who may or may not be STEM majors yet. They also pave the way for creating networks of students who can help each other be resilient in the face of what can still be very difficult classes.



Dance

A Reflection of Culture

By Joëlle Walls

Erin Ryan has been dancing since childhood, starting out in competition dance and ultimately finding her way to her future profession at the Central New Jersey Ballet Theater in her hometown in Bordertown, New Jersey.

"My friend took me to a ballet class and I was immediately drawn to this style of dance. I went home and watched almost three hours of ballet on YouTube," said Ryan, currently a sophomore dance major with a ballet concentration at Kennesaw State.

She then enrolled in the pre-professional ballet company led by owner and artistic director Alisha Cardenas. With the company, Ryan's ballet performances included dancing the lead role of Nikiya in *La Bayadère* and Giselle in *Giselle* as well as the Sugar Plum Fairy in *The Nutcracker* and Swanhilda in *Coppélia*. When choosing what university to attend, Cardenas' ties to Atlanta influenced Ryan's decision to move to the Southeast.

"Ms. Cardenas gave me so many opportunities," explained Ryan. "Since she is a UGA alum and from Marietta, she was aware of how amazing the KSU dance program was and suggested that I audition. I flew down for an audition and instantly fell in love with this school and its people. I loved how the KSU dance program focuses on in-studio work as well as academic research. I also received the out-of-state tuition scholarship which allowed me to finalize my decision of attending KSU."

Today Ryan has added undergraduate researcher to her résumé as she embarked on her first independent project



KSU Dance Company member Erin Ryan combines dance and academic research to guide her future.

after ankle surgery sidelined her from dancing during her first semester in fall 2017. With more time available for other scholarly pursuits, she said her dance history class and self-reflecting on her dual identity in society inspired her in pursuing research.

"Since I had to take a step back from the dance community, I was trying to find out who I was and how I got here," she said. "I really began to be comfortable being bisexual. But when we learned about all the famous people in dance history, I started to feel uncomfortable again, questioning if I was the only one, in the room or the profession, who is gay and a dancer. I did not think that was true given the vast number of women in the profession."

After doing some further research on her own, Ryan found, for example, that Josephine Baker, a 1920s musical theater actress, not only had multiple marriages with men, but also relationships with women. Best known for her banana skirt dance in France, this aspect of Baker's private life was downplayed or absent from most media and historical accounts.

"It was during this time period homosexuality wasn't as accepted as it is today. Within the dance community, dancers of diverse races and backgrounds have been added to the canon, yet female homosexuality has been omitted from scholarly research and critiques, dance education and media portrayal," Ryan said. "With my work, I hope to make female homosexuality more visible within the dance profession to decrease homophobia and create an environment that is welcoming to all no matter who they are."

To that end, Ryan pursued this research question that spring as a directed studies project with faculty mentor Meghan Quinlan. Through case studies, including biographies and interviews, as well as movement analysis of choreography in some contemporary dance productions, Ryan researched how homophobic and heterosexist constructs of the dance historical community impacts modern concert dance.

Internally, Ryan then presented her research at the College of the Arts' RadnoculUR series, which features undergraduate research and creative activity in dance, art and design, music, and theater and performance. After Assistant Professor of Dance Sarah Holmes attended the dance showcase, she encouraged Ryan

to also submit her research for inclusion in a special College of the Arts issue of the Kennesaw Journal of Undergraduate Research (KJUR), a peer-reviewed scholarly journal.

"Erin's work is promising scholarship at the undergraduate level," said Holmes, Ryan's current faculty mentor and co-editor of KJUR's special issue. "When students, like Erin, become engaged in their own projects, they engage in the process of learning

"The art that we create is a reflection of our personal experience and within that, the experience of our culture."

with more personal investment and excitement. I think the College of the Arts is well on its way in establishing undergraduate research like Erin's as another pillar in the college."

Externally, Ryan will present her research at the National Conference on Undergraduate Research that KSU will host in April. She also submitted an application to the American College Dance Association (ACDA) regional conference that will be held at KSU in March. Unlike other research conferences, Ryan will first present her research to a panel of judges at the event, who then select one undergraduate or graduate student to present at the Gala concert at the conference's end.

Upon graduation, Ryan plans to audition with ballet companies and continue with research by eventually pursuing a master's degree in dance studies. "I love performing and the practice, but I also love the academic side – writing and research," said Ryan. "I loved the opportunity to bring the arts into undergraduate research and keep it at the same level as the sciences and history because it is equally important to better our society."

"A culture is reflected in the arts – what people are doing and feeling. We are in a society where I can be a dancer if I so choose," she added. "The art that we create is a reflection of our personal experience and within that, the experience of our culture."



MECHATRONICS ENGINEERING

Pushing the Limits


By Joëlle Walls

Jay Strickland is on a mission – to push the limits of research and technology – while he is a student at Kennesaw State. To fulfill his dream of becoming a developmental engineer with the U.S. Air Force, he is studying mechatronics engineering in the Southern Polytechnic College of Engineering and Engineering Technology.

When he got out of the military in 2016, Strickland looked at different career options. He was most interested in the field of control systems, having gained communications electronic repair experience from his time serving in the U.S. Marine Corps.

“Control systems were really interesting to me. The idea we can turn sand into silicon computer chips that we then program to do a variety of tasks related to industry applications in automation and robotics is amazing,” said Strickland, a junior from Marietta who transferred to KSU in 2018 from Georgia State.





Jay Strickland will present his project at the 2019 National Conference on Undergraduate Research hosted by KSU.

"Mechatronics is the most direct application of controls systems engineering. I really think as far as undergraduate degree programs, especially in Georgia and the Southeast, there is no other program than the one at KSU that has such a sharp focus on direct applications of controls theory," he added.

Throughout his college career, Strickland has been accustomed to completing design projects as part of his coursework. However, an introductory class to the KSU mechatronics engineering program last spring gave him the opportunity to explore and push the limits of his imagination. Taught by Associate Professor Kevin McFall, one of the assignments involved writing about the experience of participating in one of the dozen KSU student engineering clubs offered on the Marietta Campus.

Therefore, Strickland joined the KSU Aerospace Competition Team, whose members were getting ready for a design-build contest in the Southwest. The objective was to launch a rocket 10,000 feet and deploy a payload that would fall safely to the ground, allowing for successful recovery of all the pieces. With his interests in controls and sensors, he focused on the payload recovery aspect of the project. Although there was not enough funding for the team to build the full rocket, Strickland continued with the research independently on the payload recovery system.

"Jay approached me through our class interaction with his ideas for patents, and I have mentored him since then on how to work together with KSU to develop his ideas," said McFall, also interim department chair. "Jay is a unique student with clear ambitions and specific business plans he wants to pursue alongside his studies."

After looking at various payload recovery systems that include parachutes or even drones, nature provided Strickland with his innovative design. He developed a payload recovery device, which simulates the autorotation ability of the samara, a tree seed also known as a whirlybird that spins while it falls to the ground.

"Due to the wing shape of the samaras when they fall to the ground, the autorotation helps them slow their terminal velocity. By the time they hit the ground, the samaras would be falling at slower rates that prevent damage upon impact. From my research, I found that the samara has been studied more than autorotation itself," explained Strickland. As part of his project, Strickland photographed samaras falling at high speed to understand the autorotation phenomenon. He then used shuttlecocks, or birdies used in badminton, for further analysis of autorotation when the birdies were cut open and expanded to full width. Since the original design-build competition encouraged the use of the CubeSat standard, a type of miniaturized satellite measuring 10 cm x 10 cm x 10 cm or 1 U, Strickland employed this spacecraft platform as part of his build.

"CubeSats are growing more and more popular as the standard platform for deploying research-based payloads into space," said Strickland. "Since 2010, NASA has completed launches of university and educational projects using the CubeSat. It is exciting that we can use these small and economical satellites for conducting experiments and testing new technology in space."

Strickland said that he hopes his initial prototype can become a more finished product that can be tested at 10,000 feet with the eventual possibility of commercially licensing the design to a company such as a CubeSat manufacturer. Industry applications may include using the payload recovery system for expediting high-demand shipments to consumers or delivering rations and medical supplies to soldiers in remote locations. The Kennesaw State University Research and Service Foundation (KSURSF) has filed a provisional patent application for him to protect the intellectual property.

"It is great the Office of Research and others help support such students who want to expand their university experience beyond the classroom," said McFall.



Music

Remembering the Holocaust

By Jennifer Ramsey (English '15, M.A. Professional Writing, '18)





Laurence Sherr is an internationally recognized composer and scholar, most notably for his work on the musical history of the Holocaust. His research encompasses his compositional work, Holocaust music scholarship, and the pedagogy he

developed for teaching about the Holocaust through music. He is recognized for the unique ways in which he blends all of these together.

Sherr has pursued Holocaust music research at archives, libraries and museums in Europe, Israel and the U.S., especially at site visits to the Auschwitz and Theresienstadt concentration camps. He disseminates his research at invited appearances for concerts and lectures internationally.

In addition, Sherr engages Kennesaw State University students with his scholarship through teaching, most especially via his global-learning course called Music and the Holocaust. His emphasis on the connection between culture and music in all his courses is a reflection of his personal, professional, and pedagogical interests. Those interests ultimately led him to compose his Holocaust remembrance works.

"My first composition credited as a Holocaust remembrance work was actually unintentional," Sherr said, "as it was initially intended to be a memorial piece for my younger brother, Neal."

Written on commission for the Jimmy Carter Center in 1993, Sherr's solo cello work *Elegy and Vision* was soon chosen for Holocaust memorial concert programs, particularly for the Jewish cantorial sounds that Sherr attributes to memories from his childhood synagogue. As a first-generation American, the creation of *Elegy and Vision* was a pivotal moment that led him to more deeply explore his own ancestry along with its cultural expression in his music.

The first two works Sherr created as intentional Holocaust remembrance compositions were *Fugitive Footsteps*, for baritone voice and chorus, and *Flame Language*, for voice and chamber orchestra or chamber ensemble.

Written in 2002 and 2007 respectively, these pieces were set to the poetry of Nobel laureate Nelly Sachs, known for her poems witnessing the Holocaust.

Sherr's largest composition, *Sonata for Cello and*

Piano – Mir zaynen do! (We are here!), was created in 2014 with the support of a KSU grant. In its three movements, Sherr integrated Holocaust sources—four songs from the partisans, ghettos, and camps—with his original compositional work.

An estimated 600,000 people heard this composition, along with information about Sherr and his influences, when it was featured several times on Performance Today, the classical music program broadcast on nearly 300 public radio stations across the U.S.

Sonata for Cello and Piano – Mir zaynen do! was incorporated into his 2015 Music of Resistance and Survival project that brings his music to audiences in a multi-media format, blending art and pedagogy.

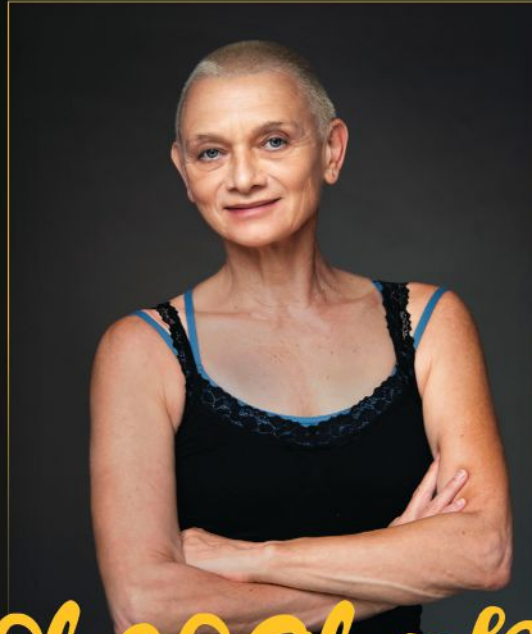
The individual Holocaust songs are performed separately, framed by Sherr's lectures on the historical significance and biographical details of their creators. The program culminates with his cello sonata that weaves them all together. Music of Resistance and Survival concerts have been produced in the Czech Republic, Poland, Australia, New Zealand, Israel and across the U.S., earning prestigious recognition for Sherr and the University's School of Music. The concerts were performed in early 2019 in Italy and the Republic of San Marino.

"The goal was to have more than a concert piece," Sherr explained. "I wanted to create something that would reach audiences in a different way, to let them experience this historical era in the same immersive way my students were learning about the Holocaust in my classroom."

"Essentially, it was a pedagogical piece intended to raise awareness of the songwriters and lyricists, and to strengthen their Jewish legacy as being more than mere victims, but rather remembered as resilient, courageous, bold artistic heroes," said Sherr, adding that he hoped people left Music of Resistance and Survival events with a greater sense of understanding, acceptance, and tolerance.

Sherr, currently professor of music and composer-in-residence, started teaching at Kennesaw State University in 1996. After earning a master's degree in music theory and a D.M.A. (Doctor of Musical Arts) in musical composition at the University of Illinois, he returned to his native Atlanta to work as a freelance composer and musician before joining academia.

He has been recognized with a broad array of external prizes, grants, and fellowships as well as awards for his teaching and scholarship, most recently the 2018 University Distinguished Professor Award.



Choreography

An Exploration of Dance

By Jennifer Ramsey (English '15, M.A. Professional Writing, '18)

Joining Kennesaw State University in 2014, Lisa K. Lock brings her unique choreographic vision to the Department of Dance as an assistant professor. She most recently took the University's dance company back to the John F. Kennedy Center for the Performing Arts in Washington, D.C. for the fifth time, further elevating Kennesaw State as a nationally elite dance program.

Lock's "Suspended Vision" was one of two selected works, presented at the regional American College Dance Association (ACDA) conference in the spring, to be featured at the Kennedy Center during the biennial National American College Dance Festival last June.

As with her other works, Lock strived to push the limits of conventional choreography in "Suspended Vision." With an all-female cast, outfitted in grey with strategically placed oversized bustles and collars, the dancers investigate a playground of oversized ballet bars that create an illusion of weightlessness as they leap and twirl and climb among large props.

The centralized moment, when a set of twins become aware of each other as they discover their likeness by touching one another's faces, shifts the performance dramatically as the other dancers begin to explore each other's faces as well.

"The performance invites audiences to experience humanity at its most personal and intimate level," Lock said.

Her unique vision for modern dance that combines elements of lighting, music, movements, costuming and staging creates a surreal and yet palpable narrative, making the performance's story of identity come alive on the stage.

Like her choreography work today, Lock took an unconventional approach to her dancing career. Born in Switzerland, she was 22 years old when she began training professionally and earned her diploma in classical ballet. Her passion for modern dance brought her to the U.S. in 1985, where she joined Stuart Pimsler

Dance and Theater Company in Columbus, Ohio. Later she enrolled in California's Institute of the Arts and earned her B.F.A. and M.F.A. in dance in Los Angeles.

"Experimenting in style and form was fundamental in my development, allowing me to continuously reinvent my ideas as a choreographer," Lock said of her education.

After graduating, Lock stayed in Los Angeles for 16 years, performing her solo works in local, national and international showcases. In 2006, she moved to Cleveland, Ohio, where she worked with Opera Cleveland in several productions and continued performing her solo work. However, it was her experience with creating site-specific performances at the Ingenuity Festival for Arts and Technology that Lock said sharpened her skillset the most.

"Site-specific work, unlike the theater, has no captive audience and requires creating something that attracts people, making them stop and observe," recalled Lock. "It's a very different type of focus and was crucial to my choreography style today."

Looking to continue her experimental work, Lock moved to Atlanta in 2012 with the intent of joining Kennesaw State University after learning about its cutting-edge dance program under Ivan Pulinkala's leadership. She began teaching modern dance and body conditioning part time at the University and was invited to teach the summer intensive program,

a one-week non-residential workshop for high school students, that same year.

It was during the summer intensive program that a first draft of Lock's "Table Manners" was created for the workshop students, and later a refined version for the KSU Dance Company was presented in the fall faculty concert. Soon after, she accepted a faculty position to teach modern dance and choreography, while continuing to choreograph for the Department of Dance and its dance company.

Created in 2015, "Table Manners" was focused on and around a table, in which a combination of lighting and movement highlighted dancers as they explored their connection to, and separation from, the confines of the tabletop.

"All you saw was the action on the table, and yet there was still a tangible story unfolding for the audience," said Lock, who credits her time in theater as being influential to how she makes her performances come alive.

Lock continues to evolve her choreography and presented her latest creation at the 2018 fall faculty concert, which delved even deeper into the surrealism that has become her signature style. Of her students, Lock is confident of their ability to keep meeting and exceeding expectations, commending them as "amazingly talented, mature and professional performers who keep raising the bar right along with me."





CURIOSITY— IT'S IN HIS DNA

KSU alum finds career
at biotech company

By Joëlle Walls

illumina

Growing up in Kennesaw, Georgia, Lewis Kraft could usually be found on the baseball field or with his neighborhood friends. Now he is leading a research group at Illumina, a biotechnology company based in San Diego, developing flowcell consumables for DNA sequencing.

Having met his future wife in high school, Kraft decided to stay local for his undergraduate education, attending Kennesaw State University from 2004–2009. He credits his undergraduate research experience at KSU as the catalyst for changing the trajectory of his future career toward biotechnology.

"I was always a curious kid, always asking questions about how things worked, but I was never a great student," said Kraft. "My parents encouraged me to do a pre-med major and to consider a career in medicine—something I was never really passionate about. But that got me into the biochemistry major."

During his sophomore year, Kraft discovered his appreciation and excitement for research after taking a course with biochemistry professor Jonathan McMurry. That summer, he worked full time in McMurry's lab, studying how bacterial proteins interact with each other and self-assemble into a bacterial flagellum, a tail-like structure that allows bacteria to swim. He was tasked with purifying proteins and measuring their binding kinetics, or the rates of the chemical reactions, when they bind together in the flagellum.

"This was a systems biology project, that is, the quantitative analysis and modeling of a biological system. The research was something that I found I was really passionate about, and it was exciting because it was the first time anyone had ever looked at that particular aspect of nature," he said. "And it turned out I was actually pretty good at research. That summer was when I realized that this was something that I wanted to do as a career. With McMurry's support, I kept going with it."



Photo by James Blake, Illumina

With his curiosity never waning, Kraft also invented a device that allowed him to measure the binding kinetics faster and easier than in the original laborious process. He entered his device into the Concept-2-Reality® competition sponsored by KSU's Coles College of Business, an opportunity for participants to pitch their new product and service ideas to entrepreneurs and venture capitalists. He quickly wrote up an elevator pitch and a business plan.

"It was probably impressive for an undergraduate to do something like that. I saw the business competition advertised and figured I might be able to win some money for building more devices," he recalled. "They selected me as a finalist to present in front of a panel of entrepreneurs. Little did I know I was competing against graduate students in the business school."

By the time he graduated from KSU in 2009, Kraft was a published researcher and had presented at local, national and international conferences such as the American Chemical Society and the American Society of Biochemistry and Molecular Biology. After interviewing at a number of institutions for graduate school, he chose to pursue his Ph.D. in chemical and physical biology at Vanderbilt University.

During his time in Anne Kenworthy's biophysics lab at Vanderbilt, Kraft, together with a group of mathematicians, developed methods of measuring reaction-diffusion (how fast molecules move around and react) in living human cells. Reaction-diffusion is a fundamental behavior of molecular systems and it underlies how biologically relevant processes, such as embryo development or pattern formation on an animal's fur, occur.

Kraft published several papers in that area. He chose to focus his method development efforts on the central proteins in an important biological pathway called autophagy, Greek for "self-eating," a process for breaking down and recycling cellular parts. The discovery of autophagy was recently recognized with the 2016 Nobel Prize in Medicine or Physiology awarded to Yoshinori Ohsumi.

After graduation in 2014, Kraft expanded his research experiences as a post-doctoral fellow in the research group of George Whitesides at Harvard University, the most highly cited living chemist at that time. His two-year fellowship gave him exposure to a variety of

"The research topics that I was involved with were very challenging, but it was a fun time in my scientific career..."

projects including the chemical origins of life—how does a molecular soup on a hot planet turn into a living cell?

Kraft honed his skills in physical chemistry and picked up additional ones in microfabrication. Kraft eventually published a paper in *Nature* before taking the next steps to a position in industry.

"The research topics that I was involved with were very challenging, but it was a fun time in my scientific career because I was involved with so many different things and there were so many brilliant people there," he said. "Despite being a university professor, George is a serial entrepreneur and a huge champion of utilitarian science. He taught us to always think about the market — what do people really want?"

Today at Illumina, Kraft spends his time leading teams on multidisciplinary research projects tied to the company's products and serving as a functional manager for the research associates and scientists in his group.

One of his first projects involved developing the surface chemistry for the iSeq100 flowcell consumable that was introduced to the market in early 2018. This compact benchtop genome sequencing device was designed to be used for routine genomics testing and exploratory research.

"My hope was that Illumina would provide opportunities for me to develop new technologies that improve human health and have a positive impact on society," said Kraft. "The technology we develop is fascinatingly complex and interdisciplinary. It feels good to deliver products that touch lives in a positive way such as hearing David Cameron [former prime minister of the United Kingdom] talk about how sequencing helped put his family's mind at ease as his son had a rare neurological disease that baffled doctors."

"Developing the next generation of scientists is critical for sustaining the technological pace at Illumina and companies like it," Kraft said, adding, "A quality undergraduate research experience is a great place to start."



Charles Elliott's current research focuses on dark personality traits in organizational settings.



Managing Conflict for All

By Heather Hankins

Charles Elliott is currently a doctoral student in the Kennesaw State University international conflict management program. He has completed his Master of Science degree in Conflict Management also at KSU.

Elliott is conducting several different research studies both in collaboration with faculty and industry as well as personal research concerning dark personality traits in organizational settings. He was recently awarded a merit-based scholarship within the School of Conflict Management, Peacebuilding, and Development.

Elliott grew up in the Atlanta area in a lower-income community. During his childhood, he observed several different forms of conflict ranging from environmental concerns to domestic violence. After completing high school, he moved to Maryland where, during the 2008 recession, he was homeless for a short time.

Elliott joined the U.S. Air Force to better his education. He was active-duty for six years and was deployed overseas for four of those years. Through his service, he was involved in both the Iraq and Afghanistan wars as well as every major humanitarian effort from 2009-2013.

After his time in the military ended in 2013, Elliott and his wife and daughter moved back to the Atlanta area where he pursued a Bachelor of Science in Psychology with minors in applied statistics and sociology at KSU. He began to work on research projects, publishing two papers in peer-reviewed journals before he graduated in 2016.

After graduation and considering his background, Elliott applied to 15 national psychology Ph.D. programs, but with the advice of his mentors, decided to pursue a Master of Science degree in

Conflict Management at KSU before pursuing a Ph.D. He completed the program in 2018 and was recently accepted into KSU's International Conflict Management Ph.D. program.

Elliott has been heavily invested in KSU since his time as an undergraduate, serving in clubs and on committees. He has a large sense of school spirit or pride for KSU and has worked closely with many faculty to find better solutions for university- or academically-related research questions.

In his own research, Elliott examines relationships within dark personality and conflict management inside of organizations. By examining dark personality traits in the workplace, Elliott helps individuals resolve conflict with others in their day-to-day lives. Elliott identifies that dark personality traits, such as narcissism, trait-based psychopathy, and Machiavellianism, are much more common than many people might expect.

He suggests that attempting to resolve conflicts without acknowledging these dark personalities in cooperation can lead to major issues within organizations. Elliott designs social experiments to test whether individuals in organizations manage conflicts differently based on personality.

"If you aren't collaborating with all types of people to better understand everyone at stake, you probably won't be able to chalk up any kind of agreement," Elliott explained. "It takes knowledge of both good and bad to see the spectrum of how people might act in organizations, why they make the decisions they do."

"Conflict management is really a set of tools and a way of thinking that cannot only prevent conflict, but effectively engage it once it arrives," he added.



Emily Bechke credits her professors and the resources at KSU for her academic success.

STUDYING HEART RATE VARIABILITY

By Emily Deibler

Emily Bechke graduated from Kennesaw State University in December 2018 with several accomplishments under her belt, including earning a master's degree in applied exercise and health science.

While Bechke had already been interested in physiology and exercise health because of her experiences playing soccer, she fell in love with her studies after she received research opportunities, specifically chances to work in the Exercise Physiology and Biomarkers Laboratory at KSU. She ultimately wants to help others through her research.

After graduating from KSU with her undergraduate degree in exercise physiology in 2016, Bechke worked as a graduate research assistant and conducted studies on heart rate variability (HRV). HRV involves the change in time between heartbeats, and she looked into how it affects someone's exercise routine.

For example, Bechke wanted to know how a normal heart rate and a "stressed" heart rate variability (caused by health concerns, situational anxiety, caffeine intake, etc.) change the outcome of a workout, as well as what this means about an individual's overall health.

With this knowledge, those who wish to exercise to improve their health can know what to do before and after exercise with their possible limitations in mind. They can also take steps to work on whatever concerns—physical, emotional and habitual—impact their routines.

To learn more about HRV and what it indicates, Bechke

has conducted studies in the University's applied lab that emphasize activity and collaboration during research. For her 16-week study, she asked nine women to come into the lab for four visits where their heart rates were taken to determine their HRV.

The participants underwent high-intensity exercise on the fourth visit in which Bechke monitored their heart rates before and after to determine their readiness for exercise and how their hearts recovered five minutes after working out.

If Bechke can identify the external factors of HRV, she can help people from different populations improve their exercise routine, assist their overall health and predict the possibility of various diseases. She hopes to expand her research through continuing her education with a Ph.D. in kinesiology.

Bechke's work has been published in *The Journal of Physical Activity and Health*. During her undergraduate career, she also presented at the KSU Symposium of Student Scholars and the 2016 annual meeting of the American College of Sports Medicine.

After the completion of her education, Bechke's goal is to become a professor and help other students just as her professors guided her in her studies. As she continues her research, Bechke's dedication and need to help others will influence her. In the end, she credits KSU's resources and her professors' willingness to start her on the path to discovering invaluable findings regarding health.



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