INNOVATIVE RESEARCH IS HAPPENING AT LYLE EVERY DAY. GREAT DISCOVERIES EMERGE HERE, WHICH WOULDN’T BE POSSIBLE WITHOUT A DEEP SENSE OF CURiosity AND A DRIVE TO CHANGE THE WORLD. OUR RESEARCH IS FOUNDED ON THIS PREMISE, ALLOWING OUR FACULTY, STAFF, AND STUDENTS TO MAKE AN IMPACT BOTH AT HOME AND AROUND THE GLOBE.

Assistant Professor Janille Smith-Colin is a great example. She recently joined Lyle after earning her Ph.D. from Georgia Tech in Civil and Environmental Engineering. When she interviewed with me, she wanted to work at a school where she could do serious research in her lab and focus on the craft of quality engineering education in the classroom. Read more in this issue about Janille’s expertise in transportation asset management, and her goal to make multimodal transportation more accessible.

From an advancement and research perspective, Lyle has some of the finest teaching and advanced research facilities in the nation. The school has grown to include a new engineering lab complex on SMU’s East campus, featuring cutting-edge, technology-rich spaces that not only meet research demands, but also enhance experiential learning and are striving to address worldwide challenges.

Lyle’s interdisciplinary approach throughout a student’s academic career allows for a wide range of opportunities and experiences. Students often work in teams, bringing a multitude of expertise together to find innovative solutions and create new instruments, models, and approaches to modern day problems. One way we are encouraging students to work through this interdisciplinary approach can be seen in the Darwin Deason Institute for Cyber Security. The Deason Institute employs both graduate and undergraduate students from diverse engineering majors as research assistants to solve the evolving challenges associated with cyber security and is working to expand the skilled workforce needed in this field.

At Lyle, we are shaping the next generation of engineering leaders. We engage with our students at all levels to help them learn critical technical skills, work with the Hart Center for Engineering Leadership to accelerate professional development, and provide a unique environment to help students flourish as engineers, entrepreneurs, and innovators who are working to become world changers.

Enjoy this view into Lyle and follow us for the latest news and updates.

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©2018 SMU Lyle Magazine is published twice a year by the Dean’s Office for the SMU Lyle community.

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AD CONTRIBUTORS:
Converge Consulting

PRINTED BY:
Best Press

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In 2010, President Obama commissioned a task force to report on the state of healthcare delivery systems in the United States. Results indicated that the U.S. healthcare delivery system could benefit from industrial and systems engineering as a discipline to improve operations and create efficiencies.

After Çetinkaya reviewed the task force report, a solution stood out to her. “Supply chain systems have been successfully implemented in military and defense systems, manufacturing systems, and various service systems. Why not use them to re-engineer the way we deliver healthcare in the United States?” she asks.

The current state of the healthcare delivery system and how to improve it is a subject of much debate. Costs continue to rise, and some individuals struggle to afford, or even gain access to quality insurance. Fortunately, Çetinkaya says medical and engineering schools have been paying close attention to these trends and are collaborating on some noteworthy solutions.

Shortly after joining SMU in 2015, Çetinkaya met Robert Haley, M.D., a professor of internal medicine and director of epidemiology at UT Southwestern (UTSW) Medical Center in Dallas. As a result of that meeting, they set in motion a collaboration based on industrial and systems engineering, and how operations research could be applied to healthcare systems.

Through this connection, Çetinkaya met Dr. Bob Hendler, former senior vice president and associate chief medical officer at Parkland Memorial Hospital in Dallas. During a tour of Parkland’s old emergency room, Çetinkaya asked Dr. Hendler why the waiting room was so overcrowded with critically ill people. He said they were compassionate dialysis patients who were there for a specific reason.

Compassionate dialysis patients are often disadvantaged, uninsured, or under-insured people who need dialysis for end-stage renal disease. The only treatments are regular dialysis or a kidney transplant. According to federal law, under the Emergency Medical Treatment and Labor Act, hospitals must treat patients regardless of their insurance status or ability to pay. “Many of these patients are uninsured. The only way they can receive treatment is to show up at the ER with life-threatening conditions because they can’t be turned away for being uninsured,” Çetinkaya explains. “There are patients like this all over the nation coming to publicly-funded county hospitals just like Parkland, so this problem is widespread.”

“Supply chain systems have been successfully implemented in military and defense systems, manufacturing systems, and various service systems. Why not use them to re-engineer the way we deliver healthcare in the United States?”

SILA ÇETINKAYA, Department Chair, Engineering Management, Information, and Systems, and Cecil H. Green Professor of Engineering

USING QUANTITATIVE APPROACHES FOR IMPROVING HEALTHCARE DELIVERY

SILA ÇETINKAYA, DEPARTMENT CHAIR, ENGINEERING MANAGEMENT, INFORMATION, AND SYSTEMS, AND CECIL H. GREEN PROFESSOR OF ENGINEERING applies operations research, prescriptive analytics, and industrial engineering methodology to healthcare applications to benefit indigent, uninsured, and chronically ill patients.
Çetinkaya was so inspired by what she saw at Parkland she decided to take action. Çetinkaya now has an adjunct appointment in internal medicine at UT Southwestern, has personally commissioned research, and assembled a team of experts for the Compassionate Dialysis Project (see inset box). Çetinkaya and her colleagues devised a process flowchart to examine data and results obtained from Parkland. This research factors in all of the complicating variables that create problems at ERs around the country, including the number of dialysis machines and nurses available, unpredictable and irregular patient arrival times, blood screening time, whether patients qualify for treatment, and associated rejection rates. The results can give hospital management insight into how to run their emergency rooms more efficiently.

“It’s very complicated, but we can crunch the numbers and create a mathematical, computer-based model and simulation on any factor administrators need to know more about. We can observe this information over time to help them make informed decisions about the compassionate dialysis process,” Çetinkaya says. “As a result, they can make investments in the overall well-being of these patients and reap the benefits of optimized decision making that considers patients’ needs.” Until then, with continued research and additional funding, the Compassionate Dialysis Project team hopes to solve this pressing problem in hospitals nationwide.

Along with Sila Çetinkaya, the Compassionate Dialysis Project research team includes:

Vishal Ahuja, assistant professor of information technology and operations management, Cox School of Business, an expert in healthcare operations and management

Olga Bountali, post-doctoral fellow, EMIS Department, Lyle School of Engineering, an expert in queueing theory

Farnaz Nourbakhsh, a Ph.D. student in operations research, with undergraduate and graduate degrees in industrial and systems engineering

Physician collaborators from UTSW Nephrology: Drs. Joseph Berger, Henry Quinones, and Miguel Vazquez

The Infinity Project, offered by the Caruth Institute for Engineering Education at Lyle, is a national leader in developing high-tech engineering curricula for secondary schools. Developed by renowned university engineering professors and education experts, this innovative program sparks students to pursue careers in Science, Technology, Engineering, and Mathematics (STEM). High schools, middle schools, and colleges across the nation and abroad utilize this program to educate technology leaders of the future.

The newly redesigned project-based learning (PBL) program explores fundamentals of the PBL teaching style, including how it differs from traditional approaches, the elements of a well-designed program, and how to effectively execute and assess student learning using this instructional methodology. Teachers also explore strategies to create a culture in their classroom that promotes inquiry and solution-based outcomes.

The Infinity Project trains teachers to build a curriculum that enables students to quickly understand how STEM concepts they learned in the past can apply to real-life challenges in the world around them today. Each summer, Infinity Project teacher “institutes” are hosted on SMU’s main campus. Training focuses on the curriculum’s five core components, including robotics, rocket science, civil engineering, electrical engineering, and coding. Instruction in the use of tools, software, and instructional materials recommended for design challenges is provided.

Four, week-long institutes, all taught by SMU faculty, will be offered during summer 2018: the weeks of June 18 and July 16 for middle school teachers, and June 25 and July 30 for high school teachers. Registration is now open and available as space permits.

Visit The Infinity Project for more information and to register for summer sessions.
Interacting with transportation is part of daily life for almost everyone, whether it's walking, taking public transit, riding a bike, or driving. However, heavy transportation use and demand, coupled with aging infrastructure, presents a pressing problem in many large metropolitan areas. There is also increased pressure for cities to provide more inclusive transportation options for all citizens.

Smith-Colin’s goal is to build a research program that mirrors the movement within the Department of Transportation to create a multimodal focus. She envisions going beyond vehicle transport on roads and highways and incorporating alternative modes of transportation to more harmoniously accommodate pedestrians, bicycles, buses, and light rail. “I’m most interested in how the human race interacts with transportation modes, including transit, pedestrians, and bicycles, and how we design infrastructure for that,” she explains.

One of Smith-Colin’s key research areas is transportation infrastructure asset management. This component focuses on improving the existing system through data analytics to increase funding and deliver more informed decision-making. “There’s a push towards using data analytics to improve how transportation organizations work together to evaluate system performance, prioritize practices, and develop projects,” Smith-Colin says.

To help make that happen, Smith-Colin hopes to work with the North Central Texas Council of Governments (NCTCOG), a partnership of local governments who plan for short- and long-term common needs and sound regional development. Smith-Colin shares NCTCOG’s goal to develop a multimodal blueprint for systems and services to address the magnitude of unmet transportation needs.

Smith-Colin is working on how to manage green infrastructure assets to support transportation, mobility, and accessibility, especially in the context of equitable transportation access for disadvantaged people. “Green infrastructure, wastewater management, and transportation systems should all be considered together. Pedestrian and bicycle trails run along green spaces, which are typically along waterways, and have adjacent roadways,” Smith-Colin explains. “As we implement more parks, green spaces, and bioswales, how are we going to track them, determine when they need to be maintained, and be clear on the impacts that they have on the adjacent transportation facilities?” she asks.

According to Smith-Colin, another significant opportunity in the civil engineering field is the research and growth, from both the public and private sectors, in autonomous and connected vehicles. “Most people think about autonomous vehicles on the mechanical side, but there’s also opportunity on the civil side to plan and design the infrastructure to support them,” Smith-Colin notes.

Smith-Colin believes the transportation industry needs an influx of professionally trained civil engineers, now more than ever. “Like most other fields, the transportation industry has a retiring workforce that needs to be replaced with engineers well-versed in leadership and working in multi-disciplinary teams,” she says. “Knowing where the innovations are going, there’s demand for civil engineers with computing and automation skill sets as well.” With her wealth of experience and guidance, Smith-Colin aims to help launch many Lyle civil engineering students on this vital career path for years to come.

“I’m most interested in how the human race interacts with transportation modes, including transit, pedestrians, and bicycles, and how we design infrastructure for that.”

JANILLE SMITH-COLIN, Assistant Professor of Civil and Environmental Engineering
During the fifth annual Lyle Research Day in November, the Lyle community learned about some exciting student research taking place across the school. Following are the 2017 Research Day winners by department:

**Civil and Environmental Engineering**

YASHA ZEINALI, Ph.D. student from Tehran, Iran  
Advisor: Brett Story  
“Performance Evaluation of Bridges Using Machine Learning and Computer Vision”  
A structural impairment detection framework to eliminate catastrophic bridge failures, which can save lives and national assets. The goal is to decrease bridge maintenance costs by using lower-price measurement instruments and reduce the possibility of a false diagnosis detected by conventional methods.

**Electrical Engineering**

ASHWINI SUBRAMANIAN, M.S. student from Old Bridge, New Jersey  
Advisors: Dinesh Rajan, Prasanna Rangarajan  
This cost-effective and high-speed volume measurement system is an alternative to metrology systems and is based on laser scanning and multi-camera machine vision. It can be used in a variety of automation tasks including invoicing and assessment of freight damage.

**Computing Research**

MURALIDHAR BALAJI, Ph.D. student from Hyderabad, India  
Advisors: Prasanna Rangarajan, Duncan MacFarlane, Marc P. Christensen  
“Holographic Imaging of Objects Hidden from View”  
This research uses a computational camera capable of recording images or objects and threats that are completely hidden from view, and has numerous military and civilian applications including disaster recovery and collision avoidance.

**Engineering Management, Information, and Systems**

FARNAZ NOURBAKHSH, Ph.D. student from Tehran, Iran  
Advisors: Sila Çetinkaya, Olga Bountali  
“Data-Driven Methodologies for Understanding Hospital Congestion in Delivery of Care for Uninsured or Underinsured Patients”  
This research uses practical data-driven models to inform medical screening and patient rejection practices to alleviate the burden of ER congestion and treatment delays. The long-term goal is to offer systemic improvements through the explicit use of healthcare informatics in real life.

**Mechanical Engineering**

AMIN MANSOORIFAR, Ph.D. student from Shiraz, Iran  
Advisor: Ali Beskok  
“Microfluidic Device for Real-Time Measurement of Dielectric Properties of Cancer Cells”  
The proposed device will allow assessment of the effectiveness of cancer drugs on an individual’s tumor cells, which can be used to discover the recipe of cancer treatment drugs that will be most effective for each patient.
IN 2017, MILLIONS OF U.S. CITIZENS WERE AFFECTED BY CYBERCRIME. PREDICTIONS FOR THIS YEAR INDICATE THAT THE FINANCIAL DAMAGE DUE TO RANSOMWARE COULD REACH NEARLY $5 BILLION. Attacks are growing in frequency and sophistication, whether they are large-scale incidents affecting millions of people, or small-scale events impacting only a few.

Two major cyber attacks occurred last year that captured the public’s attention. In one, malware was launched to encrypt files, making them inaccessible and only recoverable if a ransom was paid, usually by untraceable digital currencies like Bitcoin. More concerning was the cyber theft scheme that prevented some individuals from completing their tax returns. These taxpayers found their returns had already been filed and tax refunds collected by the cyber attacker.

"With incidents being reported almost on a daily basis, there’s greater public realization of the growing need for cybersecurity experts," says Fred Chang, executive director of the Darwin Deason Institute for Cyber Security, Bobby B. Lyle Centennial Distinguished Chair in Cyber Security and member of the prestigious National Academy of Engineering. "Cyber breaches will continue to rise as long as the talent to prevent them is not available."

Last September, Chang testified before the U.S. House of Representatives’ Cybersecurity and Infrastructure Protection Subcommittee on the “Challenges of Recruiting and Retaining a Cybersecurity Workforce.” Chang has seen estimates stating that more than 200,000 job openings are available in the cybersecurity industry in the United States. It is expected that the global cyber skills gap will grow to about 18 million by 2022, which is 20 percent higher than earlier predictions.

Lyle has been at the forefront of cybersecurity education for over 13 years, thanks to being one of the first universities in the country to offer specialized courses in network and systems security for engineering undergraduates. Many students who pursue a master’s in security engineering continue in the 4+1 program or are working professionals interested in cybersecurity who want to further their career growth.

The Darwin Deason Institute, founded in 2014, is attracting an increasing number of interdisciplinary student teams to research pressing cybersecurity challenges. The Institute employs both graduate and undergraduate students as research assistants, mostly from computer science, computer engineering, and electrical engineering.

“At the Deason Institute, we give students an opportunity to augment their classroom learning by working on real-world security projects,” Chang says. He believes that working at the Deason Institute allows students the ability to gain valuable insight into timely, relevant, and hard-hitting topics that can enrich their overall education. Most of this research is funded by corporations.

“With incidents being reported daily, there’s greater public realization of the growing need for cybersecurity experts.”

FRED CHANG, executive director of the Darwin Deason Institute for Cyber Security, Bobby B. Lyle Centennial Distinguished Chair in Cyber Security and member of the prestigious National Academy of Engineering
who approach the institute with pressing security problems. “Our students and these companies are eager to work with each other. It’s good for our students, good for SMU and the Lyle School, and good for the companies for whom we conduct the research. It’s a win-win situation for everyone,” Chang states.

The scope of this problem isn’t strictly technical. Chang believes it’s important to look beyond the technical aspects and think more broadly into the realm of economics, public policy, and legal implications resulting from cyber breaches. Yet another challenge relates to the ability to keep abreast of financial trends in cybersecurity to ensure a return on investment. “Best practices serve as a foundation for cybersecurity strategies that could mitigate catastrophes.” Chang notes. His suggestion includes developing a strategy and budget based on proactive, versus reactive, measures such as implementing artificial intelligence and automation, increasing hiring rates to meet demand, and ensuring employees are qualified enough to respond to complicated situations.

Chang likens cyber defense strategies to when doctors try to anticipate what flu strains to focus on while developing a vaccine. He believes infusing the field with professionals who are trained to think about cyber resilience will go a long way toward not only solving these problems, but also preventing them. “The big question we want to answer is, even if we get attacked, can we prevent getting infected? Can we design systems that are increasingly resilient to cyberattacks?” Chang ponders.

If Chang has his way, a robust pool of well-educated and trained cybersecurity professionals will enter the workforce, and the answer to those questions will become a resounding “yes.”

Chang recently urged a congressional subcommittee to remember the success of Cold War-era legislation that dedicated more than $1 billion to growing the “space race” workforce as a model for closing the 21st-century cybersecurity skills gap.

“‘The big question we want to answer is, even if we get attacked, can we prevent getting infected? Can we design systems that are increasingly resilient to cyberattacks?’”

FRED CHANG, executive director of the Darwin Deason Institute for Cyber Security, Bobby B. Lyle Centennial Distinguished Chair in Cyber Security and member of the prestigious National Academy of Engineering

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From that first meeting, Johnson has forged productive professional and academic relationships with several Lyle professors. “The academic mentorship and personal rapport that I’ve received from my professors and advisors have made Lyle a place where I feel not only intellectually challenged, but also personally valued and cared for,” he explains.

One of Johnson’s professors and mentors, Assistant Professor Michael Hahsler, agrees. “It is a joy to work with Ian. Just tell him about a research topic and he figures out the rest. I look forward to our weekly meetings. Ian is always excited about his work. It’s what makes the difference.”

Johnson has found common ground on more than just computer science with his professors and classmates. This winter, he ran in the Hot Chocolate 15K with Associate Professor Daniel Engels. Johnson will also participate in the Half Ironman triathlon with Hahsler and fellow CSE student Ben Maxey. “Dr. Engels and I also created a fun tradition of having research meetings while watching SMU sporting events, and last fall we were regulars at the women’s home volleyball games,” Johnson adds.

He has also taken advantage of many career-enriching experiences at Lyle. His research has encompassed associative classification, link-layer authentication in low-jitter networks, black-routing for secure Internet of Things networks, and advanced topics in machine learning. This semester he joined the Darwin Deason Institute as a cybersecurity research assistant and will also be partnering with Engels and Ph.D. student Shaibal Chakrabarty, working on a startup company focused on commercializing an effective, secure routing strategy discovered in research associated with Chakrabarty’s thesis.

Through SMU connections, Johnson had the opportunity to work with AT&T Big Data in Plano. “All of these opportunities have been incredibly educational and productive parts of my SMU career,” Johnson says.

So much so, that as a first-semester sophomore, Johnson applied to Google’s summer internship program, and after over five hours of technical interviews, he was offered a position working on the machine learning back-end for Google Ads. He enjoyed being a “Googler” so much that he has been invited to return this summer to the Boulder office, to work on load testing for the Google Pay back-end.

Johnson is also very involved in two Lyle student organizations, including Tau Beta Pi, the engineering honor society. He is a founding member of SMU’s new Computer Science Club, started last fall with the mission of expanding the reach of CSE programs outside of Lyle, in the hopes of teaching students from all over the university about the opportunities that a computer science education could offer in their careers.

If Johnson could offer advice to incoming Lyle students, it would be this: “Coming to college is not about getting a degree, it’s about getting an education. It took me a while to realize, but I’m not here to get a piece of paper. I’m here to expand my knowledge base, to discover new ways of looking at problems, and to find new problems to solve — that’s the real goal,” he explains. “I now know that a diploma is just a symbol of accomplishing the real goal of expanding my mind and learning how to think like an engineer.”
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KATE SMITH
PH.D. ELECTRICAL ENGINEERING, QUANTUM INFORMATICS, LYLE GRADUATE STUDENT COUNCIL

“I want to be on the cutting edge of technology innovation, and believe that the next great information revolution lies in quantum computation and information processing. For this reason, I decided to focus my Ph.D. studies on quantum theory,” says Kate Smith, a Ph.D. student in electrical engineering.

Smith chose to pursue her undergraduate and advanced degrees in electrical engineering at SMU because of Lyle’s outstanding faculty. She believes the professors make the school stand out because they treat students as equals and make them feel individually supported. “The instructors encourage students to test the boundaries of what they think is possible during the problem-solving process, leading to solutions that are innovative and creative.”

One of Smith’s most trusted advisors is Mitchell Thornton, professor and Cecil H. Green Chair of Engineering, whom she’s worked with since the beginning. “I have learned so much from Dr. Thornton. He always encourages me when the answers during research are hard to find, and he has the best advice for any situation,” Smith says.

Research, as a graduate student, can be difficult work but producing results and sharing them with the engineering community can be extremely gratifying, and Smith would know. She has contributed to three publications and presented promising research at the 2015 IEEE Dallas Circuits and Systems Conference, and the 2017 IEEE International Systems Conference.

Smith enjoys the spirit of camaraderie among the graduate students. “I love how Lyle engineers value teamwork and collaboration, to develop the best solution for a problem. My favorite experience as a graduate student is the feeling you get after accomplishing a project milestone with a team of peers,” she shares.

During her undergraduate years at Lyle, Smith was a Lyle Ambassador and an officer in the SMU chapter of Theta Tau engineering fraternity. Now she’s the president of the Lyle Graduate Student Council (GSC), a group that assists graduate students with academic-related expenses and holds meetings to share their experiences. Last semester, GSC added a social aspect to the group to allow graduate students of different departments to get to know each other on a personal level.

Smith appreciates SMU’s ties to Dallas-Fort Worth industry, offering opportunities to network with experienced professionals and learn about scientific breakthroughs as they happen. She had the opportunity to participate in three summer internships at Texas Instruments, all of them fulfilling experiences. In 2012 and 2013, she was a Design Verification Engineer intern, and in 2014, a Customer Quality Engineer intern.

Smith’s career plans are clear. She hopes to actively contribute to the quantum community with a research role in industry, and eventually return to academia as a professor. Smith credits Lyle’s commitment to leadership development as one of the school’s greatest strengths, “SMU trains engineers to be effective communicators, which is one of the most valuable skills I will take into my future career.”

QUANTUM INFORMATION PROCESSING HAS THE POTENTIAL TO REVOLUTIONIZE COMPUTING AS WE KNOW IT. As compared to traditional models, quantum computers have proven to be much more efficient at searching large databases, factoring numbers, and simulating complex behaviors of our universe, such as chemical reactions. Because of this, a functional quantum computer could find applications in many scientific fields such as engineering, data science, or pharmaceuticals.
RAVEN SANDERS double-majored in Electrical Engineering (EE) at Lyle and directed studies in Audio at the Meadows School of the Arts. She graduated in four and a half years while also receiving a minor in Film and another in Creative Computation. “There was a surprising amount of overlap in my courses. I would go from learning about signal processing in my EE class in the morning to learning about applications of the resulting filters in my audio class in the afternoon. My education felt well-rounded since I was able to approach related topics from multiple schools of thought,” Sanders explains.

During her senior year, Universal Orlando hosted its first “A Celebration of Harry Potter™,” a three-day event with film talent Q&A sessions, special panels, demonstrations, and surprises. After much pleading, Sanders convinced her parents to buy tickets for her birthday. One special panel they attended was by Universal Creative, the division of Universal Parks & Resorts that envisions, designs, and delivers attractions, experiences, resorts, and theme parks around the globe. The discussion topic was on the design of “The Wizarding World of Harry Potter™.”

It was at that transformative moment, while getting a behind-the-scenes look at what goes into designing a theme park, that Sanders realized she’d rather tell stories through attractions than through films. “After the panel ended, the president of Universal Creative remained on stage, so I took a chance and ran up. I got his attention and let him know I was a graduating senior and wanted a job with Universal Creative,” Sanders says. “He gave me the email for HR, and from there I got my internship which led to a full-time job.”

Since joining Universal Creative, Sanders has worked on Transformers™: The Ride 3-D, Universal Beijing Resort, Skull Island: Reign of Kong™, The Wizarding World of Harry Potter™—Diagon Alley™, and is collaborating on other exciting future projects.

Sanders is a project manager in Attraction Development, where she works on projects at the front end, ensuring they stay within budget, on schedule, and receive appropriate design attention while still in their early stages.

“I love the variety of my job. I’ve worn many hats, taken on a number of responsibilities, and worked on several projects with a vast array of people, from a wide range of departments and backgrounds. Each day presents a new set of challenges different from the last. I don’t have to worry about falling into the rut of doing the same thing day after day!” she notes.

After Transformers™: The Ride 3-D opened in 2013, Sanders and her team were invited to speak on a panel at a Themed Entertainment Association event. “We answered questions on our experience opening an attraction in 11 months. Most attractions will typically take three to four years. I was honored to represent both women and young professionals in the industry.”

Sanders’ knack for design and project management seems to parallel one of her fondest memories from her time at Lyle. She directed a team of engineering students from Theta Tau engineering fraternity and APES (Ambassadors to Prospective Engineering Students) to write, choreograph, and perform a 10-minute mini-musical for Sing Song, a Founder’s Day Weekend event. As she recalls, “Despite being the underdog in the competition, we went on to be the crowd favorite. I remember how amazing it felt to show everyone that engineers are more than just some unathletic, nerdy stereotype.” In her role at Universal Creative, Sanders gets to prove that every day.
DATACENTER SYSTEMS ENGINEERING: POWERING THE DIGITAL REVOLUTION THROUGH NEXT GENERATION DATACENTERS

WE ARE NOW IN WHAT CAN BE DESCRIBED AS THE “DIGITAL REVOLUTION.” The world is being rapidly transformed by new digital infrastructure. Datacenters have gone beyond traditional mainframe storage and technical support, and are becoming the factories of the future. They enable the analysis of big data and cloud-based computing.

In 2014, Lyle introduced a multidisciplinary master’s degree in Datacenter Systems Engineering, a first-of-its-kind program, created with industry partners, designed to educate aspiring datacenter and cloud infrastructure leaders. “We are working to meet the educational and fast-growing workforce needs of the industry,” says Volkan Otugen, senior associate dean and director of the Datacenter Systems Engineering master’s program. “The timing couldn’t be better. The datacenter industry demands professionals with diverse, highly specialized skills to effectively address the demands of this rapidly evolving profession.”

Students who enter the program are seeking to broaden their technical knowledge skillset across the datacenter system stack while developing the strategic leadership skills needed to excel in the field. They engage in collaborative learning, interdisciplinary knowledge-building, and are introduced to key areas of engineering management.

Whether they attend class on campus or via distance education, students who pursue this degree learn from industry experts. Carol Jordan, M.S. DSE ‘17, datacenter manager at the University of California, Santa Cruz was pleased to find that this program can be completed entirely online through Lyle’s Distance Education Program, a leader in distance learning for more than 50 years. “I enjoyed the flexibility to decide when to attend class and work on assignments. It’s a great way to get the benefit of expert instruction but still do the work on your own time. The program delivered academic rigor, not schedule rigor,” Jordan explains.

Students master the skills to break down industry silos and manage diverse teams, as they transform how datacenters are planned, designed, built, managed, and when necessary, hyperscaled as increased demand is added to the system. Lyle’s industry connections with leading social media, cloud, and datacenter companies is another advantage for students. The Dallas-Fort Worth area has one of the strongest datacenter networks in the country, and is an ideal location for career advancement. Students visit cutting-edge datacenters, attend seminars given by industry leaders, and are taught and mentored by distinguished faculty.

As the first woman to earn an M.S. in Datacenter Systems Engineering from Lyle, Jordan encourages more women to enroll in this program and join the industry. “This is an incredibly important, interesting, and satisfying field. In a university setting, we have a lot of areas that come together under computing, and at some point, there’s a datacenter behind it. It’s important to know how all these pieces fit together and build a team to make it all work well.”
UPCOMING EVENTS

Caruth Institute: The Caruth Institute for Engineering Education helps prepare the next generation of engineers by hosting several outreach events for K-12 students throughout the year. Learn more here or email ciee@lyle.smu.edu.

Cox/Lyle Red Zone Football Tailgate Experience: Join us this fall at the Red Zone, our home game tailgating plaza that opens three hours before kickoff. We welcome Cox and Lyle alumni, students, parents, faculty, and staff. Register here for the Red Zone. See you on The Boulevard!

Deason Innovation Gym: This 24/7 makerspace, located in Lyle’s Caruth Hall, is open to all SMU students. For hours or to check out the DIG’s events, please visit thedig.org/calendar or email hello@theDIG.org.

Lyle Lecture Series:
- Download@Lyle features presentations on current research and initiatives. This event occurs on the first Wednesday of the month during the academic year. Speaker lineup and registration will open approximately two weeks before the date of each event and can be found here.
- Distinguished Lecture Series in Engineering Entrepreneurship is for engineering students, faculty, staff, early entrepreneurs, and all members of the university community with an entrepreneurial spirit and passion for technological innovation. Events will feature four guest speakers, two in the fall and two in the spring during the academic year. For more information, visit here.
- Datacenter Systems Engineering Speaker Series, offered once a semester, will feature data center industry experts who will discuss the evolving technologies, challenges, and opportunities in the data center industry. For more information, visit here.

Hunt Institute: The Hunter & Stephanie Hunt Institute for Engineering & Humanity hosts several events over the academic year. Learn more here or email HuntInstitute@smu.edu.

Lyle Undergraduate Prospective Student Events: The Office of Undergraduate Recruitment and Retention offers special events throughout the year to showcase the many great opportunities for engineering students at SMU Lyle. Email enrollment@lyle.smu.edu for more information.

Lyle Graduate Prospective Student Events: SMU Lyle offers distinctive graduate programs in delivery formats designed to cater to student needs. If you or your employees are interested in more information or registration for upcoming events, click links below or email Lylegrad@smu.edu.
  - Domestic Graduate Student Events
  - International Graduate Student Events

Lyle Student/Industry Events: SMU Lyle and the Hart Center for Engineering Leadership offer a variety of events for engineering students to interact with industry contacts throughout the year. For more information on how you can participate, please visit here or email thehartcenter@smu.edu.
ART ‘90 & GWEN GEORGE HELPING TO OPEN DOORS IN EDUCATION

FROM THE BEGINNING, ART GEORGE AND HIS WIFE GWEN HAVE SET THEIR FOCUS ON EDUCATION, mentoring, leadership, and, more importantly, bringing these three assets to underrepresented members of the community.

Before retiring from Texas Instruments (TI) after 30 years, Art was very involved in engineering recruitment, talent development, and diversity initiatives. His most recent position was senior vice president and manager of TI’s Analog Engineering Operations.

Art knew early in his career that he was a good engineer, but felt he had the makings of being an even better leader. In 1990, during his first supervisory role at TI in Sherman, Texas, he earned his master’s in engineering management from SMU through the distance education program. “It was a perfect fit,” SMU pioneered distance learning before the internet and was one of the first schools to offer the master’s in engineering management degree,” he notes. “I took classes at the plant on nights and weekends, then put into practice the leadership skills I learned the next day with my team.”

Gwen, who spent her career in accounting, is very involved with the Trinity (TX) chapter of The Links, Incorporated, an organization of professional women of color active in giving back to society. She is particularly invested in “So SMAART,” which stands for Set on Science and Engineering Leadership. He’s been a long-time participant in the Hart Center’s Mentor Program, working with students every year. Despite being retired, Art continues to meet with three to six TI employees a month. “You never know how you’re going to impact somebody’s life,” he says. “I share what I learned to come up the corporate ladder and be successful in my career. And being a mentor to students and TI mentees keeps me fresh in what I can do to help other people.”

The Georges have been so involved with SMU that it felt right for them to support the school financially. It started with the Lyle Engineering Scholars Program, which greatly improves the school’s ability to attract brilliant young minds by providing scholarships to top students interested in pursuing an engineering degree. Giving options include annual scholarships, endowed scholarships, and contributions of any size to the Lyle Endowed Scholarship Fund.

“When the Lyle Scholar program started, we thought, ‘Wow, we can do that! It would be easy to do and would make an instant impact,’” Art recalls. “We wanted to give more minority candidates the opportunity to attend SMU, and we can actually meet and interact with the young people that are receiving our scholarships.”

Thanks to Art’s position on multiple corporate boards that offer opportunities for matching gifts, the Georges have been able to fund three Lyle Scholars. Art continues to meet and interact with the young people that are receiving our scholarships.”

Strengthen SMU Lyle Today
To discuss the many giving options available, please contact the SMU Lyle development team at (214)768-4136 or email lylegiving@smu.edu

GIVE ENGINEERING RESEARCH A BOOST >>
Give to the Lyle Research Impact Fund

The Lyle Research Impact Fund exists to bridge the gap between inspiration and implementation. Lyle faculty generate ideas with great potential that require funding to run preliminary tests which ensure the project is viable. Investment in promising early-stage research allows for further project development, which in turn helps obtain sustained external funding. Early-stage funding for targeted research on a project acts as a catalyst to enhance the Lyle School’s research productivity.

Your gift will enable students, faculty, and staff working in laboratories, research centers, and community partnerships to develop new solutions to pressing problems and help shape the way we change the world.

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