

FALL 2019

COLLEGE REPORT

COLLEGE OF ENGINEERING & SCIENCE LOUISIANA TECH UNIVERSITY

BUILDING A LEGACY

FROM THE DEAN



Dear COES Friends,

As we finish the 2019 Fall Quarter, I would like to express my appreciation to our students, faculty, staff, alumni and friends. Our students provide leadership throughout campus, volunteering for projects that enhance the College and University, while faculty and staff continue to find increasingly effective ways to engage students. I am appreciative that you, our alumni and friends, continue to support our students by devoting time to industry boards and student organizations. I believe that, together, we are creating an environment built for success.

On that note, I am pleased to announce that students will begin using learning spaces in the Integrated Engineering and Science Building this winter quarter. In this report, you'll learn more about the building. You'll also learn about senior Mechanical Engineering student Luke Moreau's family ties to Louisiana Tech, Dr. Elisabeth Fatila's dedication to students learning chemistry and how students in the CyberCorps® Scholarship for Service program are preparing to protect us from cyber threats.

Building a Legacy, the theme of this report reflects on both the content of these articles and the community that we are building together. I hope you enjoy this snapshot of the Louisiana Tech University College of Engineering and Science.

Best Regards,

Hisham Hegab, Ph.D.
Dean and Max Watson, Sr., Professor
hhegab@latech.edu



"This building symbolizes the loyalty and commitment of our alumni and friends who've been so generous. It symbolizes the excellence of leadership of those who came before us, and the building symbolizes our hopes and our dreams, not only for Louisiana Tech, but for our region, for our state and for our nation."

— Louisiana Tech President Les Guice



BUILDING A LEGACY

Beginning this winter, students will take College of Engineering and Science courses in the Integrated Engineering and Science building. For the first time in the College's history, first- and second-year courses in chemistry, computer science, math and physics will be taught in the same building as courses in engineering and engineering technology, giving students and faculty from different disciplines more opportunities to collaborate.

Thanks to \$8 million in donations from friends of the College and a \$30 million commitment from the State of Louisiana, students, faculty and staff will have access to 12 new classrooms, 24 labs and a greenspace for collaboration and events.

Louisiana Tech President Dr. Les Guice dedicated the building to past and future students, faculty and staff on September 7, 2019, at a ceremony that included speeches by Dr. Guice, College Dean Dr. Hisham Hegab, President of the University of Louisiana System Dr. Jim Henderson, Louisiana Commissioner of Education Dr. Kim Hunter Reed and Louisiana Governor John Bel Edwards.

At the dedication, Governor Edwards noted that world-class, interdisciplinary facilities like the Integrated Engineering and Science building combined with the hands-on education model of Louisiana Tech create a more versatile workforce full of individuals who are able to learn new skills as they move forward in their careers, adding that "Tech has consistently been on the forefront of providing first-class education for the twenty-first century."

The three-story, 130,000 square-foot building is the largest academic building on campus and has the capacity to accommodate more than 1,000 students at a time. All of the nearly 3,000 students enrolled in Engineering and Science majors will have opportunities to use and learn in the classrooms and labs. In addition, students from other majors will have access to the new facilities as they take general educational requirement courses in chemistry, math and physics.

LUKE MOREAU



"I think that Tech has this really cool, family-oriented, friendship-based tradition of helping the next generation come into their professional careers. They do it in a way that builds a sense of accomplishment in the students."

– Luke Moreau



LIVING A LEGACY

In the age of automation, you may ask why a process for manually building a grinder housing is important. From an educational standpoint, the process - a major project in the Mechanical Engineering 321 course on manufacturing processes - teaches students how these processes work once you take away the computers and software.

To senior Mechanical Engineering student Luke Moreau, who finished his housing last winter, the process also symbolizes family and tradition. Luke is the third member of his family, after his father Tim ('78) and his brother Beau ('03), to build the housing at Tech and will be the third to earn a Bachelor of Science in Mechanical Engineering from the University.

Luke, who is a member of the Tau Beta Pi engineering honors society and the Delta Chi fraternity and is president of the Tech Eco-marathon team, keeps himself busy both academically and socially. While he can list all kinds of projects and events he's enjoyed as a Tech student, he ranks building the grinder housing as one of his favorites.

The biggest factor that excited Luke about building the grinder housing was knowing that his dad and brother had both completed the same project when they were Tech students.

"My dad and brother (who led the Tech Society of Automotive Engineers chapter and University Baja team) have been incredible role models to me, and growing up, I regularly used the grinder that my dad made at Louisiana Tech. Because of that, making the grinder housing was an incredible experience for me. I felt like I was becoming an engineer."

Tim and Beau had a huge influence on helping Luke develop a love for engineering (and tinkering on cars), and, like them, Luke plans to continue using his grinder into the future. In fact, the grinder is already a key tool for him, and he keeps it nearby as he works with the Eco-marathon team to improve the aerodynamic design and fuel efficiency of Tech's latest car.

Despite his family's connections to Tech, Luke considered other universities before choosing to move from his hometown of Lacombe to Ruston. He ultimately chose Tech, not because his dad and brother are alumni, but because they are engineers.

"Through my brother and dad, I understood the process for making things. What I saw at other universities I toured wasn't hands-on engineering. The curricula seemed overly academic. The atmosphere, the equipment, the price, and the faculty support behind the engineering programs here make Tech unique."

Tim adds that he's proud that Luke and Beau followed his footsteps into engineering at Louisiana Tech. "The engineering programs at Tech have something special that takes capable people and turns them into engineers. It's been fascinating and heartwarming watching Beau and Luke turn into young engineers. I remember going through the process, myself, and how much Louisiana Tech changed me. I feel like I've passed something special on to my sons."



"Inorganic chemistry is important for our understanding of chemistry as a whole. For example, the study of lanthanides is important as we work to improve the efficiencies of processing rare earth metals needed for modern technology." – Dr. Fatila

As one of Louisiana Tech's experts on inorganic chemistry, Dr. Elisabeth Fatila, assistant professor of chemistry and molecular science and nanotechnology, has adopted a service-minded approach to academics that has renewed interest in the field on campus.

The Ontario native earned bachelor's and doctoral degrees from the University of Guelph before moving to Berkeley to do post-doctoral research at the University of California. During that time, she developed an interest in the coordination of lanthanides, a large subset of the 17 metallic chemical elements that make up the rare earth elements. She followed her stint at Berkeley with post-doctoral research at Indiana University Bloomington before joining Louisiana Tech in 2017.

Dr. Fatila arrived at Tech with the determination to make inorganic chemistry, particularly the inorganic chemistry of lanthanides, engaging for students while giving them a background in thinking about and solving chemistry problems in general. "My goal, beyond teaching students to characterize and synthesize new molecules, is to teach students what questions to ask and how to use control studies in experimental design."

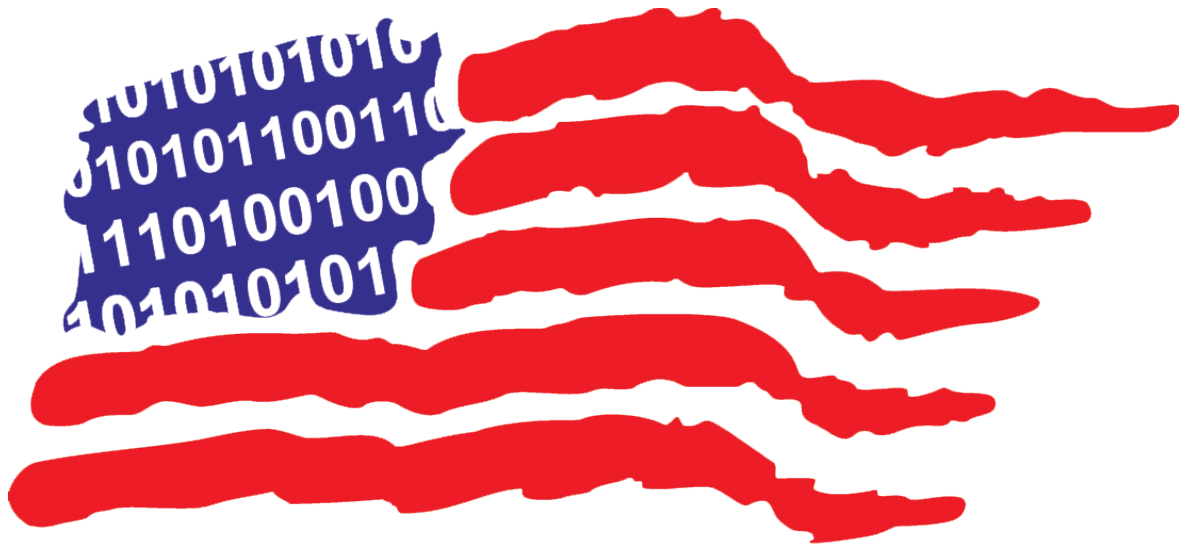
In pursuit of her mission, Dr. Fatila applied for a Louisiana Space Consortium (LaSPACE) NASA Research Enhancement Award grant that she used to establish The Fatila Group research lab. Students who earn a spot in The Fatila Group master the fundamentals of lanthanide research and lab safety while performing advanced research into solving the complex economic problems caused by limited rare earth elements.

Students who join the lab are immersed in environmental chemistry and safety, learning why they wear safety gear during experiments. These incoming students also work to understand how chemicals dissolve in mixtures, whether chemicals are toxic when broken down, why those chemicals are toxic, and how to evaluate environmental and health concerns when working with chemicals. Although they perform individual experiments, students in the lab work together to understand the problems and results of their research through weekly presentations and discussions. Because of this work, lab members are able to grasp the results and problems that they encounter with their experiments.

"Dr. Fatila gives us a lot of guidance but also gives us the chance to work on our own. First, I got confidence; now I'm able to do more predictive work," Fatila Group member Phillip Waltz said.

"Working here gives you a lot of confidence, and you learn a lot of new concepts. Then, you can apply what you learn in class, so that classes start to make more sense," Dylan Authement, Fatila Group member, who is enrolled in a special topics course that Dr. Fatila developed for students interested in bioinorganic chemistry, added.

Learn more about Dr. Fatila and The Fatila Group at www.fatilagroup.com/.



CyberCorps[®]

Defending America's Cyberspace

"The internships that our first SFS cohorts completed have shown them that they have the skills to succeed in the growing field of cybersecurity and have given them the confidence to push forward both academically and in their careers. I am thankful that this program has allowed us to provide these scholarships."

– Dr. Hisham Hegab, College Dean and Louisiana Tech SFS Grant Principal Investigator

SCHOLARSHIPS AND SERVICE: ENGINEERING CYBERSECURITY

As cyber criminals become more adept at finding vulnerabilities in networked systems, individuals, along with local, state and national governments are increasingly susceptible to cyber attacks. This vulnerability leaves infrastructure, information, energy, banking, transportation, water supply and emergency services at risk.

One solution that the United States government has developed to address emerging cyber threats is the CyberCorps[®]: Scholarship for Service (SFS) program. SFS was created under the Federal Cyber Service Training Education Initiative to increase the number of cybersecurity and information assurance experts in the U.S. workforce. The program, co-sponsored by the National Science Foundation and the Department of Homeland Security, is designed

to provide the next generation of cybersecurity experts with access to hands-on experience. Students who earn awards gain opportunities to participate in government internships in cybersecurity, as well as earning scholarship funding.

Louisiana Tech is one of fewer than 80 institutions across the nation, and the only institution in Louisiana, to receive an SFS grant. The grant, which began at Tech in 2018, provides scholarship money and internship opportunities for students majoring in Computer Science and Cyber Engineering.

In return for the funding, students who earn the award commit to serve in a cybersecurity position at a U.S. government agency after graduation. To prepare for this position, awardees complete a paid internship

during the summer after their first academic year in the program. There are currently 11 SFS scholars in Tech's program.

The 2018 awardees, Kimberly Atienza, Joseph Bingham, Kaelyn Nguyen and Ryan Parker spent the summer working with federal agencies across the country, learning what problems these agencies face most frequently and how to address them. Awardees for the 2019-2020 academic year will complete internships during the upcoming summer.

Keep reading to learn what Kimberly, Joseph, Kaelyn and Ryan did over the summer and what they believe are the most pressing issues facing cybersecurity experts.

**KIMBERLY ATIENZA****Major:** Computer Science**Internship:** United States Air Force at Scott's Air Force Base, Illinois

Over the summer, I interned with the United States Air Force in Illinois. The SFS program has shown me there is more to government

jobs than I thought and has helped me connect with others like me and those with more experience.

In addition to a basic understanding of the computer science field, Tech has helped me learn to collaborate with people of different ages and experience levels, which is important in government projects.

I believe the most important threat that cybersecurity experts face is the insider threat. It's easier to prevent someone from entering your system than it is to stop someone who already has access. The biggest hurdle is the rapid rate of change in technology. Attackers are creating newer and more dangerous ways to penetrate systems and target people who are unaware of the changes.

**JOSEPH BINGHAM****Major:** Cyber Engineering**Internship:** Air Force Global Strike Command and Nuclear Command, Control, and Communications Center at Barksdale Air Force Base, Louisiana

I was a part of the Air Force's Premier College

Intern Program, which has interns across the nation. My work included learning about nuclear communication systems and the risk management framework process.

The Cyber Engineering curriculum teaches problem-solving skills for the real world and has exposed me to technologies similar to those I worked with during my internship. Also, Tech has helped me develop social and leadership skills. I don't think many other universities provide the same number of leadership opportunities as Tech does.

Cybersecurity experts need to address how to prevent ransomware attacks like the ones that affected school districts in Louisiana and businesses in Oklahoma over the summer. To solve this problem, companies can setup more redundancy with their data, and cyber experts can help spread awareness about these attacks and how to avoid them.

**KAELYN NGUYEN****Major:** Computer Science**Internship:** Enterprise Applications at Naval Surface Warfare Center, Crane Division, Indiana

Over the summer, I had the opportunity to learn HTML, CSS, and Bootstrap and to create template web pages and implement them

in Microsoft SharePoint for the Naval Surface Warfare Center - Crane Division.

The SFS program opened my eyes to jobs offered within the government. Specifically, I was able to network with government employers at the SFS career fair in Washington D.C., which led me to my summer internship.

Courses at Louisiana Tech gave me a great foundation in programming skills and working in a team setting. Being involved with organizations on campus helped me develop the leadership skills and confidence to voice my opinion.

I believe the overall challenges for cybersecurity experts are identifying threats that affect individuals

and small businesses, in addition to larger entities like our government, and educating individuals on how to protect themselves.

**RYAN PARKER****Major:** Computer Science**Internship:** U.S. Naval Research Laboratory at Stennis Space Center, Mississippi

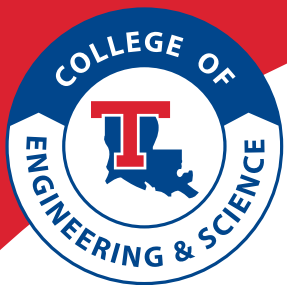
Having the SFS designation on my resume was critical in landing my summer internship with the U.S. Naval Research

Laboratory at the Stennis Space Center in Mississippi. The Naval Research Lab has strong ties with the program and regularly hires SFS scholars from across the country.

Information covered in computer science classes such as Computer Architecture and Data Structures was critical to my success in this role. Learning programming techniques and tricks from professors was also extremely beneficial in my internship.

I would have to say that social engineering is both the biggest threat and the biggest hurdle that cyber experts face. It is hard to stop the intruders, even in an impenetrable network, if employees of the organization are socially engineered to give up critical information.

CyberCorps® is designed to increase and strengthen the cadre of federal information assurance professionals that protect the government's critical information infrastructure.



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407

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108