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Spring 2014

Annual Report 2014

Brandy McKnight

Louisiana Tech University

Estevan Garcia

Louisiana Tech University

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LOUISIANA TECH UNIVERSITY
COLLEGE OF ENGINEERING AND SCIENCE

2014 ANNUAL REPORT



SUCCESS BEYOND THE BOOKS

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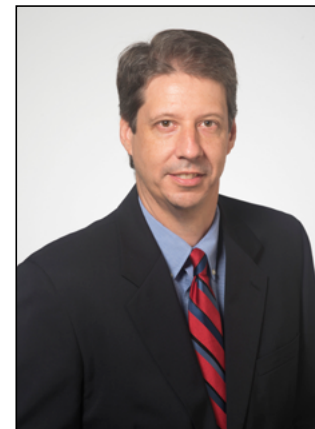


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THE DEAN'S DESK

SUCCESS BEYOND THE BOOKS




Dear Friends,
As an alumnus and 19 year member of the faculty at Louisiana Tech University, I am invested and passionate about our College's role in preparing the BEST graduates to respond to the needs and challenges of our ever-changing world. I believe my mechanical engineering degree from Louisiana Tech provided me with that preparation, and I aspire for us to continue to build and enhance our legacy of innovation and leadership in engineering and science education. We are also focused on transformative research that leverages our strengths and strategic opportunities. Both of these priorities are elevating our national recognition as evidenced by our University's consistent rise in national, rankings despite the challenges of higher education budget cuts.

In graduate studies and research, we are continuing to produce outstanding interdisciplinary graduates at the masters and doctoral levels, and we graduated 20 Ph.D. students during 2013-14, with over \$16 million in research expenditures in the previous year. Our faculty continue to make national and international news for their research as they fulfill our vision for being the best college in the world at integrating engineering and science in education and research.

Our "beyond the books" experiences are fueling an increasing demand for our programs. Last fall, we experienced a nearly 30 percent increase in our first-time freshman enrollment in the College, and, based on orientation registrations this summer, we expect another 20 percent increase this fall. I am thankful for the outstanding support of our Engineering and Science Foundation Board in successfully completing our Capital Campaign for our new Integrated Engineering and Science Education Building. It will provide critically needed space to support our "Living with the Lab" and "Living with Cyber" curricula.

I hope you enjoy reading about the many successes of our faculty and students in this report. Their hard work continues to grow the prestige and legacy of our College producing the Best Engineers and Scientists for Tomorrow.

Sincerely,

Hisham Hegab,
Dean and Thigpen Professor

While there have been many changes and challenges for our College this past year, there are still many exciting accomplishments to report. Our theme for this annual report is "Success Beyond the Books," as we have highlighted a variety of programs and activities that provide our graduates with learning experiences that go beyond just a classroom lecture. This fall, we are expanding our highly successful hands-on, project-driven "Living with the Lab" first-year curriculum and piloting a first-year "Living with Cyber" curriculum for our Computer Science and Cyber Engineering students. Our student organizations continue to be highly active and engaged, participating in regional and national conferences and competitions such as our American Society of Civil Engineers concrete canoe team (Deep South Conference winner), American Institute of Chemical Engineers senior design team (first place at National Spring meeting), Eco-marathon team (Design award winner), Society of Women Engineers (National Outreach Award), National Society of Black Engineers (two time National Chapter of the Year), and Cyber Engineering forensics team (fourth place national competition).

STAY CONNECTED

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COLLEGE OF ENGINEERING AND SCIENCE
P.O. BOX 10348
RUSTON, LA 71272



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Twitter.com/LATechCOES
Ask questions and get news.

The College of Engineering and Science Annual Report is made possible through the support of the College of Engineering and Science Foundation, and was published without the use of taxpayer funds. We owe a debt of gratitude to our alumni, friends, parents and corporate sponsors.

Louisiana Tech, a member of the University of Louisiana System, is an equal opportunity educator and employer.

LEADERSHIP TEAM 2014

- Hisham Hegab**
Dean, College of Engineering and Science
- Bala Ramu Ramachandran**
Executive Associate Dean, Research
- Jenna Carpenter**
Associate Dean, Undergraduate Studies
- James Palmer**
Associate Dean, Graduate Studies
- Lee Sawyer**
Director, Chemistry, Nanosystems Engineering and Physics
- David Hall**
Interim Director, Civil Engineering, Construction Engineering Technology and Mechanical Engineering
- Eric Guilbeau**
Director, Biomedical Engineering and Chemical Engineering
- Sumeet Dua**
Director, Computer Science, Cyber Engineering, Electrical Engineering and Electrical Engineering Technology
- Katie Evans**
Interim Director, Industrial Engineering and Mathematics & Statistics
- Catherine Fraser**
Executive Director, Engineering and Science Foundation and Director of Development
- Sylvia Shultz**
Executive Office Manager
- Sharon Ellis**
Budget Manager and Executive Administrative Coordinator





EQUIPPING OUR STUDENTS TO PURSUE THEIR PASSIONS

ABOUT THE COLLEGE

The College of Engineering and Science promotes student success by providing an environment that allows students, faculty and staff to reach their potential through hands-on education and extracurricular activities. The College consists of eight engineering programs (Biomedical, Chemical, Civil, Cyber, Electrical, Industrial, Mechanical and Nanosystems Engineering), two engineering technology programs (Construction and Electrical Engineering Technology), and four science programs (Chemistry, Computer Science, Mathematics & Statistics and Physics). Students can pursue undergraduate degree programs in each of these areas, as well as graduate degrees in engineering and science at both the master's and doctoral levels.

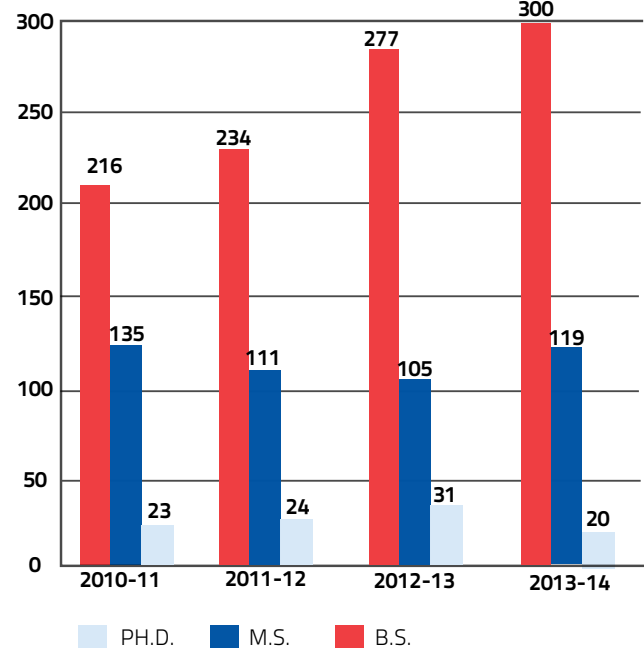
RESEARCH CENTERS

Our students can research with faculty at six centers: the Center for Applied Physics Studies, the Center for Biomedical Engineering and Rehabilitation Science, the Center for Entrepreneurship and Information Technology, the Institute for Micromanufacturing, the Integrated STEM Education Research Center, and the Trenchless Technology Center. Known for its integrated approach to both education and research, the College is an Affiliate of the National Academy of Engineering's Center for the Advancement of Scholarship in Engineering Education. We believe that teaching, research and professional service are mutually supportive in the search for excellence.

MISSION

We provide a quality undergraduate and graduate education that responds to the needs and challenges of our ever-changing world that includes an international perspective and stimulates social and ecological awareness.

DEGREES CONFERRED



ENROLLMENT ACADEMIC YEAR 2013-14

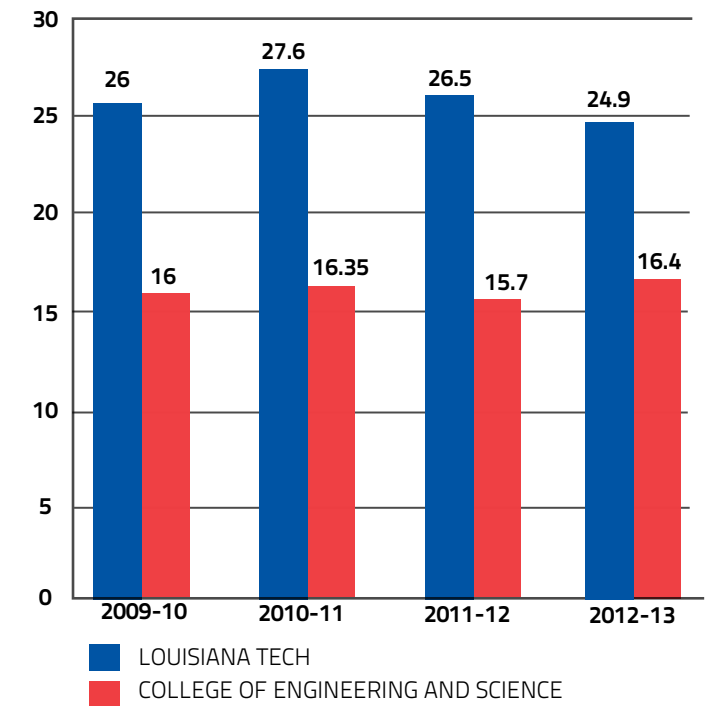
Mechanical Engineering (B.S.)	509
Chemical Engineering (B.S.)	220
Electrical Engineering (B.S.)	182
Civil Engineering (B.S.)	165
Computer Science (B.S.)	165
Biomedical Engineering (B.S.)	154
Engineering (M.S.)	105
Construction Engineering Technology (B.S.)	98
Electrical Engineering Technology (B.S.)	88
Engineering (Ph.D.)	77
Cyber Engineering (B.S.)	76
Industrial Engineering (B.S.)	60
Engineering & Technology Management (M.S.)	57
Nanosystems Engineering (B.S.)	50
Math (B.S.)	44
Chemistry (B.S.)	39
Computational Analysis Modeling (Ph.D.)	38
Physics (B.S.)	36
Computer Science (M.S.)	30
Biomedical Engineering (Ph.D.)	23
Molecular Science & Nanotechnology (M.S.)	13
Math (M.S.)	8
Applied Physics (M.S.)	7
Molecular Science & Nanotechnology (Ph.D.)	4
Microsystems Engineering (M.S.)	2

SCHOLARSHIPS

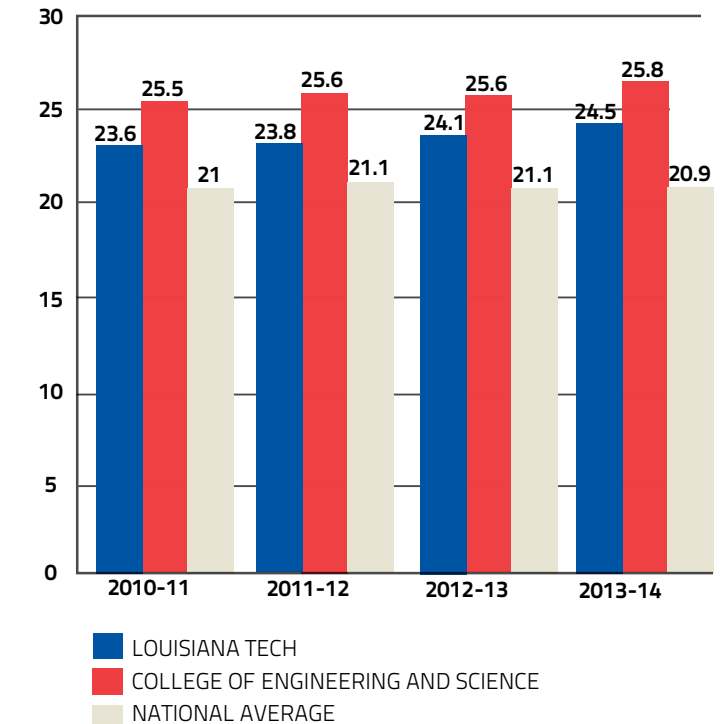
\$232,000 to approximately 175 students for 2014-15

RESEARCH EXPENDITURES IN MILLIONS

\$43.6 million in active grants
177 research grants



AVERAGE ACT SCORES





Dr. Jenna Carpenter (left), 2014 GCSP Graduate Brittany Copponex and Dr. Katie Evans (right)

CHALLENGING LIMITS OF ENGINEERING

The National Academy of Engineering’s Grand Challenge Scholars Program (NAE GCSP) at Louisiana Tech (one of only 17 in the U.S.) continues to provide Tech engineers with the interdisciplinary tools to change the world. Brittany Copponex, Mechanical Engineer from Prairieville, La., completed the program this year.

Brittany, like the 10 previous Scholars from Louisiana Tech, joined the co-curricular program to learn to better solve real-world, 21st century problems and enhance her leadership and interpersonal skills. As she explains below, the program changed the way she addresses both engineering and humanitarian problems.

How did GCSP change the way you approach engineering?

In my engineering classes, I was challenged to solve problems quickly and efficiently. This program raised the bar by challenging me to be passionate about implementing a positive change in our profession and in our world, in addition to having the typical technical skills that engineers have.

How did it change the way you approach problem solving?

It made me take a broader and more proactive approach by encouraging me to think of the source of the problem as well as the effect my solution will have.

How do you think engineers addressing the 14 Grand Challenges will shape the future?

When Scholars graduate, they take experiences from the GCSP with them. As these engineers share the program ideals, they add a level of global awareness and integrity to the profession.

How do you plan to use your GCSP experiences to shape the future?

I plan to pursue a career in power and water with General Electric and remain active in Engineers Without Borders. My goal is to help develop energy methods that will reduce the ecological footprint made by humans.

How did the program expand your education beyond the normal curriculum?

I learned how important it is for engineers to step up to global challenges. Many times, engineers are on the forefront of developing and revolutionizing the world around us, making dreams into reality.

“In this program, I have learned to apply my knowledge and capabilities to make a global impact through day-to-day actions. I am very proud to be part of a group of graduates who share this global passion and mindset.”

–Brittany Copponex, GCSP graduate, Mechanical Engineering

In addition to completing the hands-on “Living with the Lab” curriculum and a minor in Business Administration, Brittany held officer positions in the Louisiana Tech Society of Women Engineers and Engineers Without Borders, was an assistant editor for the E&S Magazine, a board member for Bulldog Entrepreneurs, and a tutor for the Bulldog Achievement Resource Center. Since graduating, Brittany has been accepted to the M.B.A. program at Oklahoma State University.

The Louisiana Tech GCSP program is led by Dr. Katie Evans, faculty advisor and interim director of Mathematics & Statistics and Industrial Engineering, and Dr. Jenna Carpenter, chair of the national NAE GCSP Steering Committee and associate dean of Undergraduate Studies for the College of Engineering and Science.

For more information visit

coes.latech.edu/students/gcscholars.php.



LIVING WITH CYBER: NEXT GEN EDUCATION

“Cyber war.” “Cyber crime.” “Cyber Monday.” The term cyber crops up on a daily basis in news, entertainment, even in shopping. Yet, it encompasses so many variables that even the U.S. Department of Defense has trouble defining it.

Starting this fall, beginning Louisiana Tech Computer Science and Cyber Engineering students will be immersed in a year long “Living with Cyber” curriculum to understand the complexities of the cyber world. The curriculum will include project-driven learning experiences centered around Google Nexus 7™ tablets combined with Raspberry Pi computers. These devices will provide students with hands-on projects.

As Director for Computer Science and Cyber Engineering Dr. Sumeet Dua noted, “This immersive ‘Living with Cyber’ curriculum will allow students to develop critical thinking, logical reasoning, information assimilation, and knowledge representation skills while learning the foundational principles of software and systems design in the computer science and cyber engineering curricula.”

“Living with Cyber,” in addition to the annual cyber security competition, Cyber Storm, in which students attempt to hack into each other’s systems, will help better prepare Louisiana Tech Computer Science and Cyber Engineering students to fill nationwide workforce needs in the growing sectors of software development, IT infrastructure, application development, cyber security and cloud computing.



Ph.D. Candidate Nathan Wallace presenting his award-winning paper at Oak Ridge National Laboratory

SECURING CYBERSPACE

Nathan Wallace, Ph.D. candidate in Engineering, won the best paper award at the “9th Cyber and Information Security Research Conference” held at Oak Ridge National Laboratory on April 9, for his paper on “A dimensional transformation scheme for power grid cyber event detection.”

Nathan earns his Ph.D. with a concentration in cyberspace engineering this summer. He received a B.S. in Physics and Electrical Engineering and an M.S. in Engineering from Louisiana Tech. He had planned to join the U.S. Marine Corps after completing his B.S. His experiences with the freshman engineering curriculum “Living with the Lab” and the ham radio club spurred him to pursue a graduate degree, and, after graduate research at Tech’s Digital Forensics and Control System Security Lab (dcsf.latech.edu), he determined that he could do more for his country with a Ph.D.

“I was able to take part in real digital forensic investigations and engineer custom solutions to cyber problems. This actually brings me back to my initial pursuits of wanting to serve our country, only now I will be able to do that in the cyber domain.”

–Nathan Wallace, Ph.D., Engineering

After graduation, Nathan will work with the federal government as a research engineer.

Photo courtesy of the 9th Cyber & Information Security Research (CISR) Conference, Oak Ridge National Laboratory.



Louisiana Tech Eco-marathon cars, Diesel Dawg and Double X

Photo by Matt Condon

SUCCEEDING OUTSIDE THE CLASSROOM

Teamwork and ingenuity propelled Engineering and Science student organizations into the spotlight this year, helping them win awards for performance and service. The Louisiana Tech chapters of the American Institute of Chemical Engineers, American Society of Civil Engineers, Cyber Engineering Forensics Teams, Engineering and Science Association, Institute of Industrial Engineering, National Society of Black Engineers and Society of Women Engineers, and the Eco-marathon team all earned accolades for innovation, leadership and outreach for 2013-14.

American Institute of Chemical Engineers

The American Institute of Chemical Engineers (AIChE) won first place in the 2014 Best Senior Design Competition at the AIChE spring meeting and “10th Global Congress on Process Safety” held in New Orleans, La.

American Society of Civil Engineers

The American Society of Civil Engineers placed first in the concrete canoe portion of the Deep South Regional Conference at Christian Brothers University, Memphis, Tenn., and competed at the nationals competition in Pittsburgh, Pa.

Cyber Engineering Forensics Teams

The Louisiana Tech Cyber Engineering Forensics Teams placed in the Top 10 at the 2013 Department of Defense Cyber Crime Center Digital Forensics Challenge. Louisiana Tech’s graduate Cyber Engineering Forensics Team finished in second place in the U.S. graduate team division and third in the graduate

overall division. Tech’s undergraduate team finished in fourth place in the U.S. undergraduate team division and fifth in the undergraduate overall division.

Engineering and Science Association

The Engineering and Science Association won the Regional Conference of the National Association of Engineering Student Councils award for Best K-12 Event (E&S Day).

Institute of Industrial Engineering

Dr. Jun-Ing Ker won the 2014 Institute of Industrial Engineering Faculty Advisor Recognition Award for the Southeast Region.

National Society of Black Engineers

The National Society of Black Engineers (NSBE) hosted the Spring Collaborative Alliance of Joint Universities in NSBE Zone Meeting for Louisiana.

Society of Women Engineers

The Society of Women Engineers won the Outreach Event/ Series Collegiate Section Award for medium sections.

Louisiana Tech Eco-marathon Team

The Eco-marathon team won first place for vehicle design and third place for best diesel fuel mileage in the Urban Concept category of the 2014 Shell Eco-marathon Americas competition in Houston, Texas, for their newest car, “Diesel Dawg” and second place for best gasoline mileage in the Urban Concept category for “Double X.” In addition, the team was invited to showcase their car, “Hot Rod,” at the Houston Grand Prix.



Students participating in two Summer 2014 Research Experiences for Undergraduates programs held at Louisiana Tech University. **First row** (L to R): Anne Rebecca (Rowan University), Jacqueline Model (Missouri University of Science and Technology), Justine Ker (Vanderbilt University), Kathleen Moyer (Stevens Institute of Technology) and Lindsay Davis (Langston University) **Back row** (L to R): Christopher Bell (Xavier University of Louisiana), Inderbir Sondh (University of Pittsburgh), Dustin Sauriol (West Virginia University Institute of Technology) and Frank Marshall (Missouri University of Science and Technology)

EDUCATING BEYOND LOUISIANA TECH

In what has become an annual event, undergraduates from around the nation came to Louisiana Tech for the Research Experiences for Undergraduates (REU) programs. REU programs immerse students in cutting-edge research projects under the guidance of faculty members. Louisiana Tech offered four REU programs in 2014, hosted by the Louisiana Alliance for Simulation-Guided Materials Applications (LA-SiGMA), the Center for Biomedical Engineering and Rehabilitation Science (Dr. Steve Jones, associate professor of Biomedical Engineering), the Institute for Micromanufacturing (Dr. Pedro Derosa, associate professor of Physics and Nanosystems Engineering), and the Research-Intensive Internship in Cyber Engineering (RICE; Dr. Miguel Gates, lecturer of Electrical Engineering).

As part of the experience, students perform interdisciplinary research on topics like cyber engineering, materials science and nanosystems engineering, learning to work through problems and overcome barriers. This experience helps them decide whether they want to pursue advanced degrees and to identify the field in which they may pursue graduate studies.

Alicia Boudreaux, LA-SiGMA’s North Louisiana Outreach Coordinator, says that the program is important for students to understand what research is and its many roles beyond academia.

“Many of our students have traveled hundreds of miles to get a taste of the innovative research at Louisiana Tech. The students learn real-life problem solving skills such as creative thinking, networking and most of all perseverance! Our faculty have a vision for education – publishing excellent research and mentoring the next generation of researchers to do the same.”

The RICE program, offered for the first time in 2014, includes a variety of cyber topics, such as work with unmanned aerial vehicles, network security and genome data.

“RICE was designed to give students all the necessary tools to succeed in both academia and industry,” said Gates. “It is more than a program—it is an experience. We give students the opportunity to do cutting-edge research that is applicable in the real world, thus engaging them in ideas that were foreign to them, and helping stimulate that desire for lifelong learning.”

“These REU programs have two enormously rewarding aspects for a faculty mentor like myself. The first is that you get to interact with young, intelligent and creative minds and engage them in important research problems. The second is that they leave with a very positive impression about Louisiana Tech University.”

–Bala “Ramu” Ramachandran, Executive Associate Dean, Research

REU programs at Louisiana Tech are funded by the National Science Foundation, Louisiana Board of Regents, Cyber Innovation Center in Bossier City, La., Department of Homeland Security and the Air Force Research Laboratory Research Collaboration Program.



EXPANDING CYBER AWARENESS

Federal agents swarmed Louisiana Tech University on July 21st and remained on campus through the 26th. The federal agents were Tech professors involved in the Cyber Discovery 2.0 program, aimed at showing high school teachers and students how the liberal arts and sciences intertwine in our national security – where analysis and investigation merge in understanding national and international crises faced in our increasingly cyber-connected world.

Louisiana Tech and the Cyber Innovation Center in Bossier City, La., funded the pilot program – Cyber Discovery 1.0 – seven years ago, which has expanded through grants from the U.S. Department of Education[^] and the U.S. Department of Homeland Security^{^^}. The program, which was implemented first in 2008 at Louisiana Tech, now includes host universities on both the east and west coasts.

Dr. Galen Turner, professor of mathematics and statistics at Louisiana Tech and National Director of Cyber Discovery, leads the team of faculty including several key leaders from Louisiana Tech who are replicating the experience around the country. The National Team includes Dr. Heath Tims, associate professor of Mechanical Engineering, Dr. Jeremy Mhire, associate professor of Political Science, and Dr. Jean Gourd, associate professor of computer science.

“Integrating engineering, science and mathematics with the liberal arts across the cyber domain is necessary to securing cyberspace for commerce and communication across the globe”

–Dr. Galen Turner, professor of mathematics and statistics, Louisiana Tech

With the importance of cyber literacy and awareness as a focus, Cyber Discovery is an immersive experience aimed at developing better cyber-citizens who help cyber-security efforts. By building on Louisiana Tech’s approach to developing and fostering competitive, knowledgeable, and ethnically diverse talent pools with expertise in science, technology, engineering and math, Cyber Discovery has expanded to include five states (Louisiana, Arkansas, Maryland, Oregon and Washington).

Cyber Discovery 1.0, a professional development program for high school teachers, culminates in a week-long experience in which student teams of rising sophomores participate in cyber-related challenges integrating disciplines such as engineering, computer science, English, history, mathematics, architecture, cryptography and political science. Curricular threads include: history of cyberspace, ethical and social issues, citizenship, applications, and the need for and use of security in cyberspace.

The Cyber Discovery 2.0 program is the next evolutionary step forward for interdisciplinary, integrative approaches in education. Led by faculty from the College of Liberal Arts, this program takes a scenario-based approach to security issues incorporating hands-on engineering and computer science labs, a cryptographic component and a challenge integrating the techniques learned through the program. Cyber Discovery 2.0 provides high school juniors with a broader exposure to liberal arts, mathematics and science in the context of cyber-security.

Teachers who participate change the way they teach by including cyber experiences across their curricula so that students are more aware of the applications of those disciplines to cyberspace.

“How we structure and teach our classes at West Monroe came from our experience at Cyber Discovery. That was how much of an impact it had on us.”

–Ashley Bell, an English teacher, West Monroe High School

Lauren Pilcher, a student at Airline High School said, “This is literally a once-in-a-lifetime opportunity, and it lived up to my expectations by providing teamwork, cyber innovation, and many other things that I can use later in life.”

This year more than 40 faculty members from six universities, 90 teachers from 45 high schools and more than 500 students

participated in Cyber Discovery across the nation. Louisiana Tech hosted almost half of the teachers this year. Prior to implementing the program on their home campuses, faculty teams from Portland State University and the University of Central Arkansas participated in Cyber Discovery at Louisiana Tech. In addition, universities from Michigan, Colorado, Mississippi and Florida sent faculty teams to observe Cyber Discovery 1.0 at Louisiana Tech this summer.



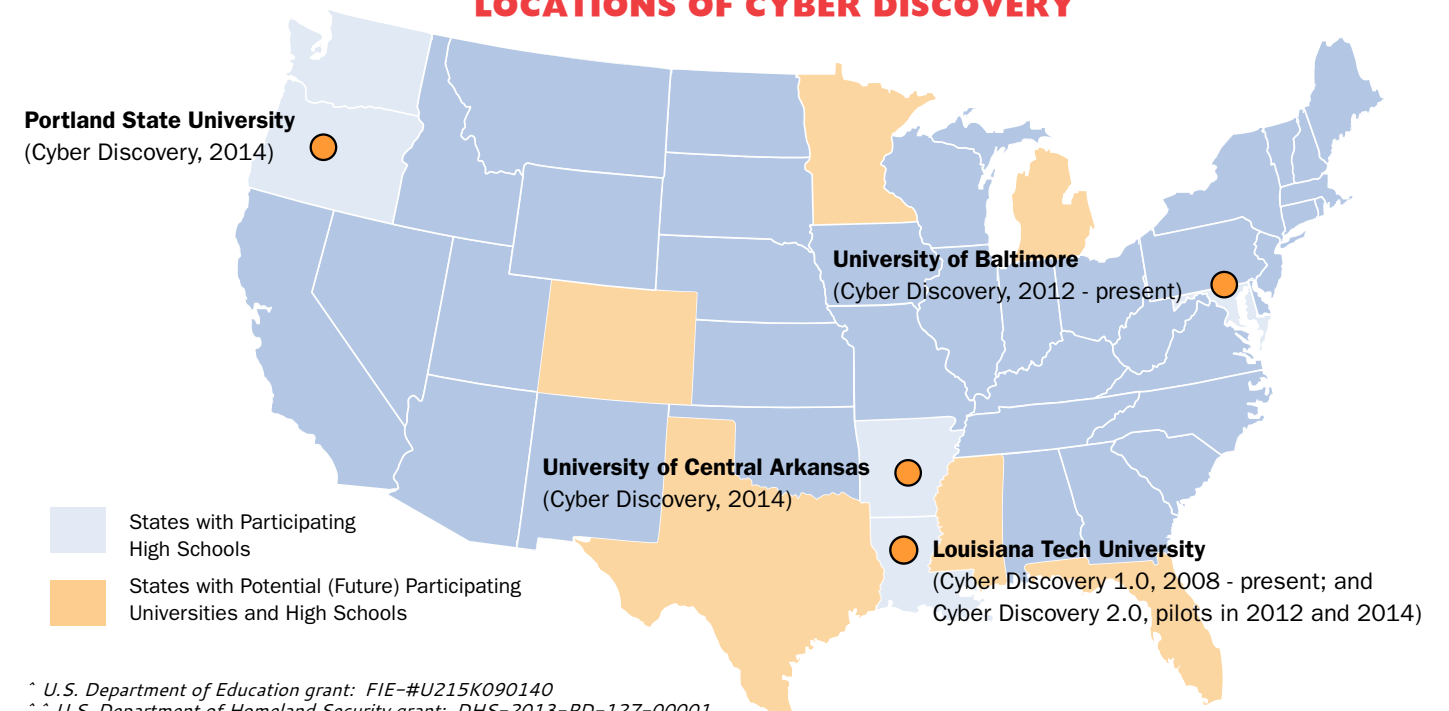
COMPLETE LIST OF ACTIVE FACULTY IN CYBER DISCOVERY

(NATIONAL AND AT LOUISIANA TECH)

All faculty are from Louisiana Tech unless designated otherwise *National Team is denoted with an asterisk.

- Galen Turner*** (Mathematics)
- Jeremy Mhire*** (Political Science)
- Nicole de Fee*** (English)
- Jean Gourd*** (Computer Science)
- Travis Atkison*** (Cyber Engineering)
- Heath Tims*** (Mechanical Engineering)
- Mike Swanbom*** (Engineering)
- Kelly Crittenden*** (Mechanical Engineering)
- Paul Hummel** (Electrical Engineering)
- Daniel Moller** (Engineering)
- Brad Deal*** (Architecture)
- Paul Crook** (Performing Arts)
- Mark Melder** (Sociology)
- Drew McKeivitt** (History)
- Jason Pigg** (Political Science)
- Ernie Ruffeth** (English)
- Christian Duncan*** (Computer Science – Quinnipiac University)
- Brian Etheridge*** (History – Georgian Gwinnett College)

LOCATIONS OF CYBER DISCOVERY



[^] U.S. Department of Education grant: FIE-#U215K090140
^{^^} U.S. Department of Homeland Security grant: DHS-2013-PD-127-00001



BRINGING WOMEN BACK TO IT

The College of Engineering and Science as part of its effort to increase the diversity of engineering and science graduates prepared to enter the IT workforce, has been invited to partner with the National Center for Women and Information Technology (NCWIT) as a part of their Academic Alliance Program.

The NCWIT Academic Alliance brings together nearly 800 representatives from academic computing programs at more than 300 colleges and universities across the country and provides access to leading practices for recruiting and retaining women and to opportunities to attend workshops and compare practices with other institutions, as well as the ability to apply for funding opportunities, to advertise their departments and announcements and participate in NCWIT marketing and branding campaigns.

Shortfalls in both the national and local IT economies can be addressed by increasing the number of women in IT fields and related majors, such as mechanical engineering, electrical engineering, computer science and cyber engineering. While the number of women in the early days of computing was high, the numbers have been declining for decades, with marked drops in recent years due to the emergence of the gaming culture.

The College effort is led by Dr. Jenna Carpenter, associate dean of Undergraduate Studies, together with Dr. Hisham Hegab, dean of the College; Dr. Sumeet Dua, director of Computer Science,

Electrical Engineering and Cyber Engineering; Dr. Sandra Zivanovic, associate professor of Electrical Engineering; Dr. Jean Gourd, program chair of Computer Science; and Dr. Davis Harbour, program chair of Electrical Engineering. The Louisiana Tech initiative includes strategically recruiting students, delivering effective messaging strategies to targeted audiences, retaining students with dynamic curricula and student support and promoting the Sit with Me project.

In addition, the College hosts the annual NCWIT Louisiana Aspirations in Computing Awards, which honors high school women in the state for their computing achievements.

NCWIT has inducted more than 2,200 young women nationally into the Aspirations in Computing community since 2007. Seventy-one percent of inductees reported choosing a college major or minor in a traditionally male-dominated science, technology, engineering and math field.

Five high school students were selected as 2014 Aspiration Award winners, with two additional honorees recognized as runners-up, and a high school computer science teacher recognized as this year's outstanding educator for his efforts to promote gender equality in computing.

To learn more about the National Center for Women and Information Technology and the Academic Alliance, visit <http://www.ncwit.org/alliance.academic.html>.



Dr. Mary Caldorera-Moore (left) guiding undergraduate researcher Mary Cathleen Dungan, Chemistry senior (right), as she adjusts the pH of a solution

PAYING IT BACK

As they drove into Austin to begin graduate school at the University of Texas, Tech alumni Arden Moore (Mechanical Engineering) and Mary Caldorera (Biomedical Engineering) knew that they would miss their alma mater- and they did. They missed it so much that they returned to the Tech family in the fall of 2013.

Dr. Moore, now an assistant Professor for Mechanical Engineering and Tech's Institute for Micromanufacturing, and Dr. Caldorera-Moore, now an assistant professor for Biomedical Engineering, Nanosystems Engineering and the Center of Biomedical Engineering Rehabilitation Science, brought expertise in energy and controlled drug release development to share with Tech students.

Dr. Moore is leading research in energy scavenging, energy production, sustainable alternative materials, chemical and environmental sensing, scalable nanomanufacturing, and advanced thermal management materials and techniques for next gen electronic devices and large industrial processes. Dr. Caldorera-Moore is developing innovative approaches to long-term drug release and

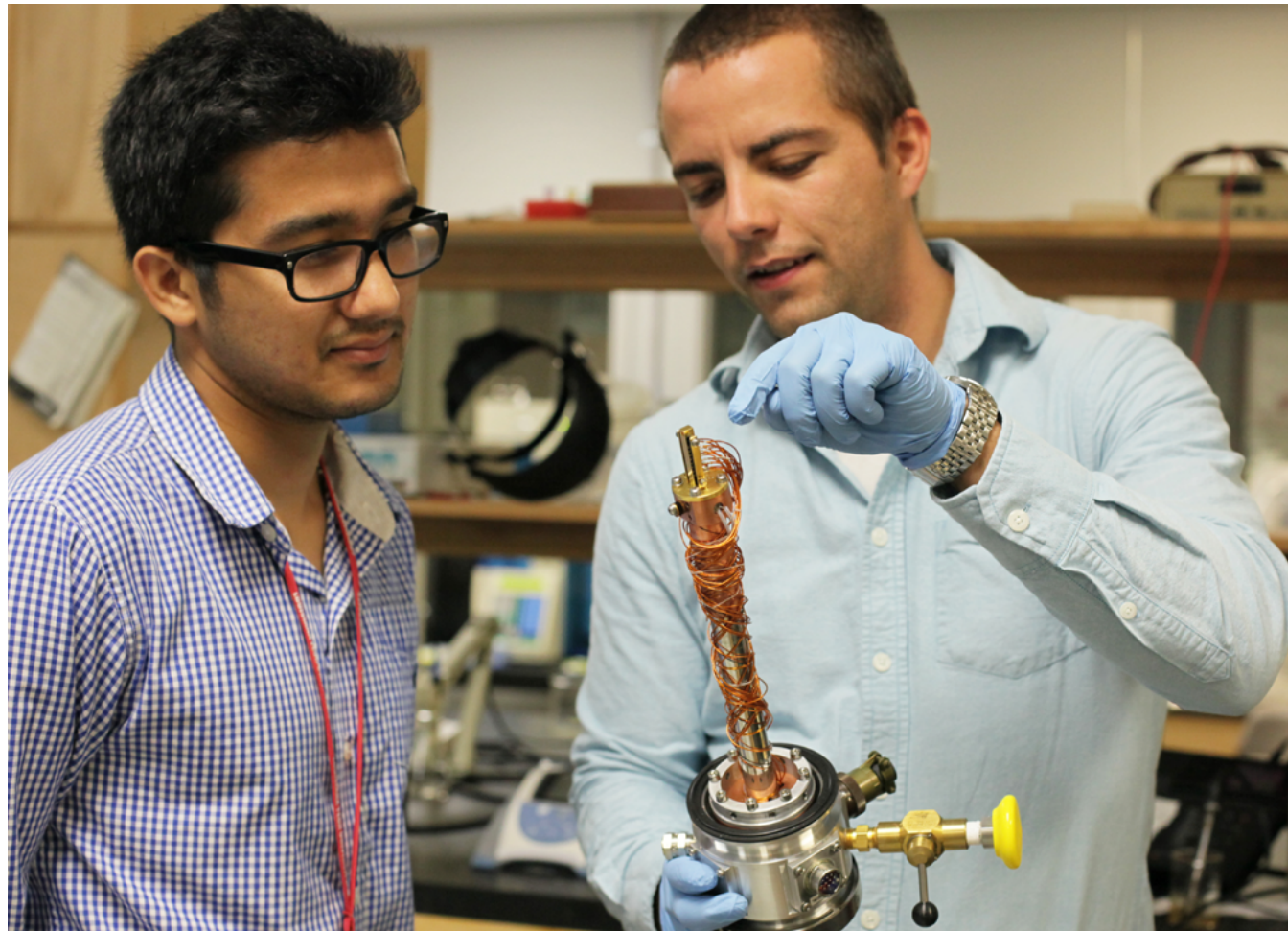
targeted, cell-specific drug delivery, and combining microscale and nanoscale technologies with intelligent biomaterials.

On paper, it is clear why Louisiana Tech asked them to return. What their resumes don't show is their passion for providing students opportunities to get involved in the cutting-edge research that occurs in their labs. Dr. Moore's Multiscale Energy Transport and Materials Laboratory and Dr. Caldorera-Moore's Therapeutic Micro- and Nanotechnology Biomaterial Laboratory provide students from a variety of disciplines and classifications with access to tools, facilities and expertise to learn the research process.

"My research focuses on developing innovative drug delivery systems that have the ability to target specific diseased cells while sparing healthy cells to improve how we treat diseases like cancer."

-Dr. Mary Caldorera-Moore, assistant professor, Biomedical Engineering

The effect their research has, not only on the future of electronics and drug delivery, but also on students, is evident in advances in student research. The labs employ high school, undergraduate and graduate student researchers. Luke Villermin, a Mechanical Engineering undergraduate student, received a research position



Dr. Arden Moore (right) discussing the workings of a cryostat, an instrument used to carefully control the environment in which energy transport in nanomaterials is studied, with student Pratik KC

at the University of Pennsylvania this summer because of his experience in Dr. Caldorera-Moore's lab with nanoscale biomaterials for drug delivery applications.

Pratik KC, who completed his undergraduate degree at Tech in Mechanical Engineering and is pursuing a Ph.D. in Engineering with a concentration in micro and nanoscale systems, researches heat transfer and cooling methods for silicon chips with Dr. Moore. While his research is primarily on electronic thermal management and enhancing heat from electronic components heat transfer, he says that he has learned to perform in-depth research from Dr. Moore as well.

"Dr. Moore is a great advisor and mentor. His knowledge of micro and nano systems, particularly in the field of heat transfer, has provided me with the ability to visualize and understand the micro/nano system applications from both an academic and an

industrial point of view. Working in his lab has helped me develop as a researcher."

Nehal Patel, who is pursuing an M.S. in Molecular Sciences and Nanotechnology and who started working for Dr. Caldorera-Moore this summer, says that the research experience is invaluable to his education.

"What Dr. Caldorera-Moore does with drug delivery and nanoparticles may change medicine. It will certainly prepare me for a future in both academia and industry."

Both professors have full teaching schedules, in addition to running labs and training researchers. As if teaching and research weren't enough to keep them busy, Drs. Moore and Caldorera-Moore also have two children, ages 8 and 2.



INTEGRATED

ENGINEERING & SCIENCE BUILDING

Thanks to your support as dedicated alumni, friends, and industrial donors, we have reached our \$7.5 million goal in private donations in the Campaign for a new Integrated Engineering and Science Building. With the additional support and leadership of President Les Guice, the University has leveraged these funds to secure \$36.9 million in state capital outlay for the project.

The modern facility will provide critically needed space for both education and recruitment planning and activities. It will house freshman and sophomore engineering and science classes, and will provide more than 60,000 square feet for classroom space, faculty offices, a 250-seat auditorium, and the Office of Undergraduate Education.

The structure will be larger than originally envisioned, and the building, originally slated for a location adjacent to Bogard Hall, will be located in Tech's new Enterprise Campus adjacent to Tech Pointe to accommodate this expansion.

TOP DONORS

AEP Foundation

Danny Rea

Dow Chemical Foundation

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**Eugene "Gene" Callens Jr., 73,
December 5, 2013**

Dr. Callens joined the College of Engineering and Science in 1983 and taught Mechanical Engineering at Louisiana Tech for 23 years. As a member of the College, he held several academic director positions, including those for Mathematics & Statistics; Mechanical, Industrial and Biomedical Engineering; and Computer Science; and was Interim Director for the Institute for Micromanufacturing. He also served as President of the University Senate. He retired as Professor Emeritus of Mechanical Engineering in 2006.

Dr. Callens devoted decades of service to community and academic organizations. He was known in all aspects of his life as someone who provided solid, practical counsel, and he lived his life based on the motto, "Do the right thing for the right reasons."



**James "Mac" McBride, 78,
August 23, 2013**

Mr. James McBride graduated from Louisiana Polytechnic Institute in 1956 with a B.S. in Mechanical Engineering. He was the first Tech graduate employed by the Union Carbide Corporation and held positions with that company in

Engineering, Maintenance, Production and Plant Management in South Charleston, W.Va., until 1992. He was the Union Carbide College Relations Representative for Louisiana Tech from 1977 to 1993, which was the longest tenure of any representative.

Mr. McBride served on the Louisiana Tech College of Engineering and Science Foundation Advisory Board for 13 years, and was named its first Executive Director Emeritus as a result. In addition, he received the College of Engineering and Science Alumnus of the Year and Outstanding Mechanical Engineering and Industrial Engineering Alumnus awards. Because of his dedication to the College, Foundation

members have contributed to "The Mac McBride Collaboration Room" in the upcoming Engineering and Science Integrated Building.



**Robert "Rob" McKim, 58,
March 21, 2014**

Dr. McKim joined Louisiana Tech in 1998, serving as Associate Director for the Trenchless Technology Center (TTC) and teaching Civil Engineering at the University until 2001 and again from 2009 to 2014. In 2009, he became the Administrative

Director for TTC, and was named chair of the Construction Engineering Technology Program at Louisiana Tech in fall of 2013.

Dr. McKim was a leader in industry associations, and he served as an executive of the Centre for Advancement of Trenchless Technologies, a member of the North American Society for Trenchless Technology, a board member of the Buried Asset Management Institute-International, chair and past chair of the Southeast Society of Trenchless Technology, and an associate director for the Southern Plains Transportation Center.



**Ronald "Ron" Thompson Sr., 78,
October 24, 2013**

Dr. Thompson received his B.S. from Louisiana Tech in 1961, his M.S. from Tech in 1968, and his Ph.D. in Nuclear Chemistry from the University of Arkansas in 1973.

As a professor at Tech for more than 30 years, Dr. Thompson served as Director of Nuclear Engineering, was awarded numerous research grants, had 32 publications, and was named Outstanding Professor at Louisiana Tech twice. Dr. Thompson also established his own consulting business, with activities ranging from radiation safety to providing expert legal opinions in cases involving chemistry or radiation. He was a consummate teacher in the classroom and in his life, where he led by example.

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