LSU | College of Engineering

IMPACT: 2013-2014

Imagine. Lives.


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Oftentimes, higher education is viewed simply as a means to an end - a necessary step in life to prepare us for what comes next. But, in actuality, LSU's College of Engineering is a new beginning. It is the catalyst in a chain reaction of self-reflection, intellectual development, discovery, and accomplishment that grows throughout our lives. This is what inspires our students to reach their full potential of intellect and what motivates our researchers to solve the world's greatest challenges.

LSU's College of Engineering averages $20 million in research funding annually. That's a powerful investment and a tremendous responsibility, which we embrace. Each day, we leverage our vast intellectual capital to properly steward those investments by solving some of the greatest challenges of our time. LSU College of Engineering faculty members are actively engaged in the continual pursuit of discovery, always striving to "Improve Lives."

A Targeted Approach: New Techniques for Diagnosing and Treating Cancer

According to the Cain Department of Chemical Engineering Assistant Professor Adam Melvin, chemotherapy treatment today often misses the mark. Melvin deduced as much after shadowing an oncologist during his postdoc work at the University of North Carolina. After observing a physician specializing in the treatment of multiple myeloma, one of the things that struck Melvin was the delta between treatment success and failure. The other problem he noticed was patients' increasing resistance to single drug treatments.

One of the limitations in contemporary cancer diagnosis today is doctors' broad approach to treatment. Physicians have only limited information to make decisions about individual patients.

"Biopsies capture a fairly small amount of cell tissue inadequate to get a clear picture of the true dynamics of each individual cancer cell," says Melvin. "Cancer lives in a very heterogeneous environment. There are healthy cells, benign cells and cancerous cells to varying degrees." People undergo the treatment regime with their fingers crossed, not knowing if they will be helped or harmed. He likens it to eliminating the grading curve in a class of 150 students—no matter how well or poor a student's performance, everyone earns the same grade. We treat cancer much in the same way. It's a one size fits all approach.

Hitting the Bull's Eye

However, according to Melvin, no two cancers are exactly alike because no two people share the same genetic profile. Today, common medical practice calls for a biopsy of the tumor. In much more sophisticated diagnostics, doctors may opt to map the genome of the cancer to understand the minute differences in the DNA of the cancer cells compared to a patient's healthy cells. The results lead to a tailored treatment that targets the tumor's mutations. This method of diagnosis and treatment is often very effective, but also costly and time consuming.

Melvin's diagnostic method takes a much simpler approach. Using a microfluidic chip and man-made biosensors, Melvin measures specific enzymatic activity in individual cancer cells. He theorizes, that based upon the enzymatic responses, we can pinpoint treatment that will eradicate the cancer but minimize the side effects of chemotherapy drugs. "Basically we can predict how an individual's cancer will respond to treatment before administering the drug or drugs," says Melvin.

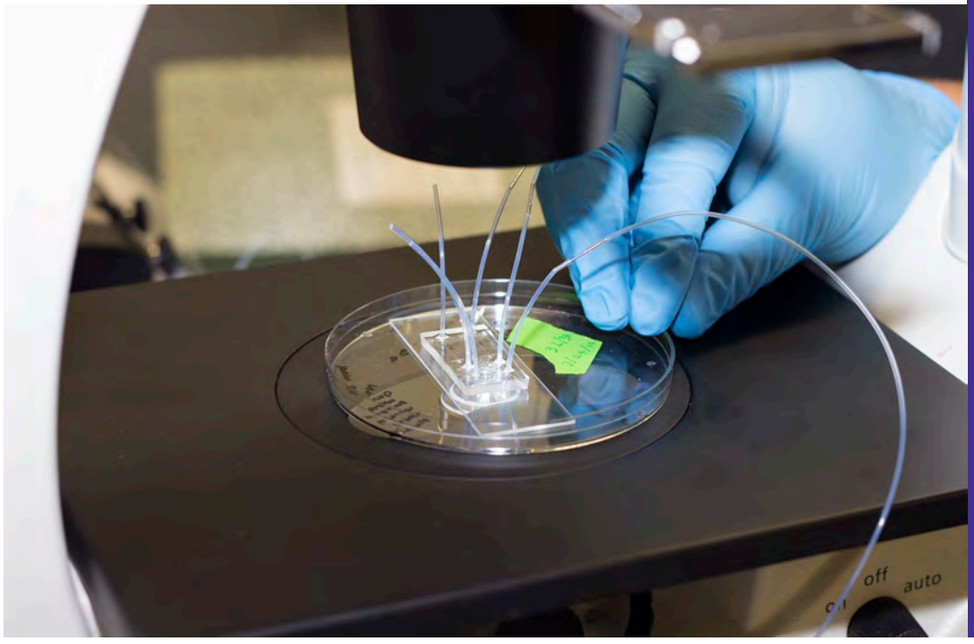
"At LSU we are pioneering a new model of research and development. Leveraging our intellectual network, the College of Engineering is embracing purpose driven, translational research."

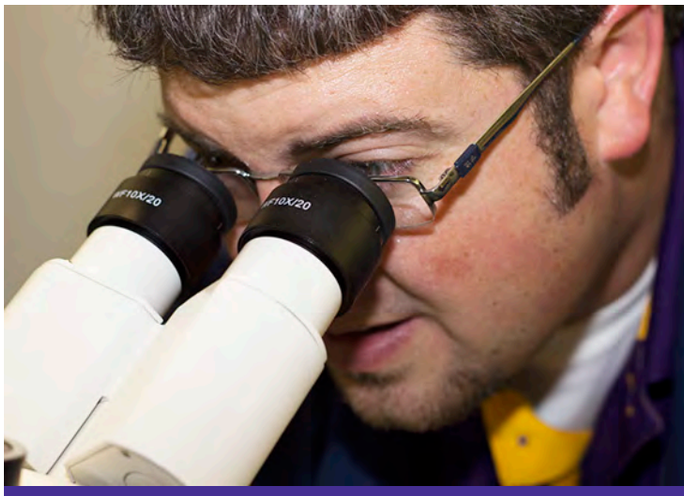
- Rick Koubek, Dean
Bert S. Turner Chair in Engineering

While still a long way off from commercialization, Melvin's research holds great promise in providing personalized cancer treatment tailored to the particular characteristics of each patient's cancer.

In addition to personalized cancer care, his research is applicable in early stage drug testing. Melvin says, "By testing drugs at the cellular level, we can determine how cells will respond to the new drug, if at all." This technology could allow pharmaceutical companies to rapidly advance to Stage III drug testing by quickly eliminating treatments that will not perform in clinic trials.

Dr. Adam Melvin is an assistant professor in the Cain Department of Chemical Engineering at LSU. He earned dual undergraduate degrees in chemical engineering and chemistry from the University of Arizona and his master's and Ph.D. from North Carolina State University.





Faculty Accolades

19 Professorships Awarded

10 New Faculty Hires

6 New Start-Up Companies from LSU Research

5 Patents Awarded

4 NSF Career Award Winners

Research Funding

FY 14: $19,717,306

Research Expenditures

FY 13: $20,445,962

Seed Funding for Research

Chevron Innovative Research Support Fund:
2 Faculty
Total Awarded $64,535

Innovation in Engineering Research Fund:
4 Faculty
Total Awarded $104,538

Board of Regents Pilot Fund:
10 Faculty
Total Awarded $100,000

LSU LIFT^2 for Tech Transfer:
4 Faculty
Total Awarded $120,555

LSU Engineering is the largest College at LSU, the largest engineering program in Louisiana and the 18th largest in the country.

Freshmen Class Snapshot

3,025 Applications

2,496 Admitted

1,266 Enrolled Freshmen

26.8 Average ACT Score

23% Female

30% Minority

Students

4,939 Undergraduate

667 Graduate

5,606 Total

Scholarships

The College awarded 536 scholarships totaling $1,105,594.85 in FY 13-14.

LSU Engineering Student Combines Robotics with Desire to Help Others

When Hugo Salom arrived in America from Venezuela, he barely knew English, much less imagined that he would one day be honored with the prestigious ExxonMobil Diversity Scholarship.

But three years later, not only does he speak fluent English, has his tuition paid in full, maintains a 3.88 GPA, and is quickly becoming an expert in robotics, he also generously takes time out of his hectic schedule to give back to younger students as a College of Engineering peer mentor. And it isn't just to round out an already impressive résumé; it's to inspire others the same way a family member inspired him.

Salom, a junior in the Department of Mechanical & Industrial Engineering, focuses on the field of robotics, in large part due to his father, an electrical engineer, who started a robotics program at Salom's high school and encouraged him to get involved. This experience inspired and motivated him to pursue a degree in mechanical engineering and to inspire others in the same way.

His experience led to his involvement in the LSU College of Engineering Peer Mentors Program, where he is the robotics leader. He trains incoming mentors who will help high school and middle school students compete in the FIRST (For Inspiration and Recognition of Science and Technology) Competition.

We managed to get a few moments with Hugo in-between his numerous activities to talk about what has led him to this point and generally what makes his "gears" turn.

LSU: Hugo, what led you to choose LSU's mechanical engineering program?

Salom: I had a lot of opportunities coming out of high school as president of my robotics team, but after I did my research, I realized that LSU was outstanding and knew it was the only choice for a mechanical engineering degree.

LSU: Where do you see your degree taking you upon graduation; are you thinking about graduate school or do you want to go directly into the workforce?

Salom: As of now, I really want to go into the oil and gas field. I have a co-op this fall with ExxonMobil, so I will be able to be very hands-on there, but mechanical engineering gives you so many options that I know I can get a job as soon as I graduate.

LSU: How can your interest in robotics serve you in the oil and gas industry?

Salom: Robotics is all "thinking outside the box," solving problems, creating something different, and, in robotics competitions for example, just working harder and thinking differently than others. These qualities are what employers look for; it's more about the thought process than the actual tangible work.

LSU: How did you first learn about the ExxonMobil Diversity Scholarship?

Salom: By working with the STEM Talent Expansion Program (STEP), I met people in the College of Engineering who told me I should apply for one of the diversity scholarships. The interesting thing is that I was considered for the ExxonMobil co-op, which I will be working in during the fall semester, before even knowing I had received the scholarship. It was perfect.

LSU: What kind of impact has the ExxonMobil Diversity Scholarship had on your life?

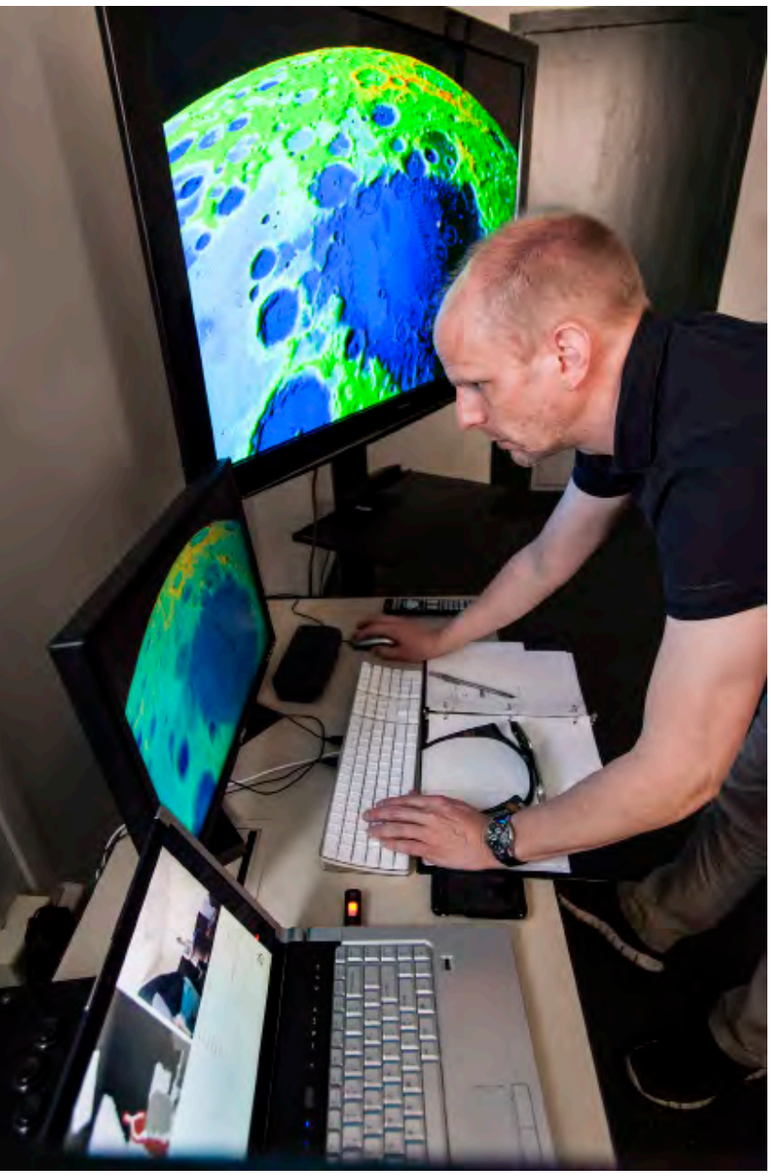
Salom: ExxonMobil has made a great impact in my life and my family's lives thanks to their generous contribution for supporting me financially and academically. My ExxonMobil mentor, Eric Valenciano, has been a great help for every moment we worked together and I could not have done many things if not for him. I feel like I've been raised to the next level, which will soon lead me to an engineering career and the ability to impact other people just like Eric and ExxonMobil impacted my life.

LSU: Speaking of impacting others, with your obviously large workload, what made you want to add mentoring; did it stem from your life experiences?

Salom: When my dad taught me about robotics, it really inspired me to say, "Wow, maybe I could be the same person to younger kids as my dad was to me." It's that sense of inspiring others that really means a lot to me.

LSU: As an ExxonMobil Diversity Scholar, what would you tell others thinking about attending LSU about the opportunities for underrepresented populations?

Salom: I have met people from all over the world here. LSU is diverse; you just have to put yourself out there on campus and meet people. Not only are you building your future academically at LSU, but you can also get to know your professors and meet industry leaders to network for future jobs, which is almost as important as maintaining your GPA. And, regardless of what you're thinking of majoring in, be passionate about it. If you're doing something you're not passionate about, it's not going to work.



"Making sure we have the most skilled workforce in the world, so we can attract the jobs of the future, starts at our flagship university. That means making LSU a magnet to attract the best and brightest students, teachers and researchers from all over the world - that, in turn, will make a strong LSU, and a strong LSU means a strong Louisiana."

-Bobby Jindal, Governor
State of Louisiana

IBM, LED and the LSU College of Engineering Partner to Transform Computer Science in Louisiana

The rapid and widespread adoption of mobile and social technologies within the last three years has changed the way customers and companies interact with one another – driving fundamental transformation to business processes and applications. Louisiana Economic Development plans to make a major investment in LSU's College of Engineering to rapidly grow the state's technology workforce and support the new IBM Services Center in Baton Rouge.

The center is the result of an innovative, public/private partnership that will include expanded higher-education programs related to computer science. The center will employ a broad range of college graduates and experienced professionals with backgrounds in computer science and other quantitative-intense fields, such as engineering, mathematics, and science to provide software development and software maintenance services to clients in the United States. In addition to the 800 jobs that will be created at the center over the next four years, LSU estimates the project will result in approximately 542 new indirect jobs, for a total of approximately 1,342 new, permanent jobs in the Capital Region.

The State will provide $14 million in funding over 10 years for expanded higher-education programs designed primarily to increase the number of annual computer science graduates. At least 65 percent of these funds will be provided for expansion of the Computer Science Division in LSU's School of Electrical Engineering and Computer Science.

"An IBM-LSU partnership means we will bring new educational and job opportunities to our state," said William Jenkins, former Interim President and Chancellor. "The State wants to expand its economic base and this partnership demonstrates that LSU can fulfill that workforce need of that future economy."

To support this new endeavor, LSU's College of Engineering is committed to doubling its computer science faculty and the number of computer science graduates in five years, which will place the LSU computer science program in the top 10-15 percent nationally for the number of bachelor degrees in computer science awarded annually. The College will also expand its computer science programs and curriculum innovation as LSU students will benefit from internship opportunities and more jobs upon graduation, keeping the best and brightest in the state.

"This public/private partnership with Louisiana Economic Development, IBM and LSU is a powerful example of the triangulation between industry, government and academia that elevates the state's role as a national leader in economic development," said Rick Koubek, Dean, LSU College of Engineering. "LSU's College of Engineering is committed to developing a mutually beneficial partnership with IBM and LED that stimulates economic growth and helps to meet the workforce development needs of the state."

To fast-track program growth, LSU's College of Engineering will launch the "Geaux Digital Louisiana" consortium. This unique initiative represents a statewide partnership with high schools, community and technical colleges, and other universities to promote interest in computer science related career fields and enhance student recruitment.

Additionally, IBM will work closely with local professors at LSU to create coursework focused on technology, math and software development, and equip students to meet the growing demand for business services including advanced analytics, process innovation and application development.

"IBM is renowned in the academic community as a global leader in innovation and we look forward to partnering on research and development to help us all achieve IBM's vision of a 'Smarter Planet'," Koubek said. "We are committed to fostering a symbiotic partnership to prepare our graduates for IBM's workforce needs and to leverage our faculty to assist in IBM's research endeavors."

Student Outcomes

214 Companies Recruited the LSU Engineer, Computer Scientist and Construction Manager Student at Two Career Expos

3,215 Engineering, Computer Science and Construction Management Students Attended Career Expo

68 Percent of LSU's On-Campus Interviews were for LSU College of Engineering Students

68 Percent of May Undergraduates Received Employment Opportunities in Louisiana at the Time of Graduation

896 Engineers, Computer Scientists and Construction Manager Graduates Account for 14 percent of LSU's Total Graduating Class

89 Percent of Graduates Employed or Enrolled in Graduate School within Six Months of Graduation

$69,500 Average Starting Salary for an LSU Engineering, Construction Management or Computer Science Graduate

Breaking New Ground Exceeds $100 Million in Public-Private Partnership Goal

On February 3rd, three months ahead of schedule, the College of Engineering announced the success of a record-breaking capital campaign. Publicly launched in April 2013, more than 450 individual and corporate donors pledged $52.5 million in private funds, fulfilling the College's commitment to a $100 million public-private partnership to renovate Patrick F. Taylor Hall and construct a new chemical engineering addition.

On October 2, 2012, Gov. Bobby Jindal punctuated the role of LSU's College of Engineering in Louisiana's economic development initiatives by announcing the support of $50 million in capital outlay funding for the $100 million project—provided that donors gave $50 million of the support.

"We are grateful for the hundreds of donors who stepped up to the plate to make this partnership a reality," said Jindal. "Experts say they have never seen an industrial expansion like the one currently under way in our state, but they also say we are going to need to train and attract even more people to fill the demand for all the jobs coming to Louisiana. That's why we are laser focused on making sure we have the tools to prepare our students so they can fill the jobs in the pipeline. This partnership will help accomplish that goal."

The $100 million renovation and expansion will support Louisiana's engineering workforce and innovation needs. Upon completion, the College expects to almost double the number of graduates, from 650 to 1,000 engineers, computer scientists and construction managers annually.

"The engineering expansion is an investment in our students and their careers," said President and Chancellor F. King Alexander. "It will also attract the top faculty who will work with students to solve some of our state's greatest problems. The speedy success of the campaign demonstrates the confidence of our alumni and industry in LSU Engineering."

Alumni, industry partners and other donors committed $52.5 million dollars to the project, an unprecedented show of support that made "Breaking New Ground" LSU's most successful short-term fundraising effort.

"This is one of the great moments in the history of LSU's College of Engineering," said Dean Rick Koubek. "A moment defined by the generosity and support of a remarkable group of donors, along with the commitment from Governor Jindal and the state. The momentum of their investment will position the College to take a leading part in securing Louisiana's position as a national leader in research and education."

November 2014

Groundbreaking on New Chemical Engineering Building and Phase I: Patrick F. Taylor Hall

January 2015

PHASE I

Renovation of Patrick F. Taylor Hall and Construction of New Chemical Engineering Building

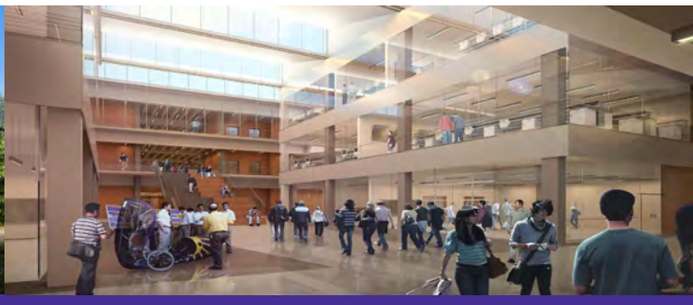
March 2016

PHASE II

Chemical Engineering Building Ribbon Cutting. Phase II: Renovation of Patrick F. Taylor Hall

June 2017

Patrick F. Taylor Hall Ribbon Cutting



"With improved recruiting, facilities and student preparedness, the LSU College of Engineering will have a positive impact on the state of Louisiana, and the nation as a whole."

- Madison Longwell, Freshman

Coleman and Partners, Perkins + Will was selected as the architectural firm to transform LSU's engineering campus. Construction is slated to begin this fall, with an estimated completion scheduled for fall 2017. Updated labs, combined with the quality education already offered at LSU, will provide students a more practical, hands-on experience to better prepare them to enter the global marketplace.

Madison Longwell, a first-year biological engineering student, said of Breaking New Ground, "Improved teaching and research spaces, an enhanced senior design capstone space, and engineering projects on display will inspire and reinforce a sense of pride and motivation for students. LSU is breaking new ground! With improved recruiting, facilities and student preparedness, the LSU College of Engineering will have a positive impact on the state of Louisiana, and the nation as a whole."

Visionary projects like Breaking New Ground maximize the impact of philanthropic support by leveraging state dollars with the generosity of private donors. As the LSU Foundation continues in its efforts to raise at least $60 million annually for LSU by 2016, large-scale initiatives like this one will provide for the successful attainment of that goal while positioning LSU as a leader in academic excellence.

The New Patrick F. Taylor Hall and Chemical Engineering Addition

436,691	Net Assignable Square Feet upon Completion of Renovation and Expansion Project
41,202	Sq. Ft. Student Collaboration
134,969	Sq. Ft. Teaching and Lab Space
1,576	Classroom Seats
272	Faculty and Staff Offices
1	Largest Academic Building in Louisiana

Philanthropy

537	Donors to the Breaking New Ground Campaign
20	$1 Million+ Gifts to the Campaign

LSU | College of Engineering

IMPACT: 2013-2014

The primary mission of the College of Engineering is to impart knowledge and learning skills to its students while also creating new knowledge and seeking innovative ways to improve people's lives. Our vision is to harness and enhance the College of Engineering's resources. In doing so, we will continuously transform the lives of the citizens of our state, the nation, and the world through: research and innovation, instruction and learning, and outreach and engagement. We will seek to establish the College as a critical asset for Louisiana citizens, industry, and government.