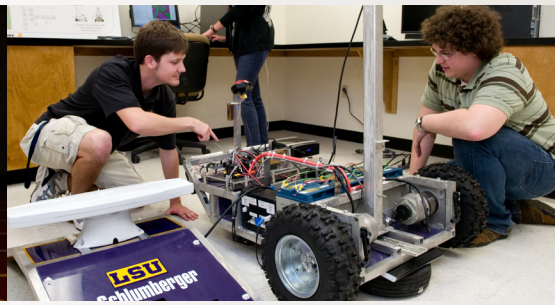
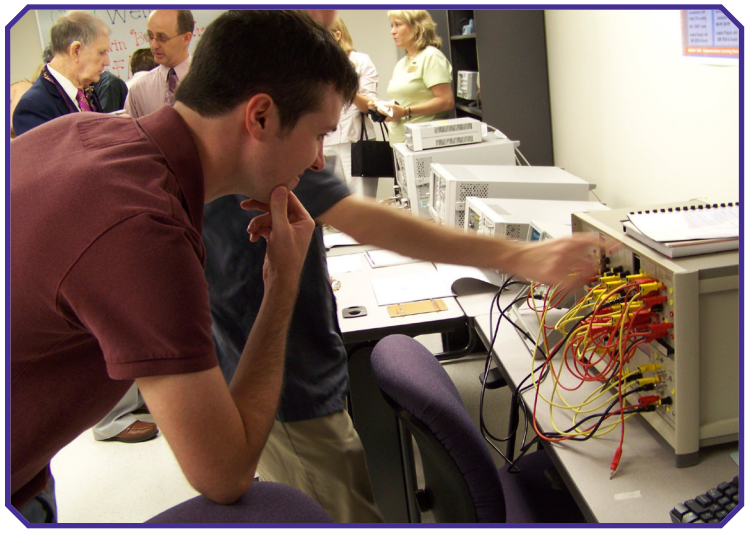
Department of Electrical & Computer Engineering

Five-Year Strategic Plan: **2010-2015**

Improving Lives. **Transforming** Louisiana. **Changing** the World.



Engineering is intertwined
with our very own way of life.



Engineering is dedicated to the process of creating. Engineers solve society's problems, make ideas reality and generate prosperity that improves the quality of life. Almost every innovation in our lives is the direct work of an engineer—roads, cars, buildings, appliances, computers, communication devices, tools and the list goes on.

Here in Louisiana, engineering is critical to our current economy and environment. It is vital to sustaining and improving both the natural infrastructure and that which we have built, and it is a key component to enhancing and diversifying our energy sources.

Electrical and Computer Engineering

Electrical and/or computer engineering (ECE) at LSU applies fields of science and mathematics that relate to the sensing, communicating, and processing of information as well as the electrical, optical, and magnetic properties of the materials and the generation and transport of electrical energy. Among the many opportunities within the field of electrical engineering are careers involving computers, communications, automatic control, electronics, and electrical energy.

ECE graduates have been successful in industry, academia, and entrepreneurial activities, both in this country and abroad. Faculty and students conduct cutting-edge research in a number of electrical and computer engineering areas that make an impact on their respective disciplines.

The LSU Engineer

The LSU Engineer Today and Tomorrow

- A critical and holistic thinker and a life-long learner with an entrepreneurial spirit
- Skilled communicator, adept at teamwork and able to rally teams around him/her
- Great awareness of the national and global implications of issues such as the environment and sustainability—always remains engaged with the community and society
- Hands-on problem solver, possessing a strong work ethic and leadership qualities
- Well-grounded with sound technical knowledge and understanding

LSU's College of Engineering offers students both rigorous coursework and challenging, hands-on experience.

These educational opportunities are showcased in such unique features as:

- An on-campus oil well-control research and training facility
- Environmental research and field work regularly conducted in our nearby coastline and bayous
- A senior design project that teaches collaboration to reach a solution and then stresses teamwork to bring it to life

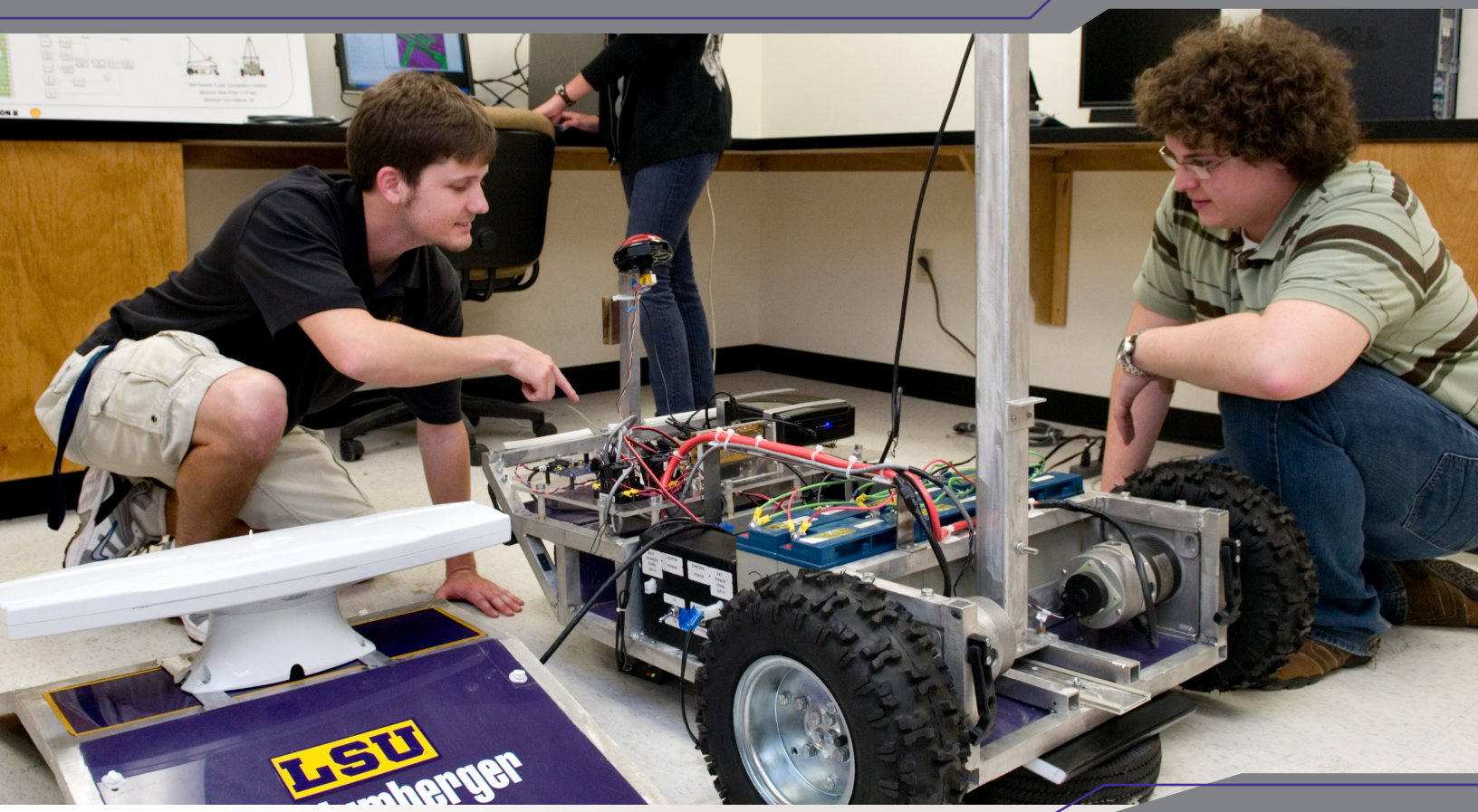
The result? Companies that employ our engineering graduates are continuously impressed. The LSU Engineer has a reputation as a hardworking individual and a solid team leader. Immersion in our unique south Louisiana culture affords our engineers and construction managers strong communication skills with both management and those in the field. Our graduates are never shy about stepping into the trenches and getting a little dirt on their hands. The LSU Engineer is a key asset to an employer's team and a coveted hire. You'll find them across the state and the nation working hard to improve lives and change the world.

Vision 2015

Our vision is to be recognized as a premier department in undergraduate and graduate education in the area of electrical and computer engineering in the region, excel nationally in selected research areas in the field of electrical and computer engineering and provide expertise and knowledge base in the area of electrical and computer engineering in the State and the region for enhancing economic development and diversification, and entrepreneurial activities.

Our Mission

The primary mission of the Department is to impart knowledge and life-long learning skills to its students in the area of electrical and computer engineering, generate new knowledge and to creatively apply the existing knowledge in novel ways in the area of electrical and computer engineering and to prepare engineers to solve society's problems and to meet its needs, thereby improving and transforming the lives of its citizens.



Our Goals

The overall goals of the Department are broadly related to its three missions of Instruction/ Learning, Research/Innovation and Outreach/Engagement. Effective creation and transfer of technical knowledge and imparting learning skills to the next generation of The LSU Engineer is our primary goal. Through research and innovation, we not only advance knowledge, but also enhance classroom instruction and the overall undergraduate/graduate education and learning mission. In addition, outreach activities serve the citizens of Louisiana through the College's position as the state's flagship engineering program.

Our Values

Our values are to provide comprehensive and up-to-date knowledge base and life-long learning skills to its students, provide extensive hands-on experience to its baccalaureate students, conduct state-of-the-art research. Generate and disseminate new knowledge as well as invent innovative ways to apply existing knowledge, actively engage the faculty in department's operation through the principles of shared governance, provide a supportive working environment for students, faculty and staff and actively encourage diversity in students, faculty and staff.

Objective 1

Learning

Prepare the next generation of LSU Engineers with a strong sense of responsibility and social awareness to serve as engineers and leaders in the state, nation and the global workplace, to adapt to a world with continually changing technology and a diversity of interests.

Strategic Actions

Prepare students for critical thinking skills and holistic approach to problem solving through multi-disciplinary and core knowledge classes spanning the program. Impart life-long self-learning skills that utilize fundamental concepts to solve problems.

Offer modern and flexible curricula that expose students to the latest trends, ideas and techniques, and which afford students opportunities for specialization, breadth in the field, and multidisciplinary work.

Provide opportunities to develop communication and leadership qualities and imbue entrepreneurial spirit.

Provide ample opportunities for undergraduate research participation.

Provide a supportive atmosphere that makes students' experience meaningful and memorable. Provide an enriching academic environment to our students.

Increase financial support for graduate students.

Increase the retention rate for all students. Special efforts will be made to increase retention rate of minority and under-represented students.

Address local and state needs for electrical and computer engineers through improved ties with industry and government partners for addressing research problems, capstone designs, student internships and solving society's problems.

Work towards raising the quality of incoming students, particularly in the graduate program.

Principle attributes of an LSU Engineer:

Well-grounded with sound technical knowledge and understanding

Critical and holistic thinker, life-long learner with entrepreneurial spirit

Skilled communicator, adept at teamwork, leadership qualities

Aware of national and global issues such as environment and sustainability; always engaged with the community and the society

Hands-on problem solver, strong work ethic

Objective 2

Discovery and Innovation

The department will utilize its expertise to address topics of contemporary interest particularly in four broad thrust areas of electrical and computer engineering, which will have significant impact in the field. These four inter-disciplinary areas of research are: computational science and engineering, digital media, electric power and energy, and physical electronics.

Inter-disciplinary areas of research

Utilize existing expertise in the College to address the following two strategic, broad, interdisciplinary thrust areas, which will have significant impact in the state and beyond:

- **Computational Science and Engineering** — Computational modeling and simulation using high-performance computers is now an integral part of scientific investigations, becoming a "third pillar of science" along with theory and experimentation. This field is highly conducive to inter-disciplinary research and includes key areas in computer architecture, compilers and parallel algorithms where the department has a strong presence.
- **Digital Media**— This multidisciplinary area includes visualization, animation, video gaming, speech/image understanding and telecommunication, and also supports AVATAR (Arts Visualization, Advanced Technologies And Research), a campus-wide multidisciplinary thrust area. The department faculty members have active research in key areas of digital media including but not limited to graphics modeling and hardware, high-performance computing, speech, audio, image and video signal processing, wireless communication and sensor networks.
- **Electric Power and Energy** — This is a part of the College of Engineering's thrust area of Energy and Sustainable Environment and among other items involves research in implementing smart grid concepts for power transmission and distribution, development of alternative energy sources and storage of large quantities of energy.
- **Physical Electronics** — Involves research in design and fabrication of RF, optical and bio-MEMS/NEMS (micro/Nano-Electro Mechanical Systems), electronic materials and devices, nanolithography, metrology, photonics, plasmonic structures, VLSI (Very Large Scale Integration) design, nano-materials and devices – areas in which the department faculty have active on-going research.

Objective 2

Strategic Actions

Seek active collaboration with other units on the campus and elsewhere including national centers and laboratories and industrial partners

Actively seek funding from State, federal and industry especially with a view to establishing an engineering national center

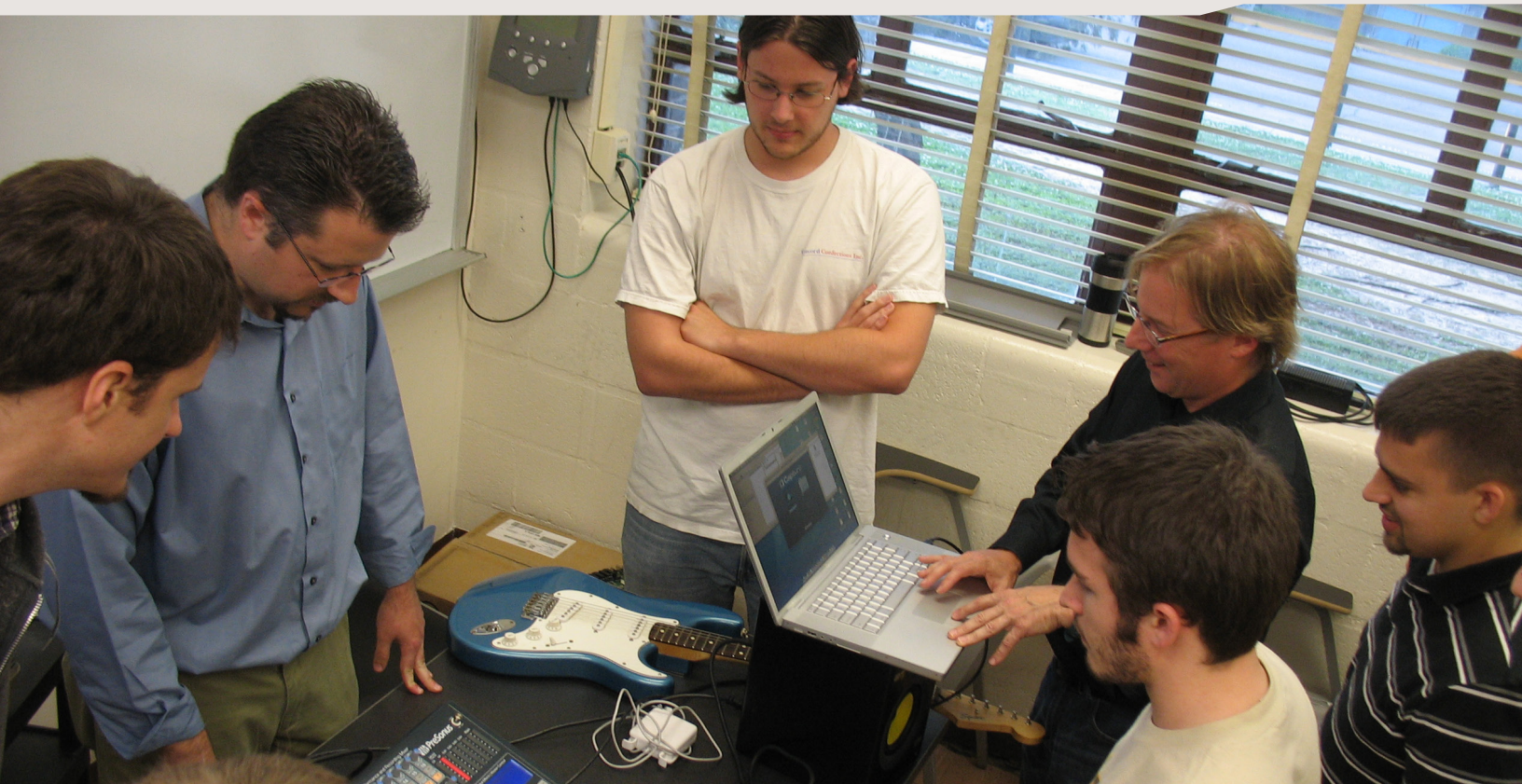
Recruit outstanding research faculty when opportunities arise

Continually improve and enhance the department's research infrastructure

Increase the quality and quantity of graduate students. Increase the completion rate for doctoral students. Recruit our own outstanding undergraduate students to graduate school through the accelerated MS program. Establish graduate student recruiting ties with partners abroad

Apply existing expertise in the department for device and sensor fabrication to assist and enhance multi-disciplinary research in the college thrust areas in Energy and Engineered and Natural Infrastructure

Apply existing expertise in the department to develop a relationship with the burgeoning local video gaming and movie industries



Objective 3

Diversity and Outreach

Proactively seek diversity in students, faculty and staff. Focus communication efforts to all department stakeholders including alumni, friends, industrial partners, academic partners, government offices and peers. Proactively work with the College efforts to establish an active recruiting pipeline of high quality students including minority and under-represented students.

Strategic Actions

Enhance the department web presence and communicate regularly with stakeholders through newsletter and other means.

Increase efforts in conjunction with the College for recruiting of students from local and other schools and partner schools in the region and abroad.

Make special efforts to recruit minority and under-represented students, faculty and staff. Establish a system of student Ambassadors to local schools to form a long-term relationship.

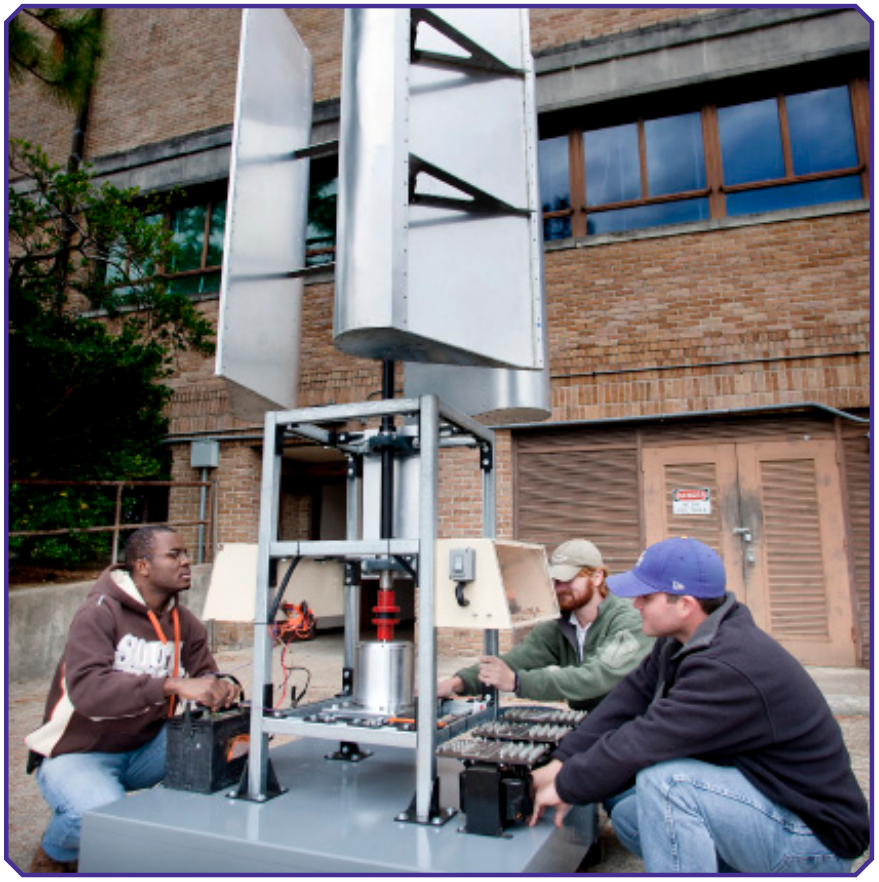
Objective 4

Development

Diversify funding sources to provide a flexible source of working capital for nimble and effective operation of the unit.

Strategic Action

Work with the College development efforts and the alumni and department well-wishers to increase the amount received through donations and philanthropy.



Objective 5

Flagship Role

As the resource of choice for electrical and computer engineering in the State, provide leadership to other institutions.

Strategic Actions

Increase communication with sister institutions in the State and in the region for effectively utilizing educational resources.

Develop courses for long-distance learning.

Strategic Actions

Provide adequate and safe work areas for students, faculty and staff. Provide for routine amenities for individual and group study.

Provide efficiencies in all student related activities such as consulting, advising etc.

Provide a flexible and responsive administrative decision making process.

Actively involve the department faculty in operation of the department through shared governance principles.

Actively solicit input from the students, faculty and staff to improve operations.

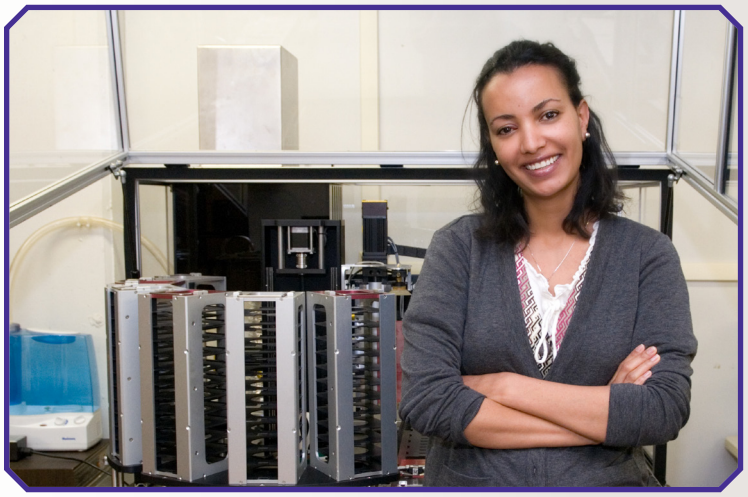
Objective 6

Administrative Approach

As the resource of choice for electrical and computer engineering in the State, provide leadership to other institutions.

How to Evaluate Success?

Performance Metrics and Periodic Assessment of Progress



Each strategic task and goals will be monitored based on performance metrics established by teams selected by the Dean. Comprised of faculty, staff, students, alumni and friends of the College, these teams will periodically assess the progress and present status reports. Feedback will provide the Dean with on-going information and allow the opportunity to modify the steps, increase or decrease certain efforts and fine-tune specific strategies to optimize the outcome.

LSU COLLEGE OF ENGINEERING

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