**Preamble**

This is the Strategic Plan for the School of Electrical and Computer Engineering at Purdue University. The ECE Strategic Planning Committee was formed in October 2007, and was charged with the task of developing a new strategic plan in concert with the strategic planning activities at the College and University levels. The Committee sought to engage key ECE stakeholders through a variety of mechanisms, including presentations from each of the graduate areas, presentations and discussion at several ECE faculty meetings and special activities at the ECE annual retreat held each August.

**Background**

The Purdue Department of Electrical Engineering was established in 1888, and has since grown into the School of Electrical and Computer Engineering, with over 80 faculty members, over 850 undergraduate students and over 650 graduate students. ECE at Purdue is one of the largest schools in the United States, and is consistently ranked as a top-ten program nationwide.

The school offers two undergraduate degree programs, the BS in Electrical Engineering and the BS in Computer Engineering. The faculty is organized into nine research areas that cover the gamut of ECE: Automatic Control (AC), Biomedical Imaging and Sensing (BIS), Communications, Networking, Signal & Image Processing (CNSIP), Computer Engineering (CE), Education (E), Power and Energy Devices and Systems (PEDS), Fields and Optics (FO), Microelectronics and Nanotechnology (MN) and VLSI and Circuit Design (VC). The school boasts a thriving graduate program, awarding about 60 PhD degrees each year.

**Drivers of Change Affecting our Future**

With enormous changes on the horizon, we are in the midst of a defining moment for the profession of electrical and computer engineering.

Electrical and computer engineering is transforming into a trans-disciplinary, global enterprise. The most significant advances are occurring when ideas from multiple disciplines are inter-woven to create imaginative solutions to compelling and urgent problems. Indeed, electrical and computer engineering fosters many emerging multidisciplinary areas involving energy, environment, information technology, nanotechnology, healthcare, entertainment and communication, and security. This multidisciplinary nature provides great opportunities as well as challenges to address the grandest challenges facing the State of Indiana, the country, and the world.

The increasing interconnectedness and interdependence among the research, development, commercial, and educational institutions of the world affects every aspect of our operation: research and educational programs, engagement, and the composition of our faculty and student bodies. Globalization provides tremendous opportunities for new collaborations with world-wide talent and an unprecedented scale of research and educational enterprise but also poses formidable challenges in terms of new competition and rapidly changing challenges and opportunities.

Over the period of the last strategic plan, ECE saw significant growth: The faculty and the graduate student population grew by about 20%, and funds were raised for a new ECE building (the Seng-Liang Wang Hall of Electrical and Computer Engineering). Thus, we stand poised to take full advantage of these gains in order to address the challenges created by globalization and the multidisciplinary nature of the profession. ECE is dedicated to the noble pursuits of discovery, learning, and engagement, all converging to the ultimate goal of service to our State, country, and world.
Vision

Purdue University School of Electrical and Computer Engineering will make the world better through:

- Field-defining research
- Leadership and excellence in education, and
- Our impact on society

Mission

To serve and lead the state of Indiana, the nation, and the world-wide profession of electrical and computer engineering, by educating the next generation of engineers, by discovery that advances fundamental knowledge and its applications, and by innovation and engagement that address global challenges of societal impact.
1. Leadership in Multidisciplinary Research with Global Reach

**Goal:** Multidisciplinary and transformative research to solve problems of global importance in public health, power and energy, defense and security, environment, and information infrastructure.

**Initiatives**
1. Create dynamic, supportive research environments that encourage and reward risk taking in creating imaginative, cross-disciplinary solutions.
2. Encourage faculty to take leadership in large-scale, university and multi-university projects with novel models of industrial and governmental engagement.
3. Enhance local infrastructure and programs to promote discussion and communication among the Purdue research community.

**Strategic Actions**
- Create incentives and rewards for faculty, including course release time and internal competitive funding, to pursue large-scale research opportunities.
- Annually host technical retreats for faculty from various subareas to discuss and debate emerging broad research themes and grand challenges.
- For select research topics, identify and assign faculty leaders, and host regular discussion forums to explore and develop capabilities, synergies, proposals, and implementation plans.
- Involve a broad range of faculty from Purdue, other universities, and industry representatives in discussion forums.
- Make information about federal, state, industry, and private funding opportunities and advice readily available to this group in a structured manner.
- Provide a historical perspective to outstanding research achievements by professors and groups in ECE to inspire faculty, students, and staff.

**Metrics**
- The number of large-scale multi-investigator research attempts and successes (led by, participation in) by ECE faculty.
- External research funding.
- Satisfaction measures, obtained by surveying the experiences of principal investigators of all submitted large-scale proposals.
- Number of internal and external recognitions of ECE faculty.
- Purdue ECE reputation rankings (e.g., *US News and World Report*).
2. 21st Century Education

**Goal:** Innovative educational methods that leverage technological advances to train the next generation of leaders in academia and industry.

**Initiatives**
1. Equip and assist faculty in applying promising innovations as well as proven techniques, with particular emphasis on applications of social networking technologies and use of lecture videos to increase flexibility in use of class time.
2. Examine and enhance ECE curricula to maximize the achievement of students.
3. Create a new generation of thought-leaders, by cultivating skills needed for our students to be leaders both in academia and industry.

**Strategic Actions**
- Review and redevelop ECE undergraduate courses starting with the sophomore year.
- Redesign the entire curriculum to facilitate class time for team projects, problem solving, and student questions and out-of-class time for videotaped faculty lectures.
- Create incentives and rewards to faculty and students for educational endeavors.
- Emphasize leadership and entrepreneurship with certificate programs.

**Strategy Outcomes Assessment**
- List of courses for which lecture videos have been recorded and used.
- Number of ECE faculty, staff, and students supported financially by ECE for instructional development.
- Number and type of engineering education publications produced by ECE in comparison to peer institutions.
- Number, size, and selectivity of teaching awards received.
- Retention of students, especially from sophomore to junior year in comparison to peer institutions.
- Summary of ECE 400 and Ph.D. student exit survey comments pertaining to students’ educational experience.
- The number, size, and location of travel grants to undergraduate and graduate students.
- The number, standing, and locations of Purdue Ph.D. graduates in academic appointments.
3. Expand External Engagement

**Goal:** Engagement of ECE faculty, staff, and students with high schools, other universities, alumni, and industry.

**Initiatives**
1. Strengthen the connection to industrial partners through student internships, technology transfer, and collaborative discovery.
2. Increase visibility of Purdue’s scientific and educational programs to high school students.
3. Improve interactions with alumni to share their industry and academia experience with students.

**Strategic Actions**
- Offer financial incentives and matching funds that can be used to attract industry sponsors to initiate collaborative efforts with ECE research groups.
- Host an annual workshop that allows an open discussion between students and alumni on future job opportunities.
- Create a faculty/student travel team to present research activities in ECE to high school students in Indiana.
- Redesign ECE webpage.

**Strategy Outcomes Assessment**
- Departmental spending on these action items.
4. Recruit and Sustain High Impact and Diverse Personnel

**Goal:** Recruitment and support high-impact students, educators, and researchers from diverse backgrounds and experiences.

**Initiatives**
1. Enhance graduate student recruitment through increase of student support (number and award size of fellowships and number of teaching assistantships) and efforts to identify and attract top students from the United States and abroad, including underrepresented minority students and women.
2. Enhance undergraduate recruitment and retention through continued support of competitive scholarships for ECE students and creation of outreach programs that interact with and guide secondary school students.
3. Retain and recruit a diverse community of elite faculty members through efforts that promote an environment in which faculty are willing to pursue discovery activities outside of the academic structure.

**Strategic Actions**
- Raise $15 million endowment for graduate fellowships and teaching assistantships. Pursue a challenge grant to facilitate the accomplishment of this objective.
- Raise a $2 million endowment to support outstanding undergraduate students and to encourage undergraduate student research.
- Raise $12 million to fund 4 new named professorships and 4 young faculty scholars.
- Identify and recruit members from underrepresented groups in our faculty, undergraduate and graduate students, including women, minorities, and domestic students.

**Strategy Outcomes Assessment**
- Percentage of prospective graduate students accepting admission and funding offers from Purdue.
- Comparison of ECE to peer institution graduate fellowship offers.
- Number of undergraduate and graduate students receiving prestigious external fellowships.
- Faculty and student diversity metrics compared with peer institutions.
5. Invest in Infrastructure to Facilitate Success

**Goal:** Create a physical infrastructure that provides an outstanding professional environment that encourages communication and engagement and facilitates success in discovery and learning.

**Initiatives**
1. Increase the quality and amount of space available for undergraduate laboratories and classrooms, and equip with state-of-the-art equipment and computers.
2. Establish a visible, central location that is the “heart” of ECE – a prominent, welcoming, and thriving space, primarily for our students and also for the administrative and academic core of the School.
3. Create community research space to encourage increased interaction within and between the department's research areas.

**Strategic Actions**
- Complete the design and construction of Wang Hall and relocate faculty, graduate students, and research programs there.
- Remodel undergraduate laboratories in the EE and MSEE buildings, investing a minimum of $1 million for new instrumentation for these laboratories.
- Remodel the MSEE atrium and the MSEE offices on the first floor for the School’s main administrative offices, creating a new and highly welcoming hub for the School.
- Raise $5 million in funds for remodeling from donations, tuition differential fees, on-campus competitive funds, and off-campus competitive funds, such as industry and government agencies.

**Strategy Outcomes Assessment**
- Number of ft² of community research space.
- Number of ft² for global research and collaboration.
- Number of ft² of laboratory space for undergraduate laboratory courses and senior design.
- Amount of funds raised and spent to fulfill the strategy elements above.
- Amount of research funding and Ph.D. production per ft² of laboratory space.
Implementation

We will revisit our strategic plan each year at the annual retreat. For each Goal, we will evaluate the progress that is being made toward achieving the Initiatives and completing the Strategic Actions, based on the Strategy Outcomes Assessment. Pursuant to this evaluation and considering other factors that may be relevant, we also will consider whether or not aspects of the Strategic Plan should be updated or modified.

A standing Committee shall be appointed by the Head of ECE, and shall be responsible for coordinating all aspects of on-going Strategic Plan evaluation, reporting the results of the evaluation to the ECE faculty at the annual retreat, and leading the discussion of potential updates or modifications to the Strategic Plan.