**DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING**

**STRATEGIC PLAN**

**March 2015**

***Final Draft***

***VISION***

To be internationally recognized as the Chemical and Biological Engineering department that best exemplifies the dual commitment to outstanding research and student education.

***MISSION***

Provide a high-quality education in chemical and biological engineering at the undergraduate and graduate levels that prepares graduates for productive careers in engineering and related fields, and for life as educated, effective citizens and leaders. Discover and disseminate new knowledge in science and engineering through creative activity in research and scholarship. Provide service to the state, nation, and world by advancing the profession of chemical engineering.

***DEPARTMENTAL ROLE******IN THE BROADER UNIVERSITY MISSION***

The Chemical and Biological Engineering Department plays a pivotal role in the Iowa State University mission to create, share, and apply knowledge to make Iowa and the world a better place. Specifically, this is achieved through the dual emphases on (1) innovative faculty research and graduate education, as well as on (2) a best in class undergraduate program.

*Research and Graduate Education*

The department's graduate program aims to improve the human condition through research that addresses contemporary societal challenges while simultaneously equipping graduate students with the skills and knowledge to carry out independent research and to become intellectual leaders. We will build upon our core competencies in catalysis, advanced materials, biochemical engineering, biomedical engineering, and computational fluid dynamics. We will also invest in the initiative of our faculty to advance emerging programs to maturity and strength. Permeating the graduate program is an emphasis on excellence in scholarship, which should be matched by the program’s perceived quality as determined by the visibility of its faculty in the academic research and industrial communities.

*Undergraduate Program*

Our undergraduate program is known for producing graduates with strong preparation for careers in industry and the ability to excel in graduate programs in chemical engineering and related fields. Strong demand for our graduates in traditional chemical process industries, as well as in emerging areas of biotechnology, advanced materials, and sustainability, is a primary indicator of its success. We are committed to developing outstanding chemical engineers by providing students with a solid foundation in chemical engineering fundamentals as well as an appreciation for the societal context of engineering decisions, so that they will be prepared to use their education and creativity to improve lives and livelihoods. Our curriculum will reach beyond the classroom and empower students with practical learning opportunities, research activities, and team design projects.

***CHALLENGES AND PRIORITIES 2015-2020***

Two critical challenges in the next five years strongly shape departmental priorities and the strategies enumerated below. First, the advancement of the graduate program and department reputation depends crucially upon our ability to increase research funding in an environment of flat federal budgets and limited industrial funding. Second, the unprecedented enrollment growth in the undergraduate program over the last ten years requires novel approaches to maximize the use of teaching resources while maintaining the high quality education that the department is known for. Both of these challenges also require significant levels of institutional and philanthropic support to cover the costs of facilities and personnel.

**Specific Strategies, Tactics, and Metrics**

***Strategy 1: Strengthen the department research profile, reputation, and teaching capacity by hiring and retaining outstanding and diverse faculty in core areas of strength.***

*Tactics:*

* Take advantage of institutional hiring initiatives in research areas supported by ISU administration.
* Publicize opportunities for collaboration at ISU, unique facilities, and integration of undergraduate education with research.
* Partner with central administration to acquire physical and monetary resources necessary to hire and retain high-achieving faculty.
* Facilitate the development and rapid success of junior faculty by providing mentorship and integrating them into existing research initiatives.
* Influence university-wide research initiatives.

*Metrics*: Number and quality of applicants for departmental faculty positions, number of hires, number of departures, diversity of faculty.

**Strategy 2: Increase externally sponsored funding by strengthening relationships with private and public funding entities and by shaping the national research agenda.**

*Tactics:*

* Faculty will strengthen existing ties with government and private partners by seeking joint research/educational opportunities such as summer internships for graduate students, which in turn could lead to industry-sponsored projects.
* Departmental faculty will participate in or organize interdisciplinary centers of excellence at ISU that simultaneously leverage institutional strengths while addressing national research priorities.
* Departmental faculty will organize and participate in workshops at federal funding agencies that shape the research agendas of these organizations. This will position departmental faculty for higher success rates in responding to proposal solicitations.

*Metrics:* Overall research funding/faculty, number of multi-investigator grants, publications, organization and participation in funding agency workshops, industrial funding, and diversity of funding sources including non-federal, number of training grants.

**Strategy 3: Increase departmental scholarly output, impact, graduate degrees, and visibility.**

*Tactics*:

* Enhance the ability of graduate students and post-doctoral associates to produce publication quality manuscripts by providing them training through resources provided by the department and graduate college.
* Encourage technology transfer and recognize it as part of faculty evaluation.
* Reward faculty for taking on highly visible prestigious leadership roles in professional societies, editorships of journals, etc.
* Initiate a systematic and concerted effort to nominate faculty and students for progressively more prestigious awards beginning with internal ISU awards and moving to national and international awards, including fellowships in societies.
* Regularly highlight significant research accomplishments through national publications such as C&E News or ASEE First Bell, as well as through local communication channels.
* Upgrade departmental and faculty web pages with professional design and updated content.

*Metrics*: Publication and citation rates, PhD production rate, PhD students and post-docs entering academia, invited talks, editorships in prestigious journals, national, international awards, patent applications, startup companies, consulting, press releases.

**Strategy 4: Make efficient use of teaching resources and advising in order to maintain a high quality educational experience for undergraduates in the face of unprecedented enrollment and projected enrollment growth.**

*Tactics*:

* Exploit technology to make efficient use of limited space and personnel in high enrollment courses by using hybrid learning methods, on-line content delivery, and webcasting.
* Focus teaching resources, including instructors, teaching assistants, and graders, on core disciplinary courses.
* Maintain high academic standards throughout the curriculum with expectations of high student performance and ethical conduct.
* Use our advising process to provide students with resources necessary to make appropriate career and education decisions, including an emphasis on excelling in coursework, proper elective planning, and pursuit of research and internship opportunities.
* Implement a gateway assessment to ensure sufficient student preparation for downstream courses and for accreditation assessment.
* Focus student recruiting efforts on highly qualified members of under-represented groups.
* Update senior survey to gauge student satisfaction with curricular and pedagogical changes.

*Metrics*: Placement rates, graduate school placement percentage, degree production figures, numbers of women and underrepresented minorities, graduating senior survey overall satisfaction indices.

**Strategy 5: Increase gift support that will simultaneously strengthen the graduate and undergraduate programs.**

*Tactics*:

* Work with ISU Foundation, alumni, and current donors to educate them about departmental needs. Communicate the rationale for prioritizing gifts that improve overall department metrics and quality, including the quantity and quality of graduate and undergraduate education, and the impact of research and teaching activities. These will include graduate teaching assistantships, fellowships, and facility upgrades.
* Strengthen relationships with alumni by more regular communication through periodic updates, department-hosted alumni events, and direct mailings and contacts.
* Better communicate with stakeholders via enhancements to the department's cyber presence.
* Seek funding for specific projects from philanthropic organizations and foundations.

*Metrics*: Number and value of graduate fellowships, endowed chairs/professorships, amount in CBE Excellence fund. Support for upgrading facilities and infrastructure.