WELDON SCHOOL OF BIOMEDICAL ENGINEERING

STRATEGIC PLAN

2012-2017
PREAMBLE

The Department of Biomedical Engineering was formed in 1998 through the integration of the emerging academic infrastructure of the then two-year-old Biomedical Engineering Graduate Program, that is a partnership with the Indiana University School of Medicine, and the research resources of the Hillenbrand Biomedical Engineering Center. This linking of the only doctoral program in biomedical engineering in Indiana with a successful research enterprise laid a cornerstone for programmatic growth. This first new engineering department at Purdue in 40 years served as both an internal hub for cross-disciplinary graduate research and teaching, as well as a visible focal point for external collaborations and funding. The department rapidly coalesced an outstanding faculty that focused its efforts on the solution of important clinical problems through technological means. Over the past two decades, biomedical engineering faculty members have been inventors on more than 100 issued U.S. patents with over half licensed, resulting in royalty income that surpasses that of any other academic unit on campus. With continued growth, including the addition of an undergraduate degree program, the construction of the Martin C. Jischke Hall of Biomedical Engineering, and the generous support of the Weldon family, the department became the Weldon School of Biomedical Engineering in 2004.

The Weldon School continues to undergo major programmatic and faculty growth to meet the needs of the rapidly growing medical device and biotechnology industries. Expansion of our research and graduate programs further enhance our already strong collaborative ties to these companies, especially those within Indiana. In addition, the continued development of our undergraduate program allows us to educate a new type of Purdue engineer who is optimally qualified to solve medical problems through a unique set of analytical and design skills. Through these and related initiatives, the Weldon School of Biomedical Engineering faculty, staff, students and alumnae/i improve the practice of medicine and thereby have widespread impact on the quality of life.
VALUES

• We strive for our students, alumnae/i, staff, faculty, and colleagues to be extremely successful. Success is shared.

• Improving the practice of medicine through new knowledge and technologies is a school driving force.

• Our environment fosters innovation and continuous improvement both within the classroom and the laboratory.

• Collaboration across scientific disciplines is considered necessary and is facilitated.

• Extramural partnerships are mission critical. We take great pride in being outstanding partners.

• The diversity of individuals that comprise the school is cherished and ever-expanding.

• Honest, caring, and ethical behavior is required.

• Our commitment to provide outstanding educational programs that meet emerging needs is steadfast.

• The opportunity to grow and continuously improve our school is appreciated, challenging, and exciting. This excitement is contagious to all who are involved.
MISSION

To be the premier source of discoveries and related technologies, and of well-educated biomedical engineers, fostering strong academic, industrial, and clinical ties, and thereby achieving significant healthcare impact.

VISION

Our vision is to improve quality of life through pioneering discoveries and their technological translation, and the education of future leaders in the medical device and biotechnology fields. From 1998-2017, we will move Purdue from having no formal academic programs in biomedical engineering to one with a preeminent and highly visible Weldon School of Biomedical Engineering with hundreds of top students, the finest faculty, ground-breaking research, cutting-edge facilities, and far-reaching strategic partnerships.
GOALS

To realize this vision and thereby significantly impact healthcare, we have set the following primary goals:

1. Continue to grow an outstanding, diverse, and research-intensive faculty through strategic recruitment;
2. Expand and enhance the curriculum and student body of our educational programs;
3. Broaden our research programs and capabilities, and amplify their industrial and clinical impact through extramural partnerships and entrepreneurship; and
4. Extend the reach and heighten the visibility and recognition of all of our efforts.
OBJECTIVES

1. **Enhance our undergraduate program**

   **Strategies:**
   - facilitate specialization within undergraduate degree requirements
   - continue to integrate training in design and innovation throughout the curriculum including First-Year Engineering
   - continue to expand relationships with industry, government, clinical, and other academic partners for increased participation in experiential learning (e.g. internship, co-op, study abroad) and placement opportunities
   - enhance the competitive advantage of our students toward obtaining national and international fellowships and placement into selective graduate programs
   - expand the national and international presence of our program

   **Metrics and Milestones:**
   - create suggested plans of study for specializations that map to our areas of research emphasis and to the career interests of students within one year
   - establish a new honors course for students applying for prestigious fellowships and doctoral programs to mentor them in writing, leadership, and outreach within one year
   - publish at least one journal paper or receive one extramurally-funded educational grant each year
   - achieve > 90% placement rate of graduates (in industry, professional or graduate schools) and double the number of students applying to top graduate programs within two years
   - create a BME-oriented design project course for First-Year Engineering students that teaches design skills and programming within four years
   - establish two new international exchange programs within five years
   - double the number of senior design partnerships with industry and clinical partners within five years

2. **Increase the impact and recognition of our graduate program**

   **Strategies:**
   - continue to implement a comprehensive student recruitment plan to matriculate top applicants
   - continue to develop curricular concentrations in key research areas
   - mentor doctoral students toward leadership careers in academia and industry
   - increase student funding opportunities from all sources, and specifically for collaborative research projects
   - enhance the international presence of our program
Metrics and Milestones:

- identify, define, and publicize our key research areas to gain more widespread recognition of our program strengths within one year
- establish a comprehensive curricular offering and teaching plan within one year
- establish a pool of extramural funds for recruitment fellowships to spur collaborative research within key areas within one year
- establish a course to mentor first year graduate students in applying for prestigious fellowships within two years, and have at least four students per year receive such
- establish a teaching mentorship program within two years to prepare and guide at least 10% of graduating doctoral students into academic post-doctoral positions each year
- create at least one major international graduate education partnership within two years and grow this along with our current partnership with the University of Puerto Rico at Mayaguez
- have more than 10% of our faculty hold leadership roles in key national societies within three years
- recruit at least three new biomedical engineering students into the combined MD/PhD Medical Scientist Training Program each year
- double the number of students in the Interdisciplinary Biomedical Sciences program with the School of Veterinary Medicine within five years
- secure at least one extramurally-funded graduate training grant within five years

3. Reach preeminence in research productivity and impact

Strategies:

- encourage and facilitate large, multi-investigator research proposal submissions
- create research consortia in order to develop research centers of excellence
- create a national identity for existing and emerging research thrust areas
- continue strategic recruitment process to fully attain an outstanding and diverse faculty
- mentor and support junior faculty to quickly initiate research programs

Metrics and Milestones:

- double extramural research funding over the next five years
- enhance existing medical imaging research facility within two years and increase its impact
- have faculty publish at least two papers in extremely high impact journals per year
- create and maintain an informative web page for each key research area
- have each new faculty member receive extramural funding within two years of joining Purdue
4. **Lead in entrepreneurial and clinical impact**

*Strategies:*
- Continue to promote and support faculty, staff and student entrepreneurial efforts
- Continue our partnership with the Indiana University School of Medicine for translational research and educational components
- Partner with key intramural and extramural entities (e.g., The Innovation and Commercialization Center at Purdue and Purdue Research Foundation’s Office of Technology Commercialization) to accelerate translation
- Maintain entrepreneurship instructional programs in our educational and research framework at all levels

*Metrics and Milestones:*
- generate at least four U.S. patents, with one patent licensed, per year
- create at least one new start-up company per year
- double patent license royalties to Purdue from biomedical engineering technologies within five years
- place at least ten graduates per year at biomedical start-up companies in Indiana within five years
- establish at least two major collaborative clinically-driven research or training programs within five years

5. **Enhance visibility, recognition, and communication**

*Strategies:*
- institutionalize a systemic award nomination process for faculty, staff, and students
- continue aggressive marketing and communications of achievements, initiatives, and partnership opportunities

*Metrics and Milestones:*
- develop expansive awards opportunities list within one year
- create comprehensive database of nomination materials for each faculty and staff member within two years
- receive at least three major faculty awards per year
- receive at least two university or college-wide staff awards per year
- host a workshop in an emerging research or educational area each year
- complete comprehensive web content update within one year
- receive far-reaching national/international news coverage of a major initiative or achievement each year
6. Expand technical support and facilities for research and instruction

Strategies:
• integrate technical support needed for research from proposal planning through project implementation
• create collaborative approaches to expanded imaging facilities on campus
• develop integrative plan for Martin C. Jischke Hall of Biomedical Engineering addition

Metrics and Milestones:
• establish mechanical design and fabrication facility within one year
• lead in developing campus-wide plan for imaging facilities expansion within three years
• design, resource, and break ground on building addition within five years
PEER INSTITUTIONS FOR BENCHMARKING

Case Western Reserve University
Duke University
Georgia Institute of Technology
Johns Hopkins University
Massachusetts Institute of Technology
Northwestern University
Rice University
University of California – Berkeley
University of California – San Diego
University of Michigan
University of Minnesota
University of Pennsylvania
University of Texas – Austin
University of Washington
University of Wisconsin – Madison