Approved by the Board of Trustees

November 18, 2021

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Board Meeting

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## ESTABLISH THE BACHELOR OF SCIENCE IN NEURAL ENGINEERING, THE GRAINGER COLLEGE OF ENGINEERING, URBANA

**Action:** Establish the Bachelor of Science in Neural Engineering, The Grainger

College of Engineering

**Funding:** Additional faculty hires by the Department of Bioengineering will be

funded by existing commitments from The Grainger College of

Engineering

The Chancellor, University of Illinois Urbana-Champaign, and Vice President, University of Illinois System with the advice of the Urbana-Champaign Senate recommends approval of a proposal from The Grainger College of Engineering to establish the Bachelor of Science in Neural Engineering (B.S. in NE).

Neural engineering is a large and rapidly growing discipline in which engineering principles are applied to the design of technologies to repair and enhance the function of the nervous system. The B.S. in NE seeks to provide a rigorous and focused training at the intersection of neuroscience and engineering fundamentals. The proposed program will be distinguished by attributes that are not available together in any individual degree in the nation, including 1) an introduction to and an immersion in fundamentals of neuroscience; 2) integrated skill development in electrical and imaging systems, molecular and cellular engineering, biological interfacing, and computational data sciences; and 3) coursework framed around the application of design principles to solve modern problems in basic and translational neuroscience.

Scientific efforts in neuroscience are becoming increasingly ambitious due to revolutionary advances in brain-machine interfaces, noninvasive functional neuroimaging, and high-resolution brain mapping, together with an increasing precision with which neuromodulatory stimuli and molecular and cellular technologies can be applied to control brain function. Simultaneously, there is an urgent need to translate research findings in neuroscience to clinical interventions due to the increasingly deleterious impact of neurological and psychiatric disorders on the worldwide population and the U.S. healthcare system, compounded by unsolved problems in clinical pain management and addiction.

Students receiving a B.S. in NE degree will be uniquely trained in both neurosciences and quantitative sciences, will be skilled in the design and advancement of electrical and bio-interfacial devices, including brain-computer interfaces, neuroimaging systems, and neurostimulation devices. They will also be competent in analytical and computational approaches necessary for their function and use, and will possess a detailed mechanistic understanding of the molecular and cellular technologies used to modulate nervous system function. Graduates will thus be well positioned to pursue professional degree programs in medicine and graduate studies in the life and behavioral sciences, as well as diverse engineering disciplines. They will also be equally prepared to enter industry as engineers, particularly in healthcare sectors to immediately impact the nascent fields of neural prosthetics and rehabilitative and assistive robotics, and to work in research and development as well as clinical implementation.

While many existing faculty members in the Department of Bioengineering will contribute to delivering the new degree, there will be a need for additional faculty. Four additional tenure track faculty or two teaching track faculty, or some combination of the two, will be hired to ensure that the Department of Bioengineering maintains sufficient personnel to meet the needs of the new program and the anticipated growth of the existing degree programs within the department. Neural Engineering has previously been identified as a strategic area for research growth in the department. The hires to support the proposed program degree will therefore be consistent with the planned expansion of the department. These hires will be forthcoming due to a commitment to the department head by The Grainger College of Engineering. For the first two years, while the program is ramping up, existing staff will be sufficient to support the administrative needs of the program. In year three, using program revenue, the department will hire a new staff position to oversee student advising, recruitment, course scheduling, and other day-to-day business of running the program. No new or additional facilities, significant improvements to existing facilities, or additional resources from the University Library are needed.

The Board action recommended in this item complies in all material respects with applicable State and federal laws, University of Illinois *Statutes, The General Rules Concerning University Organization and Procedure*, and Board of Trustees policies and directives.

The Interim Executive Vice President and Vice President for Academic Affairs concurs with this recommendation. The University Senates Conference has indicated that no further Senate jurisdiction is involved.

The President of the University recommends approval. This action is subject to further review by the Illinois Board of Higher Education.