NEURAL ENGINEERING SEMINAR SERIES

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Systems biology and the engineering of complex disease systems

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W306 Millennium Science

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ABSTRACT: Communications within and between cells are a complex network from which emerges a wide variety of biological functions. By extracting from these complex interactions the signals relevant to specific phenotypic, genetic, or behavioral changes, we can both understand the underlying mechanisms of these phenomena and identify useful markers for diagnosis, prognosis, and classification of disease states. In this seminar, I will give an overview of how we use these principles in our laboratory to answer critical questions in neurodegenerative disease and aging.

BIOGRAPHY: Elizabeth Proctor is an Assistant Professor of Neurosurgery, Pharmacology, Biomedical Engineering, and Engineering Science & Mechanics at Penn State University, where she integrates experimental and computational systems biology methods to uncover interactions between seemingly discrete pathological processes in neurological disease. The ultimate goal of her work is to design perturbations to these integrated multi-scale networks in order to maintain brain health and correct disease phenotypes. Prior to Penn State, Elizabeth was a postdoctoral fellow in the Department of Biological Engineering at MIT, where she used multiplexing and OMICS assays combined with multivariate modeling and machine learning to map cellular communication and signaling networks implicated in disease. Elizabeth completed her PhD in Computational Biophysics at UNC Chapel Hill, where she developed methodology for molecular modeling and protein engineering to control molecular structure, dynamics, and function in disease-relevant systems. Elizabeth holds Honors bachelor diplomas from Purdue University in Physics and Russian Language and Literature.