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Neural Prosthesis Seminar

Neuroengineering Approaches in Neuroprosthetics and Neurodegeneration

Friday, November 3 • 8:30 am

Biomedical Research Building, Room 105
Case Western Reserve University

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Abstract

This talk will present how neuroengineering approaches are making advances in the fields of neuroprosthetics and neurodegeneration. In neuroprosthetics, state-of-the art prostheses use the EMG signal to decode the amputee's motor intent; however, the EMG signal does not provide accurate information on the finer characteristics of the desired movement, making them inadequate to control the sophisticated movements of modern prostheses. This talk will present our effort in developing a new technology based on the motor neuron (motoneuron) firing signals. Using computational approaches, we have constructed a multi-scale, highly realistic computational model of the spinal sensorimotor circuit under different neuromodulatory states. This model was used as a research platform to develop novel, robust motor decoder algorithms based on the motoneuron firing behavior for closed-loop control of prosthetic movement.

In neurodegeneration, this talk will present a novel cross-disciplinary neuroengineering approach that we developed to examine the cellular abnormalities underlying motoneuron degeneration in the fatal neurodegenerative disease amyotrophic lateral sclerosis (ALS). In addition to understanding how the motoneuron regulates its excitability under disease conditions, this approach has uncovered cellular abnormalities masked from experimental investigation and identified novel drug targets, leading to a novel ALS treatment.

For more information, please contact Cheryl Dudek
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