BCL5

5th Workshop on Brain, Computation, and Learning

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Challenges and Opportunities at the Convergence of Neuromodulation and BCI

Abstract: The fields of brain-computer interfaces (BCI) and neuromodulation both share a common goal of providing relief for those who suffer from neurological or psychiatric disorders, injuries, and diseases. Traditionally the two fields have often been treated as distinct given how BCIs are focused on classifying neural activity to control devices whereas neuromodulation is focused on ameliorating symptoms with stimulation. However, ongoing advancements with brain-sensing enabled adaptive Deep Brain Stimulation (aDBS) devices illustrate that the distinction between the fields is growing increasingly irrelevant with BCI methods being increasingly relied upon to advance neuromodulation therapies and neuromodulation devices increasingly being utilized for BCI applications. Considering the convergence of the fields of neuromodulation and BCI in terms of both the technological and scientific provides a useful framework for examining opportunities and challenges that remain in both fields for translational benefit. In this talk, Dr. Herron will review the development of aDBS systems within the neurological movement disorders field, discuss ongoing work in translational work in the use of neuromodulation for both neuropsychiatric applications and stroke, and discuss mutual challenges to the convergent fields of BCI and neuromodulation to be addressed in future work.