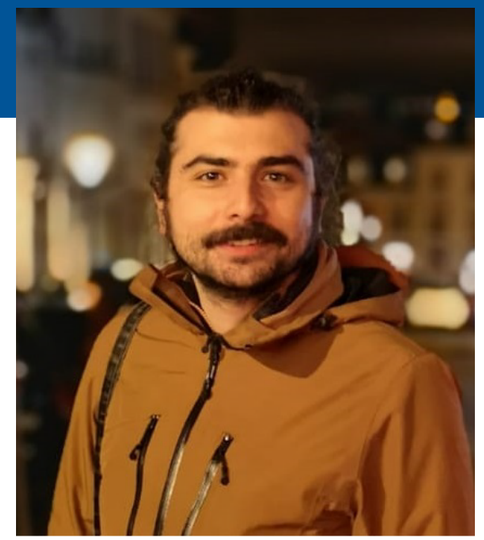
Institute of Biomedical Engineering Seminar

Investigating Dynamic Functional Connectivity with EEG in Development and Disease



Murat Can Mutlu, PhD
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19 NOV TUE at 1:00 PM (GMT+3)
ONLINE: https://bulive.bogazici.edu.tr/b/mus-c9f-hkv-fkp

About the Seminar: Functional connectivity analysis has been a great tool for investigating the brain dynamics during various paradigms such as cognitive, motor, and mental tasks, as well as at resting state to unravel fully how our brains work. To that end, many sophisticated methods have been developed, some of which could be used with different imaging modalities (i.e., fMRI, EEG, MEG, etc.), while some are modality-specific. However, 'traditional' functional connectivity analysis methods have a fundamental drawback such that they assume the connectivity in the brain is static or 'fixed', whether at rest or during different tasks. On the other hand, recent studies contradict the static nature of functional connectivity in the brain and show that connectivity profiles are formed and broken down continuously in shorter spans of time. These findings lead to dynamic functional connectivity analyses, where the connectivity profiles are computed over shorter time windows or even instantaneously. In this talk, an EEG-based novel dynamic functional connectivity analysis method, which takes advantage of surface EEG signals without requiring a source construction for computing instantaneous connectivity maps to investigate brain dynamics at very high temporal resolution, will be introduced along with its implementation on distinguishing 1) the different developmental stages in adolescents and 2) healthy controls from Alzheimer's and frontotemporal dementia patients.

About the Speaker: Dr Murat Can Mutlu holds a PhD degree from the Institute of Biomedical Engineering, Boğaziçi University, where he has investigated brain energy dynamics during language activity with brain hemodynamic (i.e., fNIRS) and physiological (i.e., tympanic temperature) signals. He has worked on EEG-based dynamic functional connectivity in adolescents and multistable perception/decision-making with fMRI as a postdoctoral researcher in the Department of Cognitive Biology at Otto-von-Guericke University, Magdeburg. Currently, he is a postdoctoral researcher in the Applied Computational Neuroscience Lab at Uniklink, RWTH Aachen, and his research focuses on the one hand, NIRS-based neurofeedback paradigms for motor rehabilitation and emotion regulation, and the other hand, extracting fNIRS fingerprints of fMRI activities of deeper brain regions during various tasks via simultaneous fNIRS-fMRI recordings.