BCL5

5th Workshop on Brain, Computation, and Learning

Dr. Siby Gopinath

Clinical Professor
MD (General Medicine), DNB (Neurology), MNAMS (Neurology)

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Quantification of Epileptogenic Networks

Abstract: Despite significant advancements in technology and understanding, the success rate of epilepsy surgery remains modest, with seizure freedom achieved in only 40–60% of patients. One of the central challenges lies in accurately delineating the epileptogenic zone within the broader epileptic network. While Stereo-EEG (SEEG) has substantially improved our ability to map these networks, interpreting the complex spatiotemporal dynamics of seizure propagation remains a formidable task. To enhance the precision and objectivity of SEEG analysis, several quantitative methods are being developed—ranging from signal processing techniques to network analysis and computational modeling. On the imaging front, although we now have access to high-resolution MRI, PET, and SPECT, the sensitivity and specificity of these modalities can be significantly improved through advanced post-processing techniques, many of which incorporate artificial intelligence and machine learning. In this brief talk, I will outline some of the strategies we are currently employing to quantify epileptogenic networks, integrating insights from both electrophysiological signals and advanced neuroimaging.