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Engineering New Therapies for Epilepsy

Abstract: Epilepsy affects more than 65 million people worldwide, 1/3 of whom cannot be controlled with medication. For these patients, surgery and implantable devices are the best alternatives, though outcomes remain suboptimal due to our limited ability to localize epileptic networks, interface with brain tissue and deliver therapy and control. In this lecture I will focus on the major technical challenges facing modern epilepsy surgery and devices drawn from the areas of materials science, data science and translational neuroengineering. I will present our work on implantable brain sensors, imaging, network neuroscience, and hybrid implantable/ cloud-based systems for delivering individualized therapy to patients with medication resistant seizure disorders.