DEPARTMENT OF COMPUTER SCIENCE
TEXAS TECH
Whitacre College of Engineering

Control Theory and its Role in Treating Epilepsy

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3:30 p.m.
Chemistry 049
Zoom: https://texastech.zoom.us/j/92364093467?pwd=JeBFBGxFDgMQY22yVvzV0Z34soVLa3.1
Meeting ID: 923 6409 3467
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Abstract: Epilepsy is a prevalent neurological disorder affecting around 50 million individuals globally. Despite the widespread use of medications, only about 70% of patients achieve seizure control. Moreover, surgery success rates range from 30% to 70% due to our limited understanding of the origin and propagation of seizures in the brain. Fortunately, alternative treatments such as neurostimulation exist, but current devices face significant challenges in providing efficient and effective care to patients.

To address these issues, my research focuses on developing effective strategies to mitigate epilepsy through advanced neurostimulation techniques that rely on controlling fractional-order dynamical networks. Remarkably, fractional-order dynamical systems have proven to be accurate models of neural behavior. By analyzing these models and deriving essential properties and feedback control strategies, I am developing innovative approaches to mitigate seizures and identify new insights into the treatment of epilepsy. I propose a new strategy that has the potential to transform the way we approach the treatment of epilepsy and thereby improve the lives of millions of individuals affected by this debilitating disease.

Bio: Emily A. Pereira is a new Assistant Professor in Electrical and Computer Engineering at Texas Tech University. During 2023-2024 school year, Dr. Pereira completed a postdoc appointment at Johns Hopkins University, where she focused on studying the impact of electrical stimulation on suppressing seizures. In 2023, she earned her Ph.D. in ECE from the University of Southern California, where she focused on developing techniques to control large-scale dynamical networks. While there, she received several fellowships including the National Science Foundation Graduate Research Fellowship, the National Defense Science and Engineering Graduate Fellowship, the USC Annenberg merit fellowship, one of USC's most prestigious fellowships, and the Qualcomm USC Women in Science and Engineering merit fellowship. In 2022, she was named a Rising Star in EECS.