

# Applied Mathematics Seminar



Dr. Paul Fishback, GVSU Mathematics

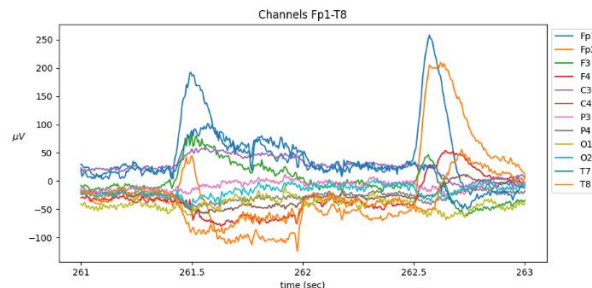
**Friday, Feb 17 1-1:50pm**

MAK A-1-155 or [via zoom](#) (request password from ortizron at gvsu dot edu)

## **Discrete Fourier Transforms, Coherence, Clustering, and Causality: Network Science Analysis of Brain Signals in the Context of Treating Intractable Epilepsy.**

Epilepsy is a neurological disorder affecting approximately 1.2% of the US population that results from abnormal electrical brain activity. Electroencephalography (EEG), which records brain signals, is an important tool, for purposes of both epilepsy diagnosis and also for making decisions regarding treatment in drug-resistant cases. Increasingly prevalent is the use of network science tools for analyzing signal characteristics. In this talk, we'll view brain activity through the lens of a social network, such as Facebook. Brain regions correspond to individuals, and "friendship strengths" are measured through a signal analysis tool known as coherence, which is based upon the Discrete Fourier Transform. Naturally, friendship strengths fluctuate over time, giving rise to "like" states of friendship within the network that can be clustered by time periods. Finally, the signal processing concept of causality assists in identifying those brain regions acting as "social influencers" so to speak.

The talk should be accessible to any student who has a rudimentary understanding of complex numbers, the dot product, and matrix multiplication.



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**More info:** <http://bit.ly/applied-math-seminar>

\*Hosted by the Mathematics Department, GVSU

