



**Wolfson Department of Chemical Engineering Seminar**

**Tuesday, April 22<sup>th</sup>, 2025 at 11:30**

**Room 6**

**Illuminating protein signaling dynamics in intact neuronal circuits**

**Dr. Tal Laviv**

**Special Seminar**

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Experience from the environment is represented by neuronal activity patterns in the brain. Inside neurons, complex protein signaling cascades provide molecular instructions for structural and functional plasticity. However, we still lack a clear understanding of spatial and temporal activity patterns of protein signaling within intact neuronal circuits.

I will describe an approach to visualize protein signaling dynamics using a combination of biosensor engineering and two-photon fluorescence lifetime imaging. I will describe how we use this approach to develop optical tools to monitor vital protein targets (PTEN, MeCP2, autophagy) for regulation of E/I balance, genomic integrity, or synaptic structure. Our overall goal is to understand how key protein signaling networks orchestrate the development and function of neuronal circuits in the healthy brain. We believe this is an essential first step towards identifying the seed process initiating neuronal dysfunction in a variety of brain pathologies.

Refreshments will be served at 11:15