

## *“Dimension Trading in the Spectroscopic Markets of Spins and Dipoles”*

The wealth of information available through spectroscopic means has led to deep insights into the spatiotemporal evolution of complex systems. In one-dimensional spectroscopy, the system response is highly averaged and information lost. Adding dimensions allows one to disperse information into higher, and hence less dense, dimensions, albeit at the cost of longer acquisition times and increased experimental complexity. Trading dimensions through an intermediary variable, however, can circumvent many of these limitations. In this talk, I will provide examples from two ends of the electromagnetic spectrum where these fundamental ideas are being applied. In magnetic resonance, the principles and applications of remote detection NMR spectroscopy will be presented in which space, time, and frequency become interchangeable dimensions. In particular, applications related to magnetic resonance detection of lab-on-a-chip (LOC) devices and gas flow through nanoporous materials will serve to illustrate the power of dimension trading. The second half of the talk will focus on how similar concepts are now being applied in the optical regime, specifically two-dimensional photon echo spectroscopy of the light harvesting complex LH2 from purple bacteria and lead sulfide quantum dots.

# SPECIAL SEMINAR

**DR. ELAD HAREL**

THE JAMES FRANCK INSTITUTE

Monday, November 29<sup>th</sup> at 3:30  
p.m. in Seminar Hall