Physics AT QUEENS COLLEGE

Colloquium Notice

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Light scattering in dynamic brain tissue: from theoretical exploration to human brain functional imaging

The brain is the most complex organ containing billions of neurons working in harmony to generate behavior. Understanding how the brain of humans and other species works in health and disease requires imaging techniques that can access structural and functional information across various spatial resolution scales. Optical imaging is a promising and, in many cases, the only technique that resolves the structural and functional information on the cellular or sub-cellular level. It can also be utilized to monitor brain functions non-invasively for human measurement. But light is multiply scattered in the brain. Understanding how light scatters within the brain is crucial for developing imaging modalities in many microscopy systems, as well as in probes of diffused light that extract information about the tissue from scattered light.

In this talk, I will introduce our studies of light propagation in scattering biological tissue. I will then discuss recent modeling and experimental work on non-invasive measurements of human brain function in which we analyze and compare the performance of diffuse optical methods including functional near-infrared spectroscopy (fNIRS), diffuse correlation spectroscopy (DCS), and its time-domain variant (TD-DCS), and speckle contrast optical spectroscopy (SCOS). This paves the way for the development of low-cost, high-performance optical techniques with applications to routinely monitor brain states at the bedside and brain-computer interfaces.

Monday
September 19, 2022
Starts at 12:15 PM
Coffee at 12:00 PM
SB B326 & Zoom
This talk is accessible via **Zoom** or use
meeting ID 829 2687 2594 and **passcode 866995** to join