Bio Phys TO

Lunchtime Seminar Series

WHEN?
March 27, 2024
12:00-1:00PM

WHERE?
McLennan Physical Laboratories
255 Huron Street
Rm. 606

WHY?
Join us for pizza and an opportunity to learn and engage with members of the UofT Biophysics community!

SPEAKER

Xiao-an Zhang

Department of Chemistry, University of Toronto

Molecular Probes for Nuclear Magnetic Resonance Sensing and Imaging

Nuclear magnetic resonance (NMR) is a versatile technique widely used in spectroscopy (MRS) and imaging (MRI). Its reliance on non-ionizing radio waves enables deep tissue penetration, making it attractive for studying biological systems. However, its utility in vivo is limited by low sensitivity and selectivity in molecular detection. This seminar presents two classes of molecular probes designed to address these limitations. The first is a pH-sensitive spectroscopic probe based on slow proton exchange (SPE), which enables ratiometric pH sensing with high precision. Using the SPE probe, even minor pH variations ($\Delta pH < 0.02$) can be detected by NMR. The second class comprises a series of high-spin Mn(III)-porphyrins (MnPs), engineered as MRI contrast agents with enhanced longitudinal (T_1) relaxivity, biocompatibility, and structural diversity. Through rational design, these MnPs selectively interact with biomolecules such as albumin, enzymes, and transporter proteins. Their applications in angiography, stem-cell labeling, and liver imaging demonstrate their potential for advancing MR molecular imaging.

SEMINAR SPONSORS
UTSG Departments of
Biochemistry
Chemistry
Physics