



BiophysTO Lunchtime Seminar Series

Date

Thursday, January 25, 2024
12:00 – 1:00 pm

Location

60 St. George Street.
Room MP 606

Prof. Leo Chou

Institute of Biomedical Engineering,
University of Toronto

Manipulating immune system receptor-ligand interactions using 3D DNA nanotechnology

Immune responses are often initiated and regulated via the clustering of immune receptors upon ligand binding. These ligands span a large range of sizes (i.e. soluble antigens, viruses, whole cells) and physicochemical properties which influence immune receptors re-organize spatiotemporally, and in turn control their signaling strength and/or outcome. Our lab has an interest in how such spatial parameters of ligand presentation affect immune receptor-ligand interactions, and how controlling them can shape immune responses. To address this question, we display immune ligands on 3D DNA nanostructures for investigating their interactions with immune cells. The use of DNA nanostructures allows us to position ligands with defined valency, stoichiometry, and spatial pattern at the nanometre scale. In this talk, I will discuss on-going projects that use this approach to examine multivalent antigen-receptor interactions that occur during immune response to vaccines. In addition, I will discuss parallel efforts in the lab to functionalize such DNA nanostructures with adjuvants to create constructs that can efficiently activate immune cells. Finally, I will highlight an imaging method developed in our lab to detect these DNA nanostructures in vivo. These tools are being used by us to guide the design and engineering of nucleic-acid nanostructures, both as a powerful research tool and a potential platform for vaccines and immune-therapeutics.

Host: Prof. Anton Zilman



**Seminar
Sponsors**

UTSG

Biochemistry Physics Chemistry