Bio Phys TO

Lunchtime Seminar Series

WHEN?
October 24, 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

Paul François

Professor, Université de Montréal, Department of Biochemistry and Molecular Medicine. Associate Academic Member of MILA - AI Institute

T Cell Recognition: From Theory to CAR-T Immunotherapy

The immune system performs a fundamental task: distinguishing between self and non-self. In an ideal scenario, formalizing this process would enable us to derive 'design principles', make accurate predictions, and create experimental interventions. In this talk, I will illustrate how starting from basic theoretical concepts, we can develop a series of models known as 'adaptive kinetic proofreading' (AKPR). These models capture key aspects of T cell recognition and shed light on immune system blindspots caused by active antagonism. I will then discuss how we employed a specially designed robotic platform to test the core principles of adaptive kinetic proofreading in the context of collective immune responses. In a clinical context, this approach is leading us to innovative applications, such as designing a novel type of CAR-T immunotherapy by transferring specificity from a T cell receptor to a Chimeric one .

Our research demonstrates how integrating theoretical models with robotic quantitative biology can significantly enhance our understanding of cell dynamics and directly impact therapeutic development.

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