UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES

LE DEPARTEMENT DE CHIMIE PHYSIQUE

a le plaisir de vous inviter à la

CONFERENCE

Intitulée

MULTIDIMENSIONAL SUPER RESOLUTION IMAGING: WASTING LIGHT TO LEARN NEW THINGS

donnée par

Prof. Steven LEE
UNIVERSITY OF CAMBRIDGE

le MARDI 24 FEVRIER à 16h30

SALLE 1S081
Sciences III

30 quai Ernest-Ansermet ou 4 bld d'Yvoy

Responsable : Dr. Alexandre FUERSTENBERG

Abstract:

This talk presents two complementary single molecule fluorescence methods that extract orthogonal information from individual emitters, extending super resolution microscopy beyond position alone.

In the first part, I will introduce POLCAM, a simplified approach to single molecule orientation localisation microscopy based on polarised detection with a polarisation camera. POLCAM combines accessible hardware with a rapid analysis pipeline that runs more than one thousand times faster than current state of the art methods, enabling near instant estimation of molecular anisotropy. To support broad uptake, we developed open source analysis and visualisation software. I will show applications to alpha synuclein fibrils and the actin cytoskeleton in mammalian cells. (Nature Methods, 2024).

In the second part, I will describe single molecule light field microscopy, which encodes three dimensional molecular position within two dimensional detector data for volumetric super resolution imaging. By exploiting parallax, this approach resolves overlapping emitters and delivers around an order of magnitude improvement in acquisition speed relative to established three dimensional point spread function engineering strategies. I will present experimental results demonstrating high localisation accuracy and sensitivity, including whole cell imaging of single membrane proteins in live primary B cells and high density volumetric imaging in dense cytosolic tubulin datasets. (Nature Communications, 2024).