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 F. LEE

YUSUF HAMIED DEPARTMENT OF CHEMISTRY
UNIVERSITY OF CAMBRIDGE (UK)

le MARDI 7 MAI 2024 à 16h30

SALLE A150
Sciences II

30 quai Ernest-Ansermet ou 4 bld d'Yvoy

Responsable : Dr Alexandre FÜRSTENBERG

A B S T R A C T

Multidimensional Super-resolution Imaging: Wasting Light to Learn New Things

The talk will outline two single-molecule fluorescence approaches that can be used to determine orthogonal metrics about a single emitter.

The first half introduces "POLCAM," a simplified single-molecule orientation localization microscopy (SMOLM) method based on polarised detection using a polarisation camera. POLCAM's fast algorithm operates over 1000 times faster than the current state-of-the-art, allowing near-instant determination of molecular anisotropy. To aid adoption, open-source image analysis software and visualization tools were developed. POLCAM's potential was demonstrated in studying alpha-synuclein fibrils and the actin cytoskeleton of mammalian cells. (Nature Methods in press).

The second approach focuses on "Single-Molecule Light Field Microscopy" (SMLFM), encoding 3D positions into 2D images for volumetric super-resolution microscopy. SMLFM shows an order-of-magnitude speed improvement over other 3D PSFs, resolving overlapping emitters through parallax. Experimental results reveal high accuracy and sensitivity in point detection, enabling whole-cell imaging of single membrane proteins in live primary B cells and high-density volumetric imaging in dense cytosolic tubulin datasets. (Nature Comms 2024)

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