

Biophotonics Seminar

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Facilitating Fluorescence Lifetime Imaging via Deep Learning

Abstract:

Molecular imaging has become an indispensable tool in biomedical studies with great impact on numerous fields from fundamental biological investigations to transforming clinical practice. Among all molecular imaging modalities, fluorescence optical imaging is a central technique due to its high sensitivity; the numerous molecular probes available, either endogenous or exogenous; and its ability to simultaneously image multiple biomarkers or biological processes at diverse spatiotemporal scales. Especially, fluorescence lifetime imaging (FLI) has become an increasingly popular method as it provides unique insights into the biological processes. However, despite its popularity and profound impact, FLI is not a direct imaging modality and datasets need to be postprocessed to quantify fluorescence lifetime or lifetime-based parameters. Such technical implementations can be complex, computationally expensive, require high level of expertise as well as user inputs. Herein, we will report on the development and validation of DL models as fast and user-friendly image formation tools for FLI. To date, our contributions have focused on outputting the quantitative lifetime image from raw FLI measurements without iterative solvers and user input, enabling enhanced multiplexed studies by leveraging both spectral and lifetime contrast simultaneously, performing FLI topography corrected by the tissue optical properties, facilitating the implementation of high-end new instrumental concepts leveraging compressive sensing techniques and performing end-to-end 3D optical reconstructions.

Biography:

Xavier Intes is a Professor in the Biomedical Engineering Department and Co-Director of the Center for Modeling, Simulation and Imaging in Medicine (CeMSIM, Troy, U.S.A.). Dr. Intes received his Ph.D. in physics from Université de Bretagne Occidentale, France. He was a postdoctoral fellow at the University of Pennsylvania under the mentorship of Britton Chance. Dr. Intes was the Chief Scientist of Advanced Research Technologies Inc. (Montreal, Canada) and oversaw the development of two commercial time-resolved tomographic optical imaging platforms: Optix® and SoftScan®. He is a recipient of the NSF CAREER award and Fellow of AIMBE/SPIE/OSA.

November 10, 2020

9:00 - 10:00 am Seminar
10:00 - 11:00 Q & A
Tuesday

Join Zoom Meeting

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