Introduction to Quantitative Fluorescence Microscopy

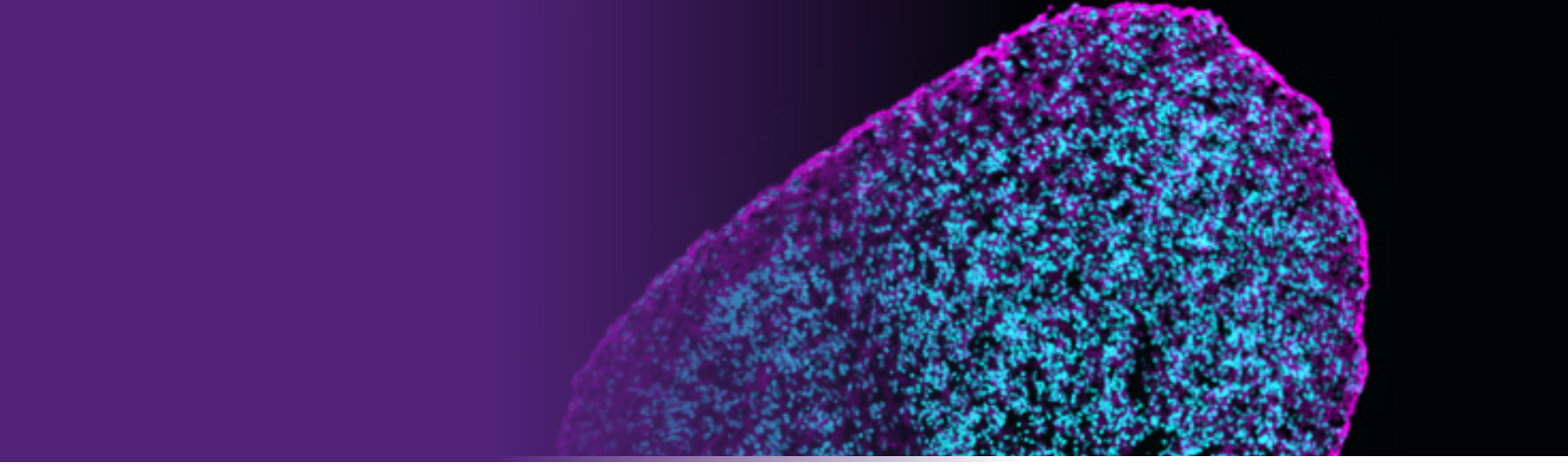
Event Program

Day 1

12 - 12:30 pm	Student arrival
12:30 - 1:45 pm	Optical Microscopy: Essential concepts - **Dr Nela Durisic** *This tutorial will examine fundamental physics principles essential for light microscopy, including topics such as the focal plane, refractive index, diffraction and related concepts. It will serve as an introduction to the basics of light microscopy.*
1:45 – 3 pm	Principle of Optical Nanoscopy - **Dr Elvis Pandzic** *In this tutorial, we will explore how standard light microscopy suffers from limited spatial resolution due to light diffraction and how we can overcome it using various strategies of super-resolution microscopy.*
3 – 3:30 pm	Afternoon tea
3:30 – 4:45 pm	From Visual to Quantitative Biology: Considerations for Project Planning *This is a panel discussion. We will be highlighting the significance of initiating data analysis from the project's inception, emphasising the analysis of data as it is collected and illustrating how this approach provides a feedback loop that improves our data acquisition and management. Additionally, we will address the handling of large datasets and explore machine learning-assisted approaches to data analysis.*

Day 2

8:30 – 9 am	Student arrival
9 – 9:45 am	Visualising Protein Interactions in Live Cells - **Dr Pranesh Padmanabhan** *This section is on Single Particle Tracking and related methods based on single-molecule detection formalism*
9:45 – 10:30 am	Tissue Preparation for Multimodal Imaging - **Dr Rob Sullivan** *This tutorial will address fixation, immunolabeling, clearing, and expansion microscopy techniques.*



10:30 – 11 am	Morning Tea
11am – 12 pm	Protein Oligomerisation and Densities in Situ - **Prof Antoine Godin** *This is a remote lecture on techniques that are not based on single molecule detection and are used for quantification of molecular density, stoichiometry and co-localisation.*
12 – 12:45 pm	Quantifying Molecular Dynamics with Fluorescence Fluctuation Correlation Spectroscopy - **Dr Elvis Pandzic** *These are analysis methods for data collected by any microscopy modality that allow measurement of movement, interaction, and segregation of proteins.*
12:45 – 1:15 pm	Lunch
1:15 - 2 pm	Counting of proteins one molecule at the time - **Dr Nela Durisic** *This section is on quantitative PALM and STORM super resolution microscopy.*
2 – 2:45 pm	Optogenetics: From Basic Principles to in vivo Applications **- Dr Roger Marek** *We will illustrate techniques employed to manipulate the activity of neurons or other cell types using light.*
2:45 – 3:30 pm	Light-sheet microscopy with data analysis for 4D data sets **- Dr Senthil Arumugam** *In this section, we will demonstrate how the previously described methods can be utilised to acquire quantitative information in sectioning microscopes.*
3:30 - 4:30 pm	Interactive case studies *This is a project-based learning session, which will also provide students with the opportunity to delve deeper into their projects and engage in discusssions.*
4:30 pm	Closing remarks