Microscopy of Molecular Motion In Living Cells

28. – 30.4. 2025
Practical course at BIOCEV,
Průmyslová 595, Vestec

Programme

08:45 – 09:00 Registration

09:00 – 09:10 Welcome and organizational details
Aleš Benda

09:10 – 10:00 What kinds of molecular dynamics can we expect in cells?
Piotr Jurkiewicz

10:00 – 11:00 Introduction to principles of single molecule fluorescence detection and correlation analysis
Dalibor Pánek

11:00 – 11:15 Coffee Break

11:15 – 12:15 Methods of fluorescence correlation analysis on confocal microscopes
Aleš Benda

12:15 – 13:10 Introduction of the participants (3 min about yourself and your research)

13:10 – 13:50 Lunch

13:50 – 14:30 Principles of Lattice Light Sheet Microscopy
Petra Prokšová

14:30 – 15:10 Principles of Fluorescence Recovery After Photobleaching.
Michaela Blažíková

15:10 – 15:25 Coffee break – Hands-on group assignment

15:25 – 16:10 Introduction to TIRF microscopy and kymography and single particle tracking.
Zdeněk Lánsky

16:10 – 17:00 Other approaches to quantify molecular dynamics in living cells
Piotr Jurkiewicz

17:00 – 17:30 Which method to choose? Comparison of different approaches
Aleš Benda

17:30 – 20:00 Get together (beer and snacks)

Tuesday, April 29. – Wednesday, April 30.

Groups 1 – 4

09:00 – 13:00 Morning hands-on session

Around 11:00 Coffee break 15 min

13:00 – 14:00 Lunch

14:00 – 18:00 Afternoon hands-on session

Around 15:15 Coffee break 15 min

	Group 1	Group 2	Group 3	Group 4
Morning Tue, April 29	LLS	SPT	FCS	FRAP
Afternoon Tue, April 29	FRAP	LLS	SPT	FCS
Morning Wed, April 30	FCS	FRAP	LLS	SPT
Afternoon Wed, April 30	SPT	FCS	FRAP	LLS

FCS (Fluorescence Correlation Spectroscopy)

Aleš Benda

Optimizing point FCS measurements in cells; PIE-FCCS analysis of interacting proteins

FRAP (Fluorescence Recovery After Photobleaching)

Michaela Blažíková

FRAP combined with a spinning disk and with TIRF to reveal the dynamics of protein pools

SPT (Single Particle Tracking)

Lánsky group

2D tracking of molecular motors on microtubules

LLS (Lattice Light Sheet)

Petra Prokšová

Fast volumetric acquisition to follow vesicular motion in cells

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