

CUSO : Electron microscopy practical course

22-26 November 2021 – Building Biophore, University of Lausanne

PROGRAM & INFORMATION

Aim : Cover the theoretical and practical basics of cellular electron microscopy. Workshops will illustrate practically the techniques used in EM these days to solve biological questions.

Tasks for students: **On Monday morning, each student has 3 minutes (1-2 slides) to explain his needs in electron microscopy in the frame of the PhD work.** If students wish to bring their own samples for tests, please contact christel.genoud@unil.ch

The Morning are dedicated to courses covering the technical aspects and main workflows. It alternates with talked given by experts to show how they solve biological problems with EM

Students are following 4 basic workshops on Monday and Tuesday afternoons. They will be able to choose between different advanced workshops on Wednesday and Thursday depending on their interests (choice to be made during the two first days).

On Friday afternoon, students have access to teachers and techniques to ask questions, going deeper in a technique or elaborate a protocol for a particular case.

Week calendar :

	Monday	Tuesday	Wednesday	Thursday	Friday
9h15-10h00 (room 2451)	EM intro – student's talks	Sample prep 1 (JD)	Ultramicrotomie (IK)	CLEM approaches (AL)	Image analysis 1 stereo (JD)
10h15-11h00 (room 2451)	EM intro – student's talks	Sample prep 2 (CG)	Cryo immuno (CL)	3D array tomo (IK)	Image analysis 2 (R.Guiet)
11h15-12h00 (room 2451)	Intro TEM/SEM (CG)	In-situ CLEM (Olivia Muriel Lopez)	EM in neuroscience (Graham Knott)	3D SBEM FIBSEM (CG)	Intro cryo-EM (A. Myasnikov)
12h00-13h15	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>
13h15-14h45 (EMF-1219)	Basic practicals	Basic practicals	Advanced workshops	Advanced workshops	Group work with teachers
14h45-15h15	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>
15h15-16h45 (EMF-1219)	Basic practicals	Basic practicals	Advanced workshops	Advanced workshops	Group work with teachers

Teachers :

Christel Genoud, head of EM platform UNIL

Jean Daraspe, scientific expert EMF UNIL, expert FIBSEM tomography

Olivia Muriel Lopez, 50% Pr. Martin et 50% EM facility UNIL, expert in-situ CLEM and tomography

Irina Kolotuev, senior scientist UNIL, expert in array tomography

Céline Loussert, senior scientist UNIFR, expert in cryo-immuno

Graham Knott, head of bio-EM facility EPFL

Amanda Lewis, post-doc EPFL, expert CLEM in human neurodegenerative diseases

Romain Guiet, imaging specialist, BIOP, EPFL, expert in image analysis with deep learning

Alexandre Myasnikov, head of Dubochet Center for Imaging, expert in cryo-EM

Basics practicals :

Sample preparation : Damien De Bellis

Cutting sections : Irina Kolotuev

Introduction to TEM : Jean Daraspe

Introduction to SEM : Christel Genoud

Advanced Workshops (on choice) :

Tomography Jean Daraspe - Thursday

Students will follow the imaging process leading to tomograms at high resolution using a 200 kV TEM

CLEM demo 1 Amanda Lewis – Thursday

Students are following a workflow going from serial section immuno for light microscopy and TEM imaging of the same ROI.

FIBSEM demo Jean Daraspe – Wednesday

Students can follow how an acquisition on a FIBSM is initiated and the parameters to take in count to make it successful.

Array tomo demo Irina Kolotuev – Thursday

Students are following the workflow going from the collection of serial sections on wafer to their imaging in the SEM

SEM EDX Antonio Mucciolo

Students are following the workflow leading to the determination of the presence of elements in a sample.

Cryo immuno Céline Loussert-Fonta – Wednesday

Students see how cryo-section are cut with a cryo-ultramicrotome. They the sections are brought to room temperature for an immunolabeling before being observed in a TEM

HPF Damien De Bellis

Students can bring their own samples and practice the cryo-fixation on our 2 instruments.

TEM RT sample prep Christel Genoud

Students can try classical sample preparation with chemically fixed samples.

Wednesday 13h15-14h45	Thursday 13h15-14h45
FIBSEM	Array tomo
SEM-EDX	CLEM
Cryo-immuno	tomography
HPF	HPF
Wednesday 15h15-16h45	Thursday 15h15-16h45
FIBSEM	Array tomo
SEM-EDX	CLEM
Cryo-immuno	tomography
TEM classic	SEM-EDX