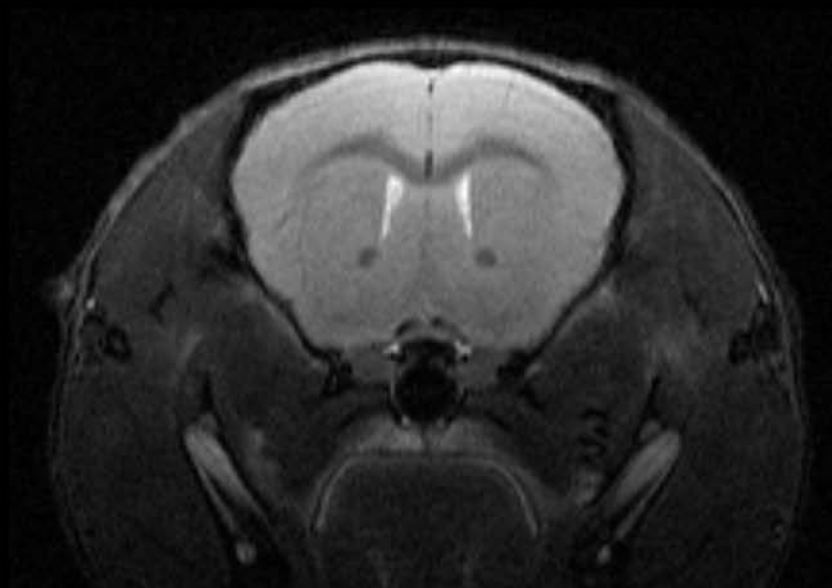




Summer Course

Module II



Mouse Imaging



STRASBOURG, Sept. 21st– 25th 2020

PATHBIO (www.pathbio.org) is an EU-funded ERASMUS+ Knowledge Alliance for “**Precision Pathobiology for Disease Models**”, including major European Universities, 5 European “Mouse clinics” for high-throughput phenotyping of mice, major mouse providers (Charles River, JAX, TCP), as well as associated partners worldwide (KMPC, APN, UATE, UCT). This Knowledge Alliance will provide courses and online teaching material for mouse embryology and anatomy, mouse pathology, and for mouse imaging.



In September 21st-25th, 2020, the second course on **Mouse Imaging**, will take place in PHENOMIN-ICS ([PHENOMIN- Institut Clinique de la Souris](http://phenomin-ics.org)), at the Institute of Genetics and Molecular and Cellular Biology ([IGBMC](http://igbmc.org)). The aim is to provide graduate, master, PhD and postdoc students with basic and expert knowledge to phenotype morphologically mouse models of human diseases. At this course, expert mouse embryologists, anatomists, pathologists and researchers from Europe, Asia, and Canada will give lectures and discuss with the participants different aspects of mouse Imaging technologies providing powerful tools to understand and follow the progress of diseases in humans as well as in mouse models.

It gives the opportunity to learn more about image-based phenotyping using a wide variety of methods to characterize morphologically and functionally disease models. This PATHBIO module covered the “state of art” for the most relevant imaging techniques used in mice, such as X-ray, microCT, MRI, OPT, HREM, optoacoustic imaging, echography, intravital microscopy, as well as the basis for image analysis and 3D rendering. Most of these are translational from the human clinic as the technologies were initially developed for assessing human patients and later adapted to mouse models. Small working groups were provided with hands-on training.

The course teaching will combine lectures and workshop with hands-on training in which participants will learn how to use Image G for analysis, discern and discuss the processing and the analyzing methods between OPT, HREM, micro-CT and MRI. Several demonstration of image processing and visit of platform are included.

There is not fee for this course. Participants have to organize travel and accommodation themselves and cover the corresponding expenses. Interested participants should apply on line with CV and letter of motivation on line. Deadline for applications is August 20th, 2020. Accepted participants will be informed early in September.



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Monday September 21st

Introduction & image analysis

- 09:30-10:00** Welcome and Introduction to PATHBIO and
PATHBIO summer course
Yann HERAULT
- 10:00-10:30** Quick Overview of the imaging principles technics
used in mouse pathology analysis
Hugues JACOBS
- 10:30-11:30** Integrated morphological mouse phenotyping:
synergies between pathology and imaging
Jesus RUBERTE
- Break**
- 11:45: 12:30** Good practices in animal research: ethical and
regulatory aspects
Isabelle GONCALVES
- Lunch (outside)**
- 14:00-15:00** Image analysis: basics
Hugues JACOBS
- 15:00-17:00** Workshop: Image analysis with IMAGE J
Bertrand VERNAY

Expert's dinner



Tuesday September 22nd

Optical imaging, X-rays and μ CT imaging

- 9:00-10:00** Bone imaging: from X-Rays, passing through CT, to specialized microscopical imaging
Jesus RUBERTE
- 10:00-10:30** Application of microCT analysis with a specific focus on Teeth
Jan PROCHAZKA

Break

- 10:45-11:30** In vivo mechanisms of (pro)platelet formation
Catherine LEON
- 11:30-12:30** *Free slot for "intravital microscopy" topic*

Lunch (lunch box inside)

- 13:30-14:15** Embryo phenotyping and HREM
Olivia WENDLING
- 14:15-15:00** Embryo phenotyping and X-rays OPT
Rosie BUNTON-STASYSHYN

Break

- 15:15-17:15**
1h/grp Hands-on experience / demonstration: HREM
Olivia WENDLING
- 1h/grp Hands-on experience / workshop tomography Part 1:
CT and OPT (ex: bone, isolated organs)
Hugues JACOBS

Free evening



Wednesday September 23rd

Optical imaging, Echography, Opto-acoustic imaging

09:00-10:00 Immunolabeling followed by optical clearing with solvents (3DISCO) and light-sheet microscopy reveals morphological phenotyping

Alain CHEDOTAL Institut de la vision

10:00-10:45 Introduction to Micro-ultrasound for preclinical imaging

Ghina BOUABOUT

Break

11:00-12:00 Short overview of applications and the next evolution of ultrasound

Dieter FUCHS/ Philippe DAVALT

12:00-13:00 Opto-acoustic imaging for oncology

Stéphanie LERONDEL

Lunch (lunch box inside)

14:00-15:00 High-resolution ultrasound and Photoacoustic imaging in embryology, neurovascular and cardiovascular diseases

Pierre SICARD

15:00-17:00

1h/grp Hands-on experience / demonstration:
Echography (heart, Abdominal)

Ghina BOUABOUT

1h/grp *Hands-on experience / workshop tomography Part 2 –
if Part 2 necessary (to be defined)*

Social event



Thursday September 24th

Nuclear imaging and Magnetic Resonance Imaging (MRI)

09:00-09:30 Introduction to Magnetic Resonance Imaging
Markus KRAIGER

09:30-10:00 MRI and image analysis
Christelle PO

Break

10:15-10:45 In vivo molecular imaging from pathology to clinic: illustration
Ho-Young LEE

10:45-11:45 Nuclear Imaging Spect-CT/PET and Bioluminescence experience at the PHENOMIN-TAAM
Stéphanie LERONDEL

Lunch (outside + bus trip)

14:15-15:00 Nuclear Imaging in animal research at ImAbio: micro PET-TEMP and microCT and recent application for diagnos
David BRASSE

15:00-17:00 Visit of the Cyrce Platform (CNRS campus Cronenbourg)
Nuclear imaging and microCT
David BRASSE

Bus trip & free evening



Friday September 25th

Imaging analysis, tissue sampling, dedicated case studies in mouse pathology

09:00-10:00 Ontologies for imaging analysis in Mouse Pathology
Paul SCHOFIELD

10:00-10:45 Tips and tricks for *in vitro* imaging: routine histology tools and histopathology evaluation to understand disease models (**Changing title**)-Part 1
Colin McKERLIE

Break

11:00-12:00 Tips and tricks for *in vitro* imaging: routine histology tools and histopathology evaluation to understand disease models (**Changing title**)-Part 2
Colin McKERLIE

12:00-12:30 End of the school: Conclusions-Questions-Feedbacks
Yann HERAULT











Lunch (lunch box inside) & departure

This course is also sponsored by



List of speakers

NAME	FIRST NAME	INSTITUT	LOGO
AYADI	Abdel	PHENOMIN-ICS	 phenomin ICS EXCELLENCE IN MOUSE PHENOGENOMICS
BOU ABOUT	Ghina	PHENOMIN-ICS	 phenomin ICS EXCELLENCE IN MOUSE PHENOGENOMICS
BRASSE	David	IPHC, Strasbourg	 IPHC Institut Pluridisciplinaire Hubert CURIE STRASBOURG
BUNTON-STASYSHYN	Rosie	MRC Harwell	 MRC Harwell Institute
CHEDOTAL	Alain	Institut de la Vision	 INSTITUT DE LA VISION
DAVAULT	Philippe	Fujifilm	 VISUALSONICS FUJIFILM
FUCHS	Dieter	Fujifilm	 VISUALSONICS FUJIFILM
GONCALVES	Isabelle	PHENOMIN-ICS	 phenomin ICS EXCELLENCE IN MOUSE PHENOGENOMICS
HERAULT	Yann	PHENOMIN-ICS	 phenomin ICS EXCELLENCE IN MOUSE PHENOGENOMICS
JACOBS	Hugues	PHENOMIN-ICS	 phenomin ICS EXCELLENCE IN MOUSE PHENOGENOMICS
KRAIGER	Markus	GMC	 GMC German Mouse Clinic
LEE	Ho-Young	Seoul National University - KMPC	 SEOUL NATIONAL UNIVERSITY KMPC KOREA MOUSE PHENOTYPING CENTER

LEON	Catherine	EFS, Strasbourg	
LERONDEL	Stéphanie	PHENOMIN-TAAM	
McKERLIE	Colin	TCP	
PO	Christelle	ICUBE, Strasbourg University	
PROCHAZKA	Jan	IMG	
RUBERTE	Jesus	UAB	
SCHOFIELD	Paul	UCAM	
SICARD	Pierre	PHYMEDEXP	
VERNAY	Bertrand	IGBMC	 
WENDLING	Olivia	PHENOMIN-ICS	