

LECTURE SERIES & WORKSHOPS 2023 / Hybrid
**NEXT-GENERATION OF MULTI-OMICS
RESEARCH: GOING TO THE SINGLE CELL**
INFECTION & IMMUNITY



LUXEMBOURG
INSTITUTE
OF HEALTH



14 June
2023

Wednesday
LECTURE

10 am - 11 am

MEET & EAT*

Light lunch provided

12 noon - 1.30 pm



David Gallas Memorial Lecture

Probes, instruments and algorithms
to propel multiscale-multimodal
imaging investigations of the brain
in health and disease

ABSTRACT

A grand challenge of modern biology is to understand mechanisms of molecular, cellular and tissue scale physiology across a daunting range of spatial and temporal scales. Current imaging methods leave significant gaps in our knowledge, limiting our ability to connect information across scales. How multiple methods are now being combined to fill and help bridge critical gaps will be shared; including where recent advances to multi-tilt electron tomography (mtEMT) and development of new probes for correlated light (LM), x-ray microCT (XRM), correlated multi-ion mass spectroscopy imaging (MIMS) and EM (MIMS-EM) and state-of-the-art 3D EM technologies add to our knowledge about structure and function in complex biological systems. Examples of questions being addressed in ongoing research projects will be described to illustrate how development and application of new contrasting methods, imaging tools and data analysis strategies are allowing the observation of otherwise complex or hidden relationships between cellular, subcellular and molecular constituents of cells. For example, how advances in methods apply to ongoing studies on the intact normal brain and to analyze brain cells and synapses during learning (or when cells and issues respond to stressors inducing degenerative brain disorders like Alzheimer's disease) will be shown. Recent accomplishments to be described include determination of the higher order structure and functional organization of chromatin of intact cell nuclei; the analysis of actin-associated structures within specific brain postsynaptic structures "dendritic spines"; as well as analysis of the extracellular matrix (ECM) around multiple types of synapses of mammalian brains. The ECM work explores Roger Tsien's theory (2013, PNAS) postulating that the brain stores life-long memories by locally managing the activity of extracellular proteases to edit ECM and thereby influences the locations and relative strengths of synapses over time scales as long as a life-span.



SPEAKER

Prof Mark Ellisman

Distinguished Professor of Neurosciences; Director, the National Center for Microscopy and Imaging Research (NCMIR), University of California San Diego, La Jolla, California, USA

HOSTS:

Department of Infection and Immunity (LIH)
University of Luxembourg

RESPONSIBLE SCIENTISTS:

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For any questions regarding the Lecture Series please email:
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***Please note that registration is mandatory by sending an email to
michelle.roderes@lih.lu or carole.weis@lih.lu**

Location:

University of Luxembourg
CAMPUS BELVAL
Maison Biotech 2 (BT2)
Room: RIKEN (ground floor)
6, avenue du Swing
4367 Belvaux

Webinar via webex:

JOIN

Event number: 2730 148 1381
Event password: 2PdFsMpr5k2

This lecture will be followed by **Dr Dean Pountney** who will give a talk on "**Neurodegeneration - Tubes, Channels and Iron: Intercellular Connectivity, Glymphatic Clearance and Iron Accumulation in Parkinson's Disease**" hosted by LCSB. Dean Pountney's presentation will take place from **11:00 to 12:00** in the RIKEN room.

JOIN

