3 – 6 June 2025

EMBL Advanced Training Centre and Imaging Centre

INDUSTRY AND COMMUNITY ROOM

ABSTRACTS

WORKSHOP 3

WEDNESDAY | 4 JUNE | 17:10 – 18:10

Abbelight / Massive Photonics

Multiplexed DNA-PAINT Imaging with Abbelight's SAFe System (in collaboration with Massive Photonics)

Presenter(s):

Yashar Rouzbahani - Abbelight, France

Dassine Zouaoui - Abbelight, France

Over the past decade, DNA - Points Accumulation for Imaging in Nanoscale Topography (DNA-PAINT) has emerged as a versatile and robust Single Molecule Localization Microscopy (SMLM) technique, enabling higher spatial resolution than other SMLM techniques through methodological optimization. DNA-PAINT relies on the transient hybridization of complementary oligonucleotides instead of photoswitching of fluorophores to create the blinking needed for SMLM, which mitigates common problems of other techniques, like blinking density or buffer incompatibility. Furthermore, DNA-PAINT incorporates striking multiplexing capabilities, evidenced through numerous applications of Exchange-Paint.

In this workshop, we demonstrate a multiplexing DNA-PAINT workflow, pushing the limits even further by combining Exchange-Paint with Spectral Demixing. For sample preparation, we use the Abbelight DNA-PAINT Kit, which provides optimized reagents for efficient and reproducible labeling and imaging . The key element of this workflow is the Spectral Demixing approach, a ratiometric analysis enabling the separation of spectrally overlapping fluorophores based on their photon emission profiles. Up to three dyes within a closely spaced spectral range can be used simultaneously for imaging using only a single excitation laser and a shared optical path. The result is a streamlined and accelerated imaging strategy that reduces acquisition time, avoids chromatic aberrations, and maintains high spatial resolution with minimal crosstalk.

We will cover:

• DNA-PAINT imaging workflows enhanced by spectral demixing

• Use of the Abbelight DNA-PAINT Kit an easy sample handling

• 3C imaging strategy: combining 2C spectral demixing + 1C sequential acquisition

Schedule

10 min Introduction to DNA PAINT imaging

10 min Introduction to Abbelight Smart DNA PAINT Kit and Safe MN 360

25 min Multi color Spectral Demixing and Exchange DNA-PAINT for multi-color imaging

15 min Summary of the workshop & Questions

Abberior Instruments

Abberior STED-MINFLUX Workshop: Biological Imaging Across Scales

Presenter(s):

Bastian Klußmann-Fricke - Abberior Instruments GmbH, Göttingen

Clara-Marie Gürth - Abberior Instruments GmbH, Göttingen

Ulf Matti - Abberior Instruments GmbH, Göttingen

Biological samples span a vast range of sizes, from millimetre-scale organisms and tissues to nanometre-sized single molecules. Investigating these diverse samples necessitates a suite of optical microscopy functionalities. This includes large fields of view and high working distances for macroscopic specimens, optical compensation for thick tissues, and high resolution for subcellular and in vitro studies. Traditionally, these requirements demanded multiple specialized microscopes. The MIRAVA POLYSCOPE overcomes this limitation by integrating confocal, MATRIX, STED, and MINFLUX modalities into a single versatile platform.

Investigating the nuclear pore complex (NPC) at various levels of detail perfectly illustrates the need for a wide range of microscopy modalities. Confocal microscopy can reveal its cellular-level organization, while super-resolution techniques like STED and MINFLUX unveil its detailed macromolecular arrangement. To highlight the MIRAVA POLYSCOPE's comprehensive features, we will focus on the NPC as a prime example.

This workshop offers participants a unique opportunity to learn how to investigate a single biological structure across several orders of magnitude, spanning from diffraction-limited overviews to true molecular insights. Through hands-on demonstrations on the abberior MIRAVA POLYSCOPE, we will showcase how confocal, STED, and MINFLUX imaging can be strategically employed to answer different questions about the NPC at corresponding scales and resolutions.

Abberior Instruments

Abberior MINFLUX Workshop: 3D and 2 Colour MINFLUX Nanoscopy

Presenter(s):

Ulf Matti - Abberior Instruments GmbH, Göttingen

Clara-Marie Gürth - Abberior Instruments GmbH, Göttingen

Bastian Klußmann-Fricke - Abberior Instruments GmbH, Göttingen

Achieving molecular-scale imaging of protein complexes has long been a goal in the life sciences. MINFLUX nanoscopy addresses this challenge by precisely localizing single fluorophores through sequential fluorescence readout at defined positions surrounding the molecule. The use of a donut-shaped excitation beam enables localization with exceptional precision while minimizing photon requirements and thereby surpasses limits of other super-resolution techniques. Previously, such high-performance microscopy remained largely accessible only to specialized optics experts.

Here, we present the MINFLUX microscope built upon a conventional fluorescence microscope stand, providing this powerful technique for a broader range of users. This system seamlessly integrates ultra-high localization precision with standard experimental workflows, empowering non-experts to readily apply MINFLUX. We demonstrate its capabilities by visualizing intricate structures, such as the nuclear pore complex (NPC), at the nanoscale in three dimensions. Furthermore, through the labelling of different components within this complex, we achieve nanoscale resolution in two colours.

This workshop will provide participants with practical insights into the 3D analysis of biological structures using MINFLUX. We will showcase how two-colour MINFLUX experiments enable the detailed investigation of spatial relationships between different proteins at the nanoscopic level.

Applied Scientific Instrumentation

Fast volumetric imaging with the ASI single-objective light sheet

Presenter(s):

Brian Hake - Applied Scientific Instrumentation

The single-objective light sheet geometry – known in the literature as OPM, SCAPE, SOPi, eSPIM, and SOLS – enables 4D fluorescence imaging of biological samples at high speed and low light dose with conventional sample mounting. In collaboration with Leica Microsystems, ASI first made this transformative technology commercially available in December 2022 with a 40x cell biology configuration designed for imaging cells, tissue cultures, and small organoids at subcellular resolution. We have continued to expand the product line by the addition of a 20x neuroscience configuration with a larger field of view, well-suited to image larger organoids, expanded tissue, and small organisms.

In this geometry, a single sample-facing objective is used for both light sheet illumination and detection, freeing up the sample space compared to other light sheet geometries. In OPM mode, stage scanning and tiling can be performed by moving the sample through the light sheet with an ASI scan-optimized stage allowing for high throughput scanning of extended samples or multi-well plates. In SCAPE mode, the illumination light sheet and detection plane are scanned together at the sample using a galvo (~1ms flyback), and the stationary descanned image is captured by a camera. This scheme allows volumetric imaging at camera-limited frame rates with negligible bleaching and excellent optical sectioning.

This ASI microscope system is flexible, affordable, and easily customized to fit your needs. Data acquisition is supported in Micro-Manager and the system is compatible with most all major laser launches containing a single mode fiber output (400-750 nm) and sCMOS cameras.

In this workshop we will share a brief overview of the technology and currently available systems, as well as an update on recent developments. We also have a functioning system nearby that will be available for viewing during the meeting – come by to learn more!

Bruker / Luxendo GmbH

Acquifer HIVE – Efficient image data workflows: Connecting acquisition with centralized storage and processing

Presenter(s):

Dr. Olaf Selchow, Microscopy & BioImaging Consulting, Germany

Dr. Balint Balazs, Bruker Fluorescence Microscopy, Germany

Modern microscopes generate vast amounts of digital image data, which are typically transferred via internal networks to centralized servers or decentralized workstations for analysis. However, the infrastructure and IT solutions required to manage, transfer, and analyze these large datasets are often complex and costly to maintain, requiring expert support.

To address these challenges, ACQUIFER has developed the HIVE data platform—an easy-to-use, all-in-one solution tailored to meet the IT and networking demands of modern microscopy. This workshop will demonstrate how HIVE streamlines image data workflows from acquisition to analysis.

The HIVE system enables fast, secure, and direct data transfer from multiple microscopes via the HIVE NET to a centralized storage unit (HIVE DATA). Once stored, the data can be accessed remotely by multiple users for analysis using the high-performance HIVE CORE processing unit. The CORE module combines powerful hardware with the familiar and user-friendly Windows server environment, supporting efficient image visualization and analysis.

We invite you to bring your own laptop and image data to the session. With preinstalled software from various vendors, you'll have the opportunity to experience server-based image analysis workflows firsthand.

Cairn Research

Cairn Research Ltd Diamond Digital Micromirror Device Technology and Applications

Presenter(s):

Daniele Love - Cairn Research Ltd

Digital micromirror devices (DMDs) offer a powerful approach to the interrogation of biological samples, enabling dynamic, real-time adjustments for optogenetics experiments and photo-stimulation applications, including photoactivation, uncaging, and photobleaching. In this application talk we introduce the Diamond DMD from Cairn Research Ltd, which advances established DMD technology to deliver precise, dynamic and customisable light delivery with transmission from 400nm to 770 nm for advanced photokinetic and optogenetic applications. The Cairn Research Diamond DMD is compatible with a wide range of microscope stands. In this example, the Diamond DMD is coupled to the Cairn Research Ltd openFrame, a powerful and stable modular microscopy system developed in partnership with Paul French, Imperial College London.

The Cairn Research openFrame provides a flexible and future proofed solution, built from multifunctional modules that can function as illumination or detection layers. Modular layers also allow horizontal branching from the optical axis in order to split or combine light within the microscope, offering novel opportunities for multi-modal image acquisition. Cairn Research Ltd is the pioneer of image splitting technology, enabling simultaneous imaging of multiple wavelength, polarisation, or z-depth channels for use with one or more camera sensors using our OptoSplit and TwinCam technology. Through its expandable design, the Cairn openFrame ensures that initial cost can be kept low by enabling users to buy only the modules required, and to expand their openFrame imaging platform as and when research goals, budget or imaging requirements develop over the course of a project. Through our modular design, the Carin Research openFrame achieves this without ever compromising on the highest standards of optical design and performance.

Carl Zeiss Microscopy Deutschland GmbH

Lightfield 4D - Keeping pace with the pulse of life

Presenter(s):

Dr. Sven Poppelreuther, Carl Zeiss Microscopy Deutschland GmbH, Germany

LSM 990 and 910 – One imaging platform. Endless possibilities

Life moves. Many neuronal and physiological processes occur at very high speeds, making it difficult to accurately capture their spatiotemporal dynamics. Although established technologies have become faster, the required acquisition time still increases with sample volume. So, fast processes like neuronal activity or heartbeats require a trade-off between volumetric information and image frame rate. With Lightfield 4D, you no longer must compromise, as you can capture up to 80 volumes per second without time delay in 3D. This makes it possible to follow neuronal activity in zebrafish brains, track tissue movement in developing Drosophila embryos and keep track of moving structures in crawling C. elegans larvae.

The unique one-snap-one-volume acquisition of Lightfield 4D minimizes light exposure and allows to efficiently acquire thousands of volumes over extended periods of time without harming your sample. Reach new heights of productivity with the ability to capture multi-color images at multiple positions within or between whole organisms, organoids or spheroids, in a single acquisition run.

As an integrated part of ZEISS LSM 990 or 910 systems, Lightfield 4D lets you effectively combine its fast volumetric imaging with any other LSM acquisition method: involving photomanipulation, super-resolution, spectral, and even molecular dynamic data can be added to each live imaging session.

In our workshop, we will give you the opportunity to experience to capture all 3D information with up to 80 volumes per second. We will show how you can draw scientific conclusions from this new unique volume data by utilizing the 3D algorithms of ZEISS arivis pro.

LSMs are one of the most complex high-end microscopy systems – providing a great variety of options. Microscopy Copilot, your personal AI assistant, helps you to interactively discover new possibilities for your imaging experiments, constantly evolve your research and exploit the potential of your specific LSM system configuration. We will show you this new path to immediate support by ZEISS in times of increasing numbers of microscopy technologies and reduced time to publication.

Chip NanoImaging

Ultra-Large-Field-of-View Imaging Using Innovative Photonic Chip Technology

Presenter(s):

Merete Storflor - Chip NanoImaging, Norway

Luis Villegas - Chip NanoImaging, Norway

Jon Kristian Hagene - Chip NanoImaging, Norway

Explore the full complexity of biological processes with the largest uniform field of view available. Chip NanoImaging offers multi-channel TIRF imaging at the millimeter scale, delivering exceptional signal-to-noise performance through high refractive index contrast. Our multimode waveguide technology is seamlessly integrated into the sample carrier, providing tight light confinement, high intensity, and a flat illumination profile - ideal for super-resolution imaging. Our bio-compatible carriers are well-suited for both live and fixed cell imaging as well as for use with tissue sections. Further, our landmarked carriers enable robust correlative microscopy workflows. The system also integrates EPI fluorescence with advanced post-processing tools for 2D/ 3D deconvolution, along with GPU-accelerated reconstruction software for single-molecule localization microscopy (SMLM) data. Its versatility makes it ideally suited for studying membrane dynamics and drug interactions with precision and ease.

Join our workshop and experience how advanced photonic chip-based TIRF increases the power of imaging techniques like SMLM - by allowing for super-resolution imaging across ultra-large fields of view. For those interested, we can also demonstrate on-chip histology. We will also showcase our user-friendly reconstruction software, designed to efficiently reconstruct large datasets, ensuring a seamless and high-performance imaging workflow.

Community room workshop

Biomero - orchestrating fair workflows in omero

Presenter(s):

Torec Luik - Amsterdam UMC - The Netherlands

Maarten Paul - Leiden University Medical Center (LUMC) - Netherlands

In this workshop, we will show the audience how to work with BIOMERO, including a demo of the latest features like database and web UI integration.

BIOMERO (bioimage analysis in OMERO) is a bridge connecting OMERO, a renowned bioimaging data management platform; FAIR workflows; and high-performance computing (HPC) environments. BIOMERO facilitates seamless execution of FAIR workflows, particularly for large datasets from high-content or high-throughput screening. BIOMERO empowers researchers by eliminating the need for specialized knowledge, enabling scalable image processing directly from OMERO. BIOMERO notably supports the sharing and utilization of FAIR workflows between OMERO, Cytomine/BIAFLOWS, and other bioimaging communities.

Expect to learn:

What is BIOMERO

How to setup BIOMERO on your own laptop

How to run workflows with BIOMERO

How to package a workflow for using with BIOMERO

Example: How to work with multi-dimensional segmentation

And much more.

Audience can work along if they bring a (windows) laptop with Docker and Git, or just spectate.

This work is part of the NL-Bioimaging-AM, NWO National Roadmap for Large-Scale Research Infrastructure of the Dutch Research Council (NWO 184.036.012). One of the central aims of the Netherlands Bioimaging initiative is to develop an infrastructure and common services for creating and utilising FAIR (Findable, Accessible, Interoperable and Reusable) bioimaging research.

Community room workshop

Measuring and monitoring the PSF of a microscope

Presenter(s):

Ioannis Alexopoulos - Justus Liebig University Giessen - Germany

Yury Belyaev - University of Bern - Switzerland

Orestis Faklaris - French National Centre for Scientific Research (CNRS) - France

Laure Plantard - FMI for Biomedical Research - Switzerland

The Point Spread Function (PSF), which describes the response of an optical system to a point source, is a key quality control of a microscope. Regular measurements, conducted with consistent tools, methods, and protocols, along with the calculation of robust metrics enable the monitoring of the microscope performance and therefore ensure better reproducibility of scientific experiments. During this workshop, we will show briefly how to prepare a bead slide, how to perform an acquisition, and finally how to analyze the PSF with open-source tools (1, 2). We will give some tips to troubleshooting PSFs that have an abnormal shape or are far from the theoretical expected size. We will also demonstrate the upload the analysis results to OMERO, a database that will help monitoring PSF in time. We will use the protocols and metrics that are defined in the framework of the QUAREP-LiMi consortium's WG5 (3).

1. Faklaris O., et al. “Quality Assessment in Light Microscopy for Routine Use through Simple Tools and Robust Metrics.” Journal of Cell Biology 221, no. 11 (2022): e202107093. https://doi.org/10.1083/jcb.202107093.

2. https://github.com/MontpellierRessourcesImagerie/MetroloJ_QC3. Nelson G., et al. Protocolos.io, Monitoring the point spread function for quality control of confocal microscopes , dx.doi.org/10.17504/protocols.io.bp2l61ww1vqe/v1

CrestOptics

Multiplexed Confocal Imaging: A High-Throughput Approach to Deciphering Spatial Omics

Presenter(s):

Francesco Bacchi - Business Development Manager EMEA, CrestOptics Spa

Greg Perry - Business Development Manager EMEA, CrestOptics Spa

Understanding the spatial relationships between various molecular markers in complex tissues, such as the whole brain, is fundamental to unraveling the principles of brain function and disease. This workshop will showcase a multiplexed imaging strategy employing CrestOptics' X-Light V3 and DeepSIM for high-content analysis of whole brain slices. X-Light V3 facilitates rapid acquisition of large volumetric datasets, enabling the simultaneous visualization of multiple markers across the entire tissue. DeepSIM is then used to resolve subcellular details within these multiplexed datasets, providing crucial information on protein localization and interactions. This workflow offers a powerful tool for spatial omics studies, linking molecular identity to cellular and tissue context.

CSR Biotech

MI-SIM Advanced: Mastering Intelligent Features for Super-Resolution Live-Cell Imaging

Presenter(s):

Christiaan Stuut - CSR Biotech, Heidelberg, Germany

Jinqing Wang - CSR Biotech, Guangzhou, China

Shutang Zeng - CSR Biotech, Guangzhou, China

Take your live-cell microscopy to the next level with an in-depth exploration of the MI-SIM system and its powerful IMAGER software. Building upon the fundamentals of super-resolution imaging, this workshop focuses on leveraging intelligent software features and smart hardware design to streamline complex experiments and maximize data acquisition efficiency.

The core of this advanced workshop lies in mastering the intelligent capabilities of the IMAGER software. Discover how to seamlessly stitch large fields of view captured with the MI-SIM, learn how to keep your sample in the center of your field of view using Tracker, and explore the event detection built into the IMAGER software. Furthermore, we will delve into the Acquisition Workflow module, showcasing how to design and execute sophisticated, multi-dimensional experiments with precise control over acquisition parameters, time-lapse settings, and triggering events. Learn how to automate complex imaging routines to enhance reproducibility and throughput.

This workshop is ideal for researchers already familiar with the basics of SIM microscopy who are looking to optimize their experimental design and analysis using the advanced features of the MI-SIM and IMAGER software. Get a sneak peek at the integrated potential of the IMAGER software for handling multiple imaging modalities, a key aspect of our next-generation SIM-Supreme system.

EVIDENT Europe GmbH

Pushing the limit of spinning disk confocal with the IXplore IX85

Presenter(s):

Wojciech Brutkowski, Evident Europe

Advancements in spinning disk confocal microscopy are unlocking new frontiers in live cell imaging and high-speed volumetric acquisition. Explore at ELMI 2025, how IXplore™ IX85 with an industry-leading 26.5 FOV across two integrated imaging ports, redefines the potential of confocal research by integrating cutting-edge innovations designed to enhance usability, stability and resolution.

Experience seamless and efficient workflows supported by AI-based macro-to-micro imaging, auto-correction collar and intelligent shading correction. Learn, how our revolutionary LUPLAPO25XS silicone gel objective enhances organoid imaging and multi-well plate screening, providing deeper insights, more stable time-lapse imaging and precise data with ease.

Paired with spinning disk technology, the IXplore IX85 offers a powerful solution for advanced imaging. Researchers can now achieve higher resolution, improved signal-to-noise ratios, and enhanced reproducibility with minimal manual intervention. With a system built for adaptability and precision, the IX85 ensures that confocal imaging workflows are faster, more reliable, and capable of delivering unprecedented insights into complex biological systems.

Leica Microsystems

Viventis Deep: Open top multi sample dual view light sheet microscope for live imaging of large multicellular systems

Presenter(s):

Andreas Fulterer - Leica Microsystems, Germany

Andrea Boni - Leica Microsystems, Germany

Visualizing the dynamics of individual cells to understand the underlying mechanisms shaping complex tissues is an overarching goal in cell and developmental biology.

However, visualizing single cells in the innermost layers of large 3D multicellular systems like developing model organisms or 3D cell culture systems including spheroids or organoids is challenging, mainly due to light scattering causing poor penetration. In addition, understanding complex processes in these samples often requires crossing large spatiotemporal biological scales. Due to its high spatiotemporal resolution and low phototoxicity light sheet microscopy should be the method of choice for imaging of large living samples [1].

In this workshop we present Viventis Deep, an open-top dual-view and dual-illumination light-sheet microscope purposefully designed for live imaging of large specimens at single-cell resolution. The configuration of objectives together with a customizable multi-well mounting system combines for the first time dual view light sheet imaging with multi-position imaging.

We will show the easiness of Viventis Deep imaging workflow from system alignment, sample mounting, time-lapse acquisition and downstream visualization/analysis with AIVIA software.

References

[1] J. Huisken, J. Swoger, F. Del Bene, J. Wittbrodt, and E. H. K. Stelzer, “Optical Sectioning Deep Inside Live Embryos by Selective Plane Illumination Microscopy,” Science, vol. 305, no. 5686, Art. no. 5686, Aug. 2004, doi:10.1126/science.1100035.

[2] Moos, F., Suppinger, S., de Medeiros, G. et al. Open-top multisample dual-view light-sheet microscope for live imaging of large multicellular systems. Nat Methods 21, 798–803 (2024). https://doi.org/10.1038/s41592-024-02213-w

Lyncée Tec

Fast, Label-Free, Live-Cell Analysis with Digital Holographic Microscopy

Presenter(s):

Benjamin Rappaz

Head of Life Sciences

Lyncée Tec, Lausannne, Switzerland

Digital Holographic Microscopes (DHM®) by Lyncée Tec offers a fast, label-free, noninvasive imaging approach based on quantitative phase measurements. This technique enables real-time monitoring of living cells, providing metrics such as cell morphology, dry mass, and intracellular dynamics without the need for exogenous labels or dyes. Thus, allowing to quantify cell health status and ongoing bioprocesses without perturbing your cells.

In this workshop, we will present the principles and key applications of DHM® in life sciences:

Quantitative analysis of morphology, proliferation, and cytotoxic responses

Applications for high-content screening and long-term live-cell monitoring

4D tracking of live cells

The system offers multi-objective support (2.5x to 100x), a large field of view (up to 1.3 mm at 5x), and fast acquisition speeds (up to 194 fps), allowing robust and scalable live-cell imaging. DHM® can also be correlated with fluorescence for simultaneous recording and correlative studies.

Case studies and live demonstrations will illustrate how DHM® enables reproducible, high-throughput analysis of cellular processes, with minimal perturbation to the biological system. The session is intended for researchers seeking robust, quantitative, and label-free imaging methods for live-cell studies.

More info:

www.lynceetec.com

benjamin.rappaz@lynceetec.com

Nikon Europe BV

From samples to easy results with Artifical Intelligence

Presenter(s):

Isabelle Delias - Nikon Europe BV

Pierre-Emmanuel Monet - Nikon Europe BV

Image analysis have been simplified in recent years by the development of Artificial Intelligence/Machine Learning/Deep Learning tools.

The complete workflow from the sample to results is now simplified but different precautions and understanding are necessary to get the best out of these innovative tools. During this workshop, we will discuss how to acquire all the necessary images to use those tools, how to create the ground truth used for training and how to ensure that the results are correct with different validation tools.

During the workshop you will have the opportunity to practice and be able to use some of the different AI tools integrated within Nikon NIS-Elements software and create your own deep learning network within a few minutes:

- Segment objects in fluorescence (Segment.ai) or use the brightfield images as label-free imaging for segmentation

- Pre-process the images in order to improve segmentation results (Clarify.ai, Denoise.ai, Enhance.ai, Convert.ai):

Cells: HeLa/Fucci(SA) RCB4917, RIKEN BioResource Research Center

The binary objects show cells in different stages of the cell cycle:

Yellow : G1-S phase

Red: G1 phase

Green: late S, G2 and M phase

NIS.ai webpage: https://www.microscope.healthcare.nikon.com/en_EU/products/software/nis-elements/nis-ai-1

Ji application notes using AI: https://www.microscope.healthcare.nikon.com/en_EU/products/digital-microscopes/eclipse-ji/application-notes

ONI

Everything Extra-cellular Vesicles! – Harness the power of ONI super-resolution expertise to characterise your EV's with ease

Presenter(s):

Dr. rer. nat. Nensi Alivodej - Field Application Scientist, EU - nalivodej@oni.bio

Pip Timmins - Sales Executive - phillipa@oni.bio

Everything Extra-cellular Vesicles! – Harness the power of ONI super-resolution expertise to characterise your EV's with ease

The Nanoimager is a compact and state-of-the-art microscope, offering quantitative analysis for localization-based imaging (dSTORM and PALM), single-particle tracking and single-molecule FRET.

The Nanoimager is designed to operate on a standard lab bench and has a footprint smaller than a piece of A4 paper, making it more accessible to researchers.

Exosomes and other extracellular vesicles (EVs) play key roles in cell-to-cell communication. EVs can cross biological barriers (such as the blood-brain barrier) and get internalized into the cell with a high degree of specificity. Thus, they are an ideal candidate for novel drug delivery methods and disease diagnostics. This workshop focuses on recent progress in fluorescent super-resolution imaging and characterization of extracellular vesicles using the Nanoimager and our new range of reagent kits, automated data acquisition and software tools.

This workshop is intended for people working with EV's, exosomes, lipid nanoparticles or with interest in related fields. During this work we will demonstrate that the ONI Nanoimager can acquire, image and analyse the complete work flow in a fully automated way!

Workshop attendees will receive a 10% discount voucher to be redeemed against the purchase of an EVP2 Profiler Kit.

Oxford Instruments

Unlock the Potential of Microscopy Images with AI-Enhanced Analysis in Imaris 10.2

Presenter(s):

Julia Schweizer - Oxford Instruments

In this presentation, we will explore how the AI segmentation and classification tools in Imaris 10.2 can revolutionize your microscopy image analysis. This version features a Trainable Pixel Classifier, integral to its robust big-data segmentation model, capable of efficiently handling large datasets (hundreds of GBs) and enabling training on thick slices to visualize complex biological structures.

Imaris 10.2 facilitates advanced 3D visualization and analysis of various cell types, including neurons microglia, as well as subcellular components like the cytoskeleton, nuclei, and Golgi apparatus, along with organoids and blood vessels. The software automatically generates morphology measurements to enable comparisons across experimental conditions, investigates interactions between cells and organelles, and calculates distances and colocalization metrics.

For live-cell and time-lapse imaging, Imaris 10.2 excels in tracking dynamic objects, including dividing cells, allowing for comprehensive studies of morphological changes and interactions over time. Furthermore, with enhanced visualization speeds—twice as fast as previous versions—Imaris 10.2 significantly improves user interactivity. This version is available natively for both PC and Apple M platforms, making it a versatile tool for researchers.

Learn how ease of use can be combined with complex image analysis and sophisticated multi-step image analysis workflows. Imaris will become a game changer in your lab or imaging facility, providing all the image analysis tools needed from the moment of data acquisition to publishing a paper, including deconvolution, visualization, object detection, analysis and plotting - for data exploration and group comparisons.

PhaseView

Ultra-thin Light Sheet Microscopy Providing Multi-user Experience Combined with Automated Multi-scale Imaging Capabilities

Presenter(s):

Igor Lyuboshenko - PHASEVIEW

Alpha3 Facility Edition is an automated light sheet microscope designed for imaging facilities and research laboratories. It integrates key technologies to deliver ultra-thin light sheet thickness and a multi-user experience, from rapid sample screening to high-resolution image acquisition of fixed or live samples and whole cleared specimens. The system offers a seamless multi-scale imaging experience for diverse applications, enabling multiple users to observe the same sample at various scales without compromising imaging resolution.

As a fully automated system, the Alpha3 Facility Edition configures itself when changing magnification, allowing users to focus on capturing images. It recovers all settings and calibration parameters, providing a personalized multi-user and multi-application experience. Intelligent illuminators coupled to a wide-field detection microscope ensure maximum homogeneous light coverage for both small and large samples. Illumination from both sides simultaneously covers the maximum area of the sample. Observation is possible through oculars and with a camera.

The system features an extended working distance and objectives with high numerical aperture, providing a very thin optical section with optimized sharpness. It allows varying the orientation of the sample sectioning plane within the specimen, maintaining homogeneous image sharpness over the entire field of view. It automatically configures lenses for illumination and detection, optimizing image quality and ensuring excellent colocalization of images acquired with multi-wavelength light beams, thanks to the dynamic focusing module.Alpha3 Facility Edition offers advanced capabilities in light sheet microscopy, providing a versatile and automated solution for multi-user environments and diverse imaging applications. You are welcome to join us to explore these innovative features and discuss potential collaboration opportunities to further advance your research.

PicoQuant GmbH

Monitoring of dynamic processes: An easy and reliable way to perform single molecule FRET and FCS measurements

Presenter(s):

Isabel Gross - PicoQuant GmbH

Mathias Bayer - PicoQuant GmbH

Single molecule studies and – more specifically – single molecule FRET methodologies have become a standard tool for studying dynamic structural changes in proteins and nucleic acids. These types of measurements can reveal dynamic events on time scales covering several orders of magnitude from ~ns to several seconds. This allows studying e.g., chain dynamics, binding, folding, allosteric events, oligomerization, and aggregation. The power of these methodologies is highlighted by the study of Intrinsically Disordered Proteins (IDPs) whose biological relevance has been increasingly studied over the recent years.

In this workshop we will showcase how easy it is for new users to perform single molecule measurements on two model systems:

a) doubly labeled freely diffusing short oligonucleotides and

b) Cy5 molecules immobilized on the coverslip surface

Several online previews enable users to immediately judge sample and data quality. All correction parameters necessary to obtain FRET efficiency vs. stoichiometry histograms are automatically determined online, requiring no interaction from the user. The algorithm employs methodologies benchmarked by the scientific community.

Furthermore, we will show how the variable PSF feature can be used in smFRET and FCS measurements to fine-tune the observation window of freely diffusing biomolecules.

Thermo Fisher Scientific

Leveraging Amira Software's AI capabilities for advanced image analysis and optical image segmentation

Presenter(s):

Sarawuth Wantha - Amira Software - Thermo Fisher Scientific

It is crucial for scientists and imaging experts to comprehend complex biological structures through image visualization and analysis. Imaging data serves as a valuable tool for understanding cellular architecture and processes. However, analyzing data from multiple imaging systems and modalities can be a challenging endeavor. Each experimental setup presents unique challenges, and multi-scale dynamic processes necessitate the detection of objects of various sizes, ranging from diffraction-limited particles to entire cells. Identifying and quantifying sub-cellular structures within datasets, which may contain anywhere from a few dozen to tens of thousands of objects, can be overwhelming.

Given the growing need for advanced analytical tools, researchers require image processing software that enables fast, high-quality visualization, effective processing, and accurate data analysis to expedite their workflows.

Thermo Scientific Amira Software is a powerful, comprehensive, and versatile solution designed for visualizing, segmenting, and understanding life science and biomedical images. It allows researchers to explore complex biological data in 3D, which would be impossible to fully comprehend with 2D images alone.

Amira Software empowers researchers to gain a deeper understanding of their image data. With its user-friendly interface and comprehensive tools, users can streamline their workflows and dedicate more time to advancing the field of optical imaging. The intuitive, flexible, and customizable "visual programming" workflow ensures accurate and reliable results.

Enhancing its segmentation capabilities, Amira Software now incorporates artificial intelligence for imaging and analysis applications. AI methods, such as deep learning, have proven to be powerful tools for improving resolution, reducing noise, and automating segmentation. The integration of AI-based deep learning represents a significant advancement for Amira Software solutions. This approach ensures that your analysis is repeatable across specimens, making future image segmentation independent of manual processing or user-based variability often encountered in manual annotation tasks.

Tomocube Inc.

Holotomography : the next imaging breakthrough is unlabeled

Presenter(s):

Bruno Combettes - Tomocube Europe, Germany

Daniel Ghete - Tomocube Europe, Germany

"No stains. No labels. Just truth. See what you've been missing."

Label-free holotomography is redefining the way we explore live cells in 3D. By harnessing refractive index as intrinsic contrast, this cutting-edge technique enables high-resolution, quantitative imaging without the need for fluorescent dyes or stains. This workshop will introduce the fundamentals of holotomography, showcase applications in live-cell and tumoroid imaging, and provide insights into how it can complement your existing microscopy toolbox.

Whether you're managing an imaging facility or looking for new approaches in your research, this is your chance to discover the full potential of label-free imaging.

The showcased setup integrates holotomography with the CrestOptics spinning disk confocal module, giving you the best of both worlds — intrinsic contrast and molecular specificity, all in real time. Holotomography reveals structure and dynamics without labels. Spinning disk confocal adds molecular context with high-speed fluorescence imaging. Together, they offer a unique correlative approach — where cellular truth meets targeted insight.

그들은 함께 Cellular Truth가 목표 통찰력을 충족시키는 독특한 상관 접근법을 제공합니다.

Visitron Systems GmbH

Smart Imaging – Feedback Microscopy with VisiView Software

Presenter(s):

Dr. Marcel Dunkel - Sales and Application Support - Visitron Systems GmbH Puchheim

Dr. Andreas Babaryka - Sales and Application Support - Visitron Systems GmbH Puchheim

Since the early days of fluorescence imaging, many microscopists have spent much of their time looking through eyepieces, searching for and observing cells. Over the last few decades, microscopes have become digital and observation routines have become automated. However, this automated imaging has been far from flexible or adaptive. In this workshop, we will show how VisiView uses AI analysis and feedback to make imaging truly intelligent, reducing the time spent using the microscope, the workload of the researcher and minimising the amount of data that needs to be stored.