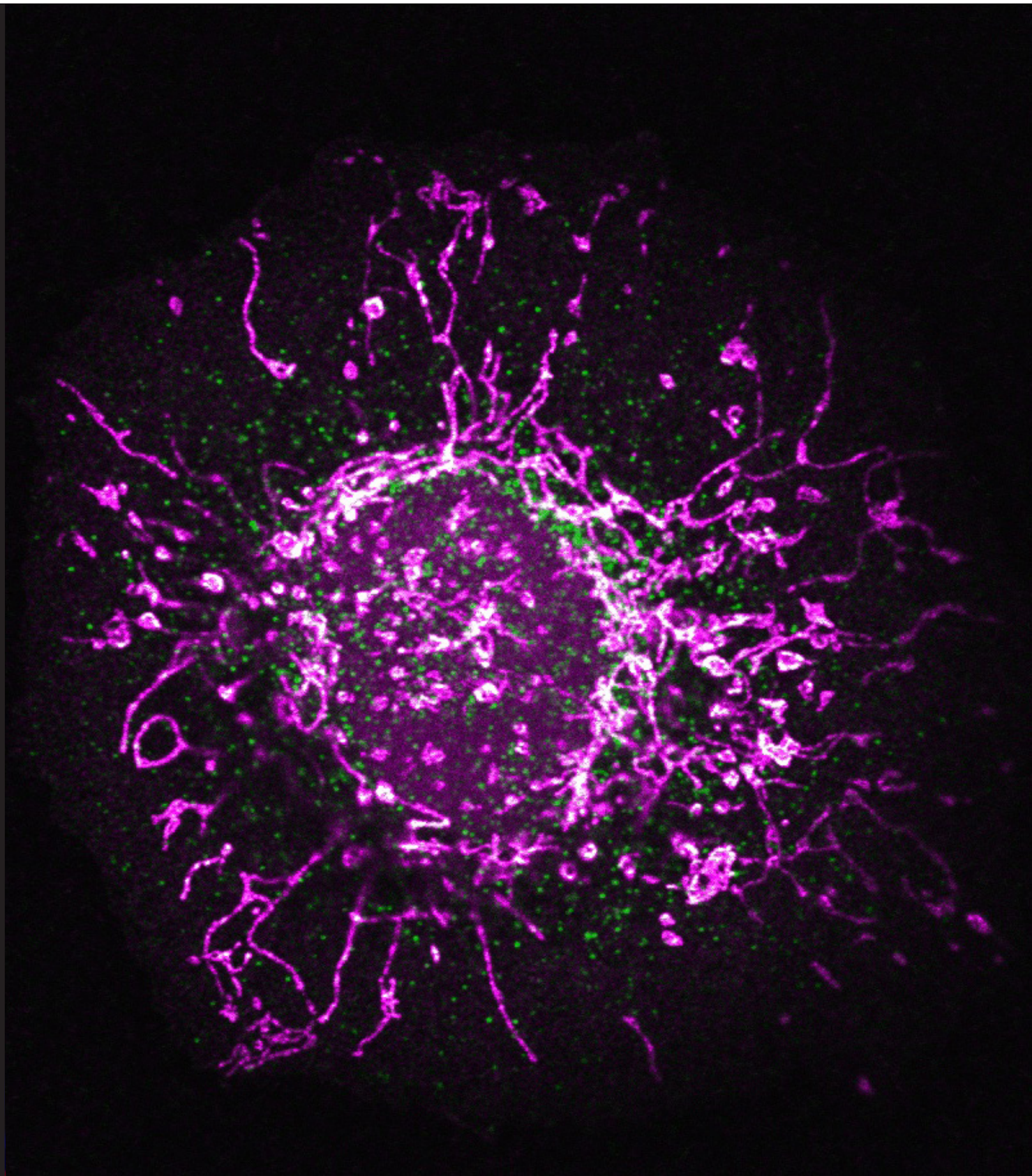
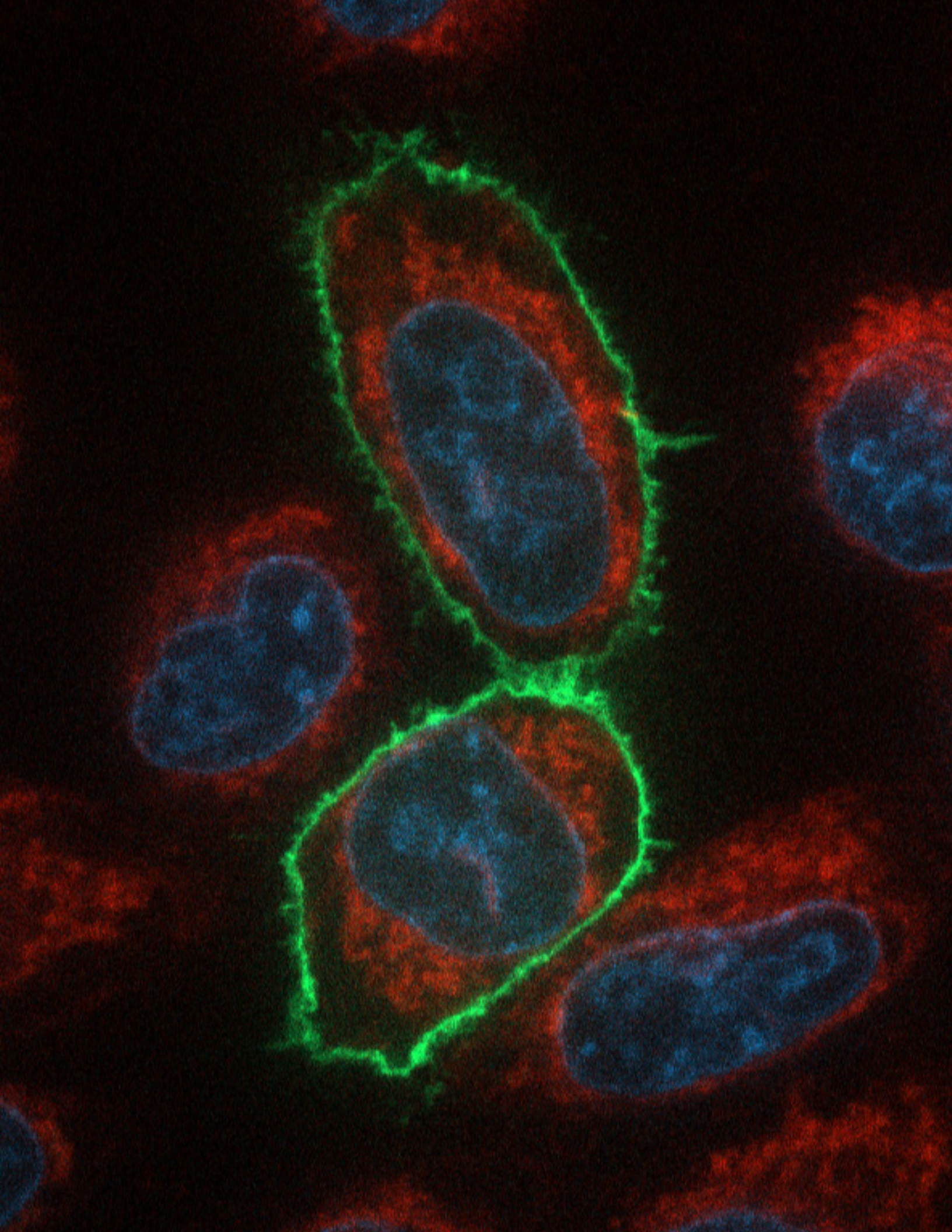
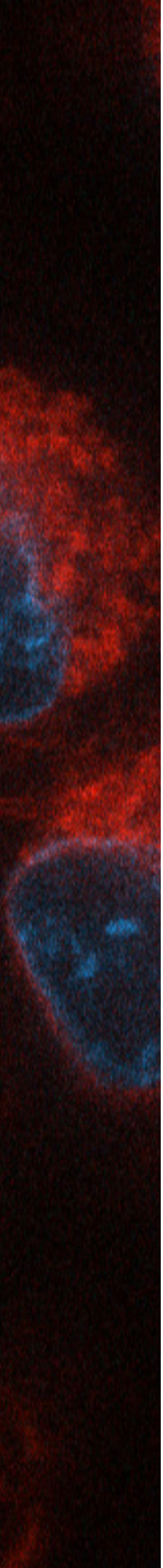
DANISH BIOIMAGING SYMPOSIUM 2025

AUDITORIUM - UNIVERSITY OF ROSKILDE - 11-12 JUNE







DANISH BIOIMAGING SYMPOSIUM 2024

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WELCOME MESSAGE

Welcome to the 8th Danish Bioimaging Scientific Symposium, Roskilde University, 2025.

Dear DBI Symposium Participants,

On behalf of the organizing committee, it is with great pleasure that I welcome you to the 8th Danish BioImaging Scientific Symposium.

Over the next two days, we would like to facilitate the creation of consortiums bridging technology development research with bioimaging core facility professionals.

In the past two decades, the evolution of imaging technologies has wielded a transformative influence on life sciences. As we experience a bioimaging technology renaissance, the pace at which new technologies, methods, and applications appear makes it difficult for life scientists to keep up to date. A close interaction and collaboration between life scientists, technology developers and technology experts has become an essential new interface in innovative sciences.

The focus of the 8th Danish BioImaging Symposium is to

" create space and oportunities for interdisciplinary interactions and collaborations between three key communities; technology developers, bioimaging experts working at technology platforms, and life scientists using bioimaging technologies to excel and discover"

We would like to take the opportunity to thank our commercial sponsors, and to thank you all in advance for your active participation and essential contribution to this community and meeting.
We hope you will be inspired by the program, meet new collaborators, and work together to raise funds and resources to democratize access to innovative methods and technologies in Denmark.

On behalf of the organizing Scientific Committee, we extend our warm regards.

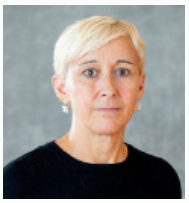
CLARA PRATS
DBI DIRECTOR

ORGANISING COMMITEE

Roskilde University
Denmark

UNIVERSITY OF
COPENHAGEN

Pia Nyeng
DBI INFRA Executive board
Associate Professor
Roskilde University



Clara Prats
DBI-INFRA Director
Associate Professor
University of Copenhagen

Pratik Shah
Associate Professor
Roskilde University

Sonia Diaz Garcia
Danish BioImaging Infrastructure
University of Copenhagen
Faculty of Health and Medical Sciences

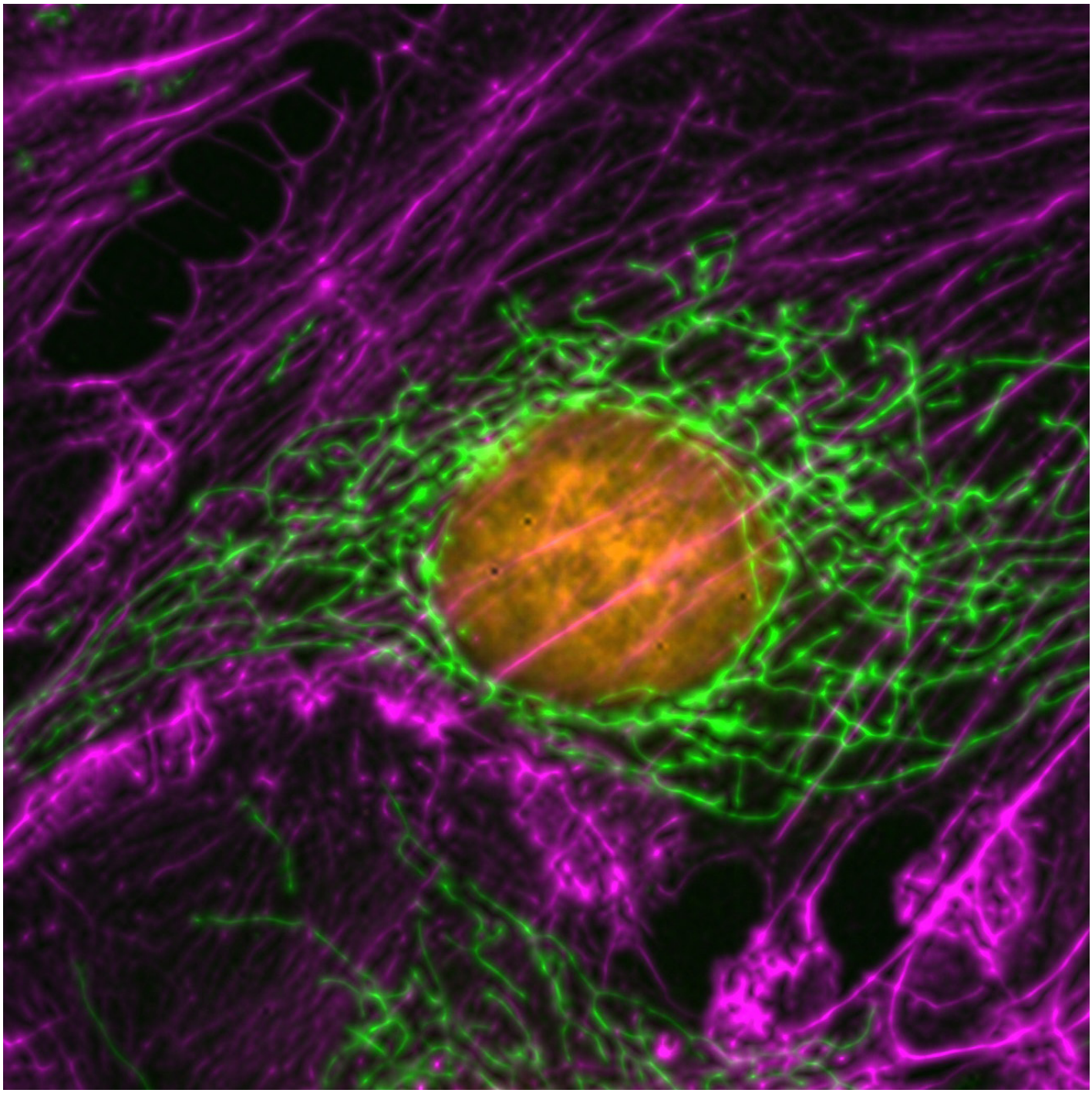
Ole Vang
Associate Professor
Roskilde University

Jacqueline Van Hall
Secretary
University of Copenhagen
Faculty of Health and Medical Sciences
Core Facility of Integrated Microscopy (CFIM)

Rikke Agerskov
PhD Researcher
Roskilde University

Marco Lolaico
Postdoc
Roskilde University

PROGRAM



PROGRAM 11TH JUNE

11 Jun 2025 | 12 Jun 2025

09:00

Registration and Coffee

10:00

Welcome - Susanne Sørensen, Dean of Natural and Mathematical Sciences at Roskilde University - Pia Nyeng, Lektor /Ole Vang, Lektor, Institut for Naturvidenskab...

Session 1: New developments in Bioimaging research models and detection...
Ole Vang,Roskilde University
Chair for the First Session

11:00

- **10:30 - 10:45 Talk by Bo Wegge Laursen, Professor, Department of Chemistr...**
- **10:45 - 11:00 Talk by Victoria Birkedal, Associate Professor, Interdisciplinary ...**
- **11:00 - 11:15 Talk by Javier Martin Gonzalez, Manager of the Transgenic Core ...**
- **11:15- 11:30 Talk by Pratik Shah, Associate Professor, Roskilde University**

Session 1: Panel Brainstorming

12:00

Lunch

13:00

Session 2: New developments in bioimaging systems.
Pratik Shah, Roskilde University
Chair for the Second Session

- **13:00 - 13:15 Talk by Aimilia Nousi, Facility Manager, Center for 4D Cell Dyna...**
- **13:15 - 13:30 Talk by Emil Boye Kromann, Group leader, Associate Professor D...**
- **13:30 - 13:45 Talk by Guillermo Sergio Moreno Pescador, Assistant professor, ...**
- **13:45 - 14:00 Talk by Martin Aage Barsøe Hedegaard, Associate Professor, Un...**

14:00

Panel Brainstorming

Break

Session 3: Image data management and new developments in biological Im...
Rebecca Engberg, Center Manager for Center for Quantification of Imaging Data from MAX IV (QIM), DTU
Chair for the third session

15:00

- **14:45 - 15:00 Talk by Tricia Loo, DBI INFRA Image Analysis Core Facility (IACF)**
- **15:00 - 15:15 Talk by Jon Sporring, Professor, Image Analysis, Computational ...**
- **15:15 - 15:30 Talk by Ingegerd Wirehed, HSC Project Lead, Lund University an...**
- **15:30 - 15:45 Talk by Hannah Mihai, Data Management Consultant, DeiC**

16:00

Panel Brainstorming

Break

Panel of Facilities - Talk by Thomas Hartig Braunstein, Core Facility Manager

17:00

Poster session and company stands with drinks

18:00

Dinner - CAFÉ KORN TREKRONER
https://cafekorn.dk/cafe-korn-trekroner-2/

19:00

20:00

PROGRAM 12TH JUNE

11 Jun 2025 | 12 Jun 2025

08:00

Welcome and Coffee

09:00

Collaboration consortium...

Breakout room 1
Bioimaging technology uptake into facilities

Breakout room 2
Method and tool developments uptake into Core Facilities

Breakout room 3
Creation of a national image repository & cloud HPC analysis

10:00

Break

11:00

Presentation and discussion of research ideas from the three breakout rooms in plenum

12:00

Lunch and Symposium closure by Pratik Shah

13:00

DBI Panel of facilities physical meeting - Open to all core facility staff

14:00

15:00

Image Analysis Open Office

The DBI-INFRA Image Analysis Core Facility will be attending the 8th Danish BioImaging Symposium at RUC. During the second day of the symposium, the team will provide free consultation sessions for life scientist with bioimage analysis questions. Our team will provide you with guidance on your bioimage analysis problems and you will also have a chance to learn from the questions of your peers.

16:00

17:00

Places for consultations are limited, register now to indicate your interest! Selected participants will be notified of their successful registration via email shortly after sign-ups close on 6th June 2025.

INVITED SPEAKERS

SESSION 1

NEW DEVELOPMENTS IN BIOIMAGING RESEARCH MODELS AND DETECTION METHODS

New fluorescent labels, probes and nanoparticles

10:30 - 10:45 Talk by Bo Wegge Laursen,
Professor, Department of Chemistry, University of Copenhagen

The talk will be a brief overview of our work on development of:

- Fluorescent dyes with long (20 ns) fluorescence lifetimes and their use for time-gated imaging, FLIM, and anisotropy assays.
- New fluorescent probes for weak bases such as, phosphate and glutamate
- Ultra bright nanoparticles with tunable emission wavelengths and fluorescence lifetime
- Chiral dyes for circular polarized detection and imaging

Single molecule fluorescence imaging and analysis

10:45-11:00 Talk by Victoria Birkedal
Associate Professor, Interdisciplinary Nanoscience Center, Aarhus University

Single molecule fluorescence encompasses a range of powerful approaches for bioimaging and to quantify molecular events in real time. The talk will give an overview of our experimental and data analysis work, including studies of biomolecular conformations, interaction and dynamics as well as multi-color cellular imaging.

Genetically modified models for Bioimaging – The Transgenic Core Facility at KU

11:00 - 11:15 Talk by Javier Martin Gonzalez,
Manager of the Transgenic Core Facility, University of Copenhagen

As an alternative to immunostaining, genetic modification of cells and mouse embryos to endogenously express fluorochromes and other biomarkers is a powerful tool to generate valuable models for in-vivo and ex-vivo imaging. The Transgenic Core Facility helps its users in every step of the model generation.

DNA-based nanosensors for biosensing and imaging applications

11:15- 11:30 Talk by Pratik Shah,
Associate Professor, Roskilde University

The talk will provide a brief overview of our work on the development of DNA-based nanosensors for bioimaging applications.

DNA-stabilized silver nanoclusters as ultra-small (<2 nm), tuneable fluorescent probes for live-cell bioimaging.
Designing of DNA to reversibly modulate the fluorescence of nanosensors in response to the physiological stimulus.
Application of DNA-based nanosensors for imaging of biomarkers.

INVITED SPEAKERS - SESSION 2

NEW DEVELOPMENTS IN BIOIMAGING SYSTEMS

4D Imaging Hub for Real-Time super resolution Cellular Entry Studies Using Lattice Light Sheet Microscopy and AI-Powered Analysis

13:00 - 13:15 Talk by Aimilia Nousi,
Facility Manager, Center for 4D Cell Dynamics

The Imaging Center is dedicated to real-time, high-resolution 4D microscopy of biological processes at the single-particle level. Leveraging lattice light sheet microscopy, we achieve minimally invasive, volumetric imaging of nanoparticles or/and biologicals (e.g. viral particles, lipid nanoparticles loaded with pharmaceutics, therapeutic antibodies) as they interact with and penetrate cells and tissues. The work flows are optimized for imaging a host of cell lines including polarized epithelial and endothelial monolayers, as in vitro models of the endothelial and blood-brain barriers. Inspired by the methodologies of and in collaboration with Professor Nikos Hatzakis, our center capitalizes on the quantitative spatiotemporal mapping of molecular trajectories and heterogeneity in cellular entry pathways. Advanced machine learning frameworks are employed for automated detection, tracking the spatiotemporal localization, and classification of entry events cellular localization and cargo release, enabling large-scale, high-throughput analysis of complex diffusion behaviors, membrane dynamics and cellular responses. This integrative platform supports in-depth biophysical exploration of membrane trafficking and therapeutic delivery at subcellular resolution.

Young probing: Projection imaging without cameras and arrayed actuators

13:15 - 13:30 Talk by Emil Boye Kromann,
Group leader, Associate Professor DTU HEALTH TECH Department of Health Technology

In this short talk, we present a new variant of the single-pixel imaging method, which does not rely on cameras and arrayed actuators. We demonstrate how our method (Young probing) enables projection imaging of fluorescent targets and briefly explore potential advantages and applications – also for imaging beyond the near-visible regime of the electromagnetic spectrum, where cameras and arrayed actuators are unavailable.

INVITED SPEAKERS - SESSION 2

Beyond Labels: New Windows into Living Cell Imaging

13:30 - 13:45 Talk by Guillermo Sergio Moreno Pescador,
Assistant professor, University of Copenhagen

Traditional imaging techniques, which rely on fluorescent protein markers to label specific vesicle populations or compartments, are limited by short observation times due to photobleaching and only allow for the observation of a subset of compartments. Under the umbrella of the newly established Experimental Microscopy lab at PLEN, we are developing a suite of complementary label-free optical techniques that provide unprecedented insights into plant cell dynamics and mechanics without perturbing the biological system.

We present recent advances in Rotating Coherent Scattering Microscopy (ROCS) applied to plant cells, exploiting differences in motile behavior for automated detection of subcellular organelles including Golgi, post-Golgi, and late endosomal vesicles. We are developing machine learning approaches for artificial labeling of the data, working toward implementing a geometric deep learning framework that exploits spatiotemporal relations to classify tracking data without requiring fluorescent markers. To extend our imaging capabilities, we are implementing confocal interferometric scattering (iSCAT) microscopy, which significantly expands axial imaging range while maintaining the label-free advantage.

In parallel, we are building toward a comprehensive mechanical characterization platform by integrating interferometric holography with Brillouin microscopy to create a unified instrument capable of simultaneously mapping cellular topography and mechanical properties. This combined approach promises to deliver a complete mechanical picture of living cells, bridging structural and biomechanical information at subcellular resolution.

Together, these innovations represent a paradigm shift toward truly non-invasive plant cell imaging, opening new avenues for understanding fundamental processes in plant biology and environmental responses.

Label-free 3-D molecular imaging of living tissues using Raman Spectral Projection Tomography

13:45 - 14:00 Talk by Martin Aage Barsøe Hedegaard,
Associate Professor, University of Southern Denmark

The ability to image tissues in three-dimensions (3-D) with label-free molecular contrast at mesoscale would be a valuable capability in biology and biomedicine. Here, we present Raman spectral projection tomography (RSPT) for volumetric molecular imaging with sub-millimeter spatial resolution.

We have developed a RSPT imaging instrument capable of providing 3-D molecular contrast in transparent and semi-transparent samples. Alongside the instrumentational development a computational pipeline for multivariate reconstruction was established to extract label-free spatial molecular information from Raman projection data. We show imaging and visualization of phantoms of various complex shapes with label-free molecular contrast. Finally, we apply RSPT as a novel tool for imaging of molecular gradients and extracellular matrix heterogeneities in fixed and live tissue-engineered cartilage constructs and explanted native tissues. RSPT imaging opens new possibilities for label-free molecular monitoring of tissues.

These findings show that the imaging approach can serve as a platform for minimally invasive molecular analysis and a means to meticulously track molecular gradients within living tissues with high precision in both contrast and resolution.

INVITED SPEAKERS - SESSION 3

IMAGE DATA MANAGEMENT AND NEW DEVELOPMENTS IN BIOLOGICAL IMAGE ANALYSIS

Bridging Users and Technology - Access to Services at the Image Analysis Core Facility

14:45 - 15:00 Talk by Tricia Loo,
DBI INFRA Image Analysis Core Facility (IACF)

The Danish Bioimaging Infrastructure Image Analysis Core Facility (DBI-INFRA IACF) provides open services to help life scientists visualize, analyze, and extract quantitative information from their bioimaging datasets. Our experts handle image analysis tasks with sound scientific foundations, for imaging modalities ranging from light and electron microscopy to (pre-)clinical imaging.

This talk gives an overview of the services available at the IACF, with concrete examples from completed projects at the facility. Through these examples, we will illustrate the practical aspects of accessing such services and what potential users can expect over the service timeline.

Thoughts on Larger than memory image processing

15:00 - 15:15 Talk by Jon Sporring,
Professor, Image Analysis, Computational Modelling and Geometry, Department of Computer Science, KU

As imaging technology advances, microscope datasets are rapidly growing beyond the capacity of standard computer memory. This talk explores practical strategies for working with these ultra-large images, focusing on real-world examples from biological microscopy, including vessel segmentation and organ imaging. We will introduce accessible tools and methods—like 2D slicing, chunked 3D storage, and multiplane annotation—that enable efficient visualization, segmentation, and analysis of massive datasets. Emphasis will be placed on intuitive workflows, semi-automatic segmentation tools like

Hanseatic Science Cloud prototype

15:15 - 15:30 Talk by Ingegerd Wirehed, HSC Project Lead, Lund University and Emanuel Larsson, HALRIC national ambassador, Lund University

Explore the Hanseatic Science Cloud (HSC) Prototype. Supported by Interreg ÖKS within the HALRIC project, the HSC prototype aims to enhance scientific collaboration.

This innovative cloud solution is a proof of concept designed to facilitate and expedite research through seamless data access, sharing, and reproducibility across institutions, borders, regions, and it is currently in the prototype phase.

Key Features:
- Seamless Data Access: Easily access data and powerful analysis tools across the ÖKS region.
- Collaborative Platform: At this moment, it offers the possibility to connect with researchers from DESY, Lund University (LUNARC, MAX IV), and other institutions for diverse research needs.
- Intuitive Interface: Simplified data management, analysis, project management and sharing with this user-friendly platform.Scalable Solutions: Suitable for both small-scale studies and large, multidisciplinary cross-border projects.

Presenting the possibility for HSC pilot project, with accessing HSC's key features, including advanced computing, storage, and robust collaboration tools, through our piloting initiative. Your feedback will be instrumental in refining the platform in future development to better serve the research community

INVITED SPEAKERS - SESSION 3

DeIC towards image based FAIR share repository DeIC towards image based FAIR share repository

15:30 - 15:45 Talk by Hannah Mihai,
Data Management Consultant, DeiC

DeiC, the national eInfrastructure provider in Denmark, supports both national and international research by providing compute and data management services. One of our key offerings is the DeiC Dataverse repository, designed to expose reserch data and facilitate efficient data handling for researchers.

This presentation will provide an overview of DeiC Dataverse's technical specifications, discussing its strengths and current limitations. DeiC Dataverse supports the FAIR data principles (Findable, Accessible, Interoperable, and Reusable) by assigning persistent identifiers to datasets, attaching detailed metadata, and ensuring long-term data preservation and accessibility.

DeiC's goal is to assist researchers in creating and managing FAIR data, thereby promoting better data practices within the research community. The presentation will focus on the practical aspects of using DeiC Dataverse and how it can benefit your research.

POSTERS

POSTER NUMBER 1

Danish Bioimaging Infrastructure Image Analysis Core Facility (DBI-INFRA IACF)
Tricia Loo, Julia Mertesdorf, Peidi Xu
University of Copenhagen

The Danish Bioimaging Infrastructure Image Analysis Core Facility (DBI-INFRA IACF) runs an open service in image analysis to help life scientists visualize, analyze, and extract quantitative information from their bioimaging datasets. Our experts handle image analysis tasks with sound scientific foundations, for imaging modalities ranging from light and electron microscopy to (pre-)clinical imaging.

Our team works with you to discuss and define your image analysis needs, guide and train you in the most suitable software solutions and, when needed, develop image analysis workflows customized to your research project. All services, including project meetings, training, booking and access to our image analysis workstations, software and storage can be provided either on-premise or remotely.

You can contact us through the IACF webpage (www.dbi-infra.eu/iacf) to take part in a free Call4Help consultation or to submit an image analysis project. Projects involving software or methodological development must be submitted online and are bound to fees estimated during a free quotation prior to project start. Software training and support are provided on demand on our workstations and at a fixed hourly cost. We are additionally involved in teaching bioimage analysis during workshops and training schools, and we actively promote community standards for sharing and preserving scientific image and associated software. Since opening for service in 2023, the IACF has worked on 25 user projects by providing custom workflows or training solutions, and have reached out to many more through our free consultation services and training courses.

The facility received funding from a national infrastructure grant (DBI-INFRA 2022-2027, Danish Ministry of Higher Education and Science) and aims to actively promoting open science and enforcing high sharing and reproducibility standards through good practices, dedicated data and software repositories. To this end, we will systematically try to reach agreements with the researchers to define a timeline for sharing the assets developed in the facility, especially for those with high re-usability potential. The facility also aims to establish a new open service model embracing professional project management practices, fair service billing, and an optimal utilization of existing local resources and expertise.

POSTER NUMBER 2

Lipid-based Nanocarriers for Mitochondrial Gene Delivery

Taranjeet Kaur, Pia Nyeng, Ole Vang, William Goldring, Louise Torp Dalgaard
Roskilde University

Mitochondria are vital for cellular energy production and metabolic regulation. Mitochondrial dysfunction, marked by impaired electron transport, elevated reactive oxygen species, and disrupted gene expression, contributes to metabolic diseases, such as type 2 diabetes and obesity. Oligonucleotide therapeutics may restore mitochondrial function via gene modulation, but effective delivery remains a major barrier. This study aimed to develop a lipid nanoparticle-based platform for targeted mitochondrial gene delivery.

Method

Cationic lipids were synthesized and used to prepare lipid-DNA complexes (lipoplexes). Gel electrophoresis assessed the DNA-binding and protection capability of the lipoplexes. Dynamic light scattering (DLS) determined particle size and polydispersity. Cytotoxicity, intracellular trafficking, and mitochondrial targeting were evaluated in vitro. Data were analyzed using R Studio.

Results and Future Perspectives

Lipoplexes efficiently encapsulated and protected DNA from enzymatic degradation. Quantitative imaging analysis showed that lysosomal degradation and endosomal recycling did not significantly hinder mitochondrial gene delivery. However, only partial mitochondrial localization (<20%) was observed, suggesting limited endosomal escape. These findings highlight the need for further optimization. Future work will focus on enhancing endosomal escape and improving mitochondrial targeting efficiency of lipoplex formulations.

POSTER NUMBER 3

Disconnect to Connect: A Data Augmentation Method for Improving Topology Accuracy in Image Segmentation

Juan Miguel Valverde (1,2), Maja Østergaard (3), Adrian Rodriguez-Palomo (3), Peter Alling Strange Vibe (3), Nina Kølln Wittig (3), Henrik Birkedal (3), Anders Bjorholm Dahl (1)
(1) DTU Compute, Technical University of Denmark, Denmark (2) A.I. Virtanen Institute, University of Eastern Finland, Finland (3) Department of Chemistry and iNANO, Aarhus University, Denmark

Accurate segmentation of thin, tubular structures (e.g., blood vessels) is challenging for deep neural networks. These networks classify individual pixels, and even minor misclassifications can break the thin connections within these structures. Existing methods for improving topology accuracy, such as topology loss functions, rely on very precise, topologically-accurate training labels, which are difficult to obtain. This is because annotating images, especially 3D images, is extremely laborious and time-consuming. Low image resolution and contrast further complicates the annotation by causing tubular structures to appear disconnected. We present CoLeTra, a data augmentation strategy that integrates to the models the prior knowledge that structures that appear broken are actually connected. This is achieved by creating images with the appearance of disconnected structures while maintaining the original labels. Our extensive experiments, involving different architectures, loss functions, and datasets, demonstrate that CoLeTra leads to segmentations topologically more accurate while often improving the Dice coefficient and Hausdorff distance. CoLeTra's hyper-parameters are intuitive to tune, and our sensitivity analysis shows that CoLeTra is robust to changes in these hyper-parameters. We also release a dataset specifically suited for image segmentation methods with a focus on topology accuracy. CoLetra's code can be found at https://github.com/jmlipman/CoLeTra

POSTER NUMBER 4

Unraveling Pancreatic-Neuronal Crosstalk in Embryonic Development with Real-Time Neurotransmitter Tracking and 4D Bioimaging

Rikke Hoegsberg Agerskov, Fatima AlZahraa Alatraktchi, Torben Lund, Louise Torp Dalgaard, Pia Nyeng
Roskilde University and The Candy foundation

The autonomic nervous system innervates the pancreas early in development, influencing endocrinogenesis and islet formation. Neurotransmitters are hypothesized to regulate these processes, with potential implications for diabetes. However, the dynamics of innervation during pancreatic development remain poorly understood. This interdisciplinary project combines nanoscience, bioimaging, and endocrine biology to develop a new method for simultaneous neurotransmitter sensing and 4D imaging in live tissues. The method will be applied to study neuron–epithelial interactions during endocrinogenesis in the mouse pancreas and in diabetes-like islet cell cultures. The study aims to elucidate the role of neurotransmitters in pancreatic development, with potential implications for pancreatic disease research and stem cell applications.

POSTER NUMBER 5

BRIC'S CORE FACILITY FOR HIGH-CONTENT CRISPR SCREENS (HCCS)
André Dias, Bichitra Paul, Sandra Gordon, Krister Wennerberg
University of Copenhagen, Denmark

The Core Facility for High-Content CRISPR Screens(HCCS),housed at the Biotech Research and Innovation Center (BRIC),is a cutting-edge, open-access resource for all scientists. Our specialty lies in automated assays and cell-based screening, offering a flexible platform for a range of automated assays in 96- and 384-well plate formats (with others available on demand).Notably, we employ high-throughput confocal microscopy or flow cytometry alongside techniques such as fluorescence and luminescence. Our comprehensive genome-wide human sgRNA CRISPR library and compound libraries further expand our services. From initial setup to automation, performance, data analysis, and candidate validation, our dedicated team supports all phases of screening research, ensuring top-quality service to fulfill our users' research objectives.

POSTER NUMBER 6

Imaging at the Center for Advanced Bioimaging (CAB)
SJ Kjeldgaard-Nintemann1, NM Christensen1
Center for Advanced Bioimaging Denmark, Faculty of Science, University of Copenhagen, Denmark

The Center for Advanced Bioimaging (CAB) at the University of Copenhagen offers users from a broad spectrum of research areas expert training and access to a comprehensive bioimaging instrument park, including widefield and advanced confocal microscopes including 2-photon for imaging label free and in depth.
CAB is specialized in live imaging and has vast experience in plant imaging as well as imaging mammalian cells/organs under physiological conditions. Currently CAB is moving into the exciting field of analytic imaging with new microscopes that allow for Raman scattering, FLIM and EDS transmission electron microscopy. The poster will give an overview over instruments and examples of their use.

POSTER NUMBER 7

Bioimaging at the Danish Cancer Institute
Chris Dinant, Tiina Naumanen Dietrich
Danish Cancer Institute
Description of the core facility for bioimaging at the DCI. We list our instruments and services and show usage statistics. We go a bit deeper into a few example microscopes and address future plans.

POSTER NUMBER 8

Multimodal Quantitative Bioimaging Across the Stargardt Disease Spectrum: Structural–Functional Correlation for Phenotyping and Staging Toward Translational Readiness.

Dr. Suneth Dayan Lindamulage

Stargardt disease (STGD) is a genetically heterogeneous group of inherited macular dystrophies, most commonly caused by biallelic ABCA4 mutations (STGD1). These mutations impair the ATP-driven transport of retinal derivatives across photoreceptor outer segment discs, leading to the accumulation of toxic bisretinoids such as A2E, forming lipofuscin within the retinal pigment epithelium (RPE). The resulting photoreceptor degeneration manifests as progressive central vision loss. Less commonly, Stargardt-like phenotypes arise from dominant mutations (e.g. in ELOVL4 or PROM1), with variable clinical trajectories. The disease spans a broad phenotypic spectrum—from early-onset maculopathy with dense flecks and atrophy to foveal-sparing or late-onset presentations—posing diagnostic and prognostic challenges. These complexities underscore the need for integrated structural–functional staging frameworks to improve genotype–phenotype correlation and support clinical decision-making.

A multimodal clinical bioimaging approach was applied to a diverse series of Stargardt cases. Imaging modalities included fundus photography, fundus autofluorescence (FAF), optical coherence tomography (OCT), electrophysiology (ffERG, PERG, mfERG), and selected fluorescein angiography (FA). Structural characteristics—such as macular thickness, foveal preservation, ellipsoid zone integrity, fleck patterns, autofluorescence distribution, and lesion configuration—were evaluated alongside functional metrics including ffERG amplitude and timing, PERG responses, and mfERG ring analysis. Phenotypic staging combined qualitative grading and preliminary quantitative assessments to enable reproducible classification, disease grading, and progression tracking.

This structure–function alignment facilitated patient stratification and informed therapeutic planning, including gene augmentation for ABCA4 mutations, RPE or photoreceptor cell-based transplantation, visual cycle modulators aimed at reducing toxic bisretinoid accumulation, and future genome-editing or RNA-based strategies. Ultimately, this approach demonstrates how bioimaging can bridge diagnostics and personalized interventions—advancing the clinical readiness of retinal biomarkers in inherited retinal diseases.

POSTER NUMBER 9

Danish BioImaging Infrastructure
Open Access to a broad range of bioimaging technologies and expertise in Denmark. A multi-modal, multi-sited national-wide RI offering
Denmark is home to world-leading life scientists and pharmaceutical companies, which are key players in the country's economy and development. Bioimaging has become a central technology platform driving research in most disciplines of life sciences. Bioimaging technologies are becoming increasingly complex, technically demanding, and too expensive to be implemented in individual research groups. Additionally, several of these techniques may be required to answer a single scientific question. Therefore, the limitations that prevent many life scientists from using the full power of bioimaging, as a set of tools to answer their research questions, are access to: a) knowledge (guidance on which technologies to use), b) appropriate research infrastructures (open access facilities) and c) technical support (staff to educate and train life scientists).
Local open access core facilities have become essential research platforms that aim at overcoming these limitations by hosting, maintaining, and continuously developing imaging infrastructures, offering scientists access to high-end equipment, methodological and technical training, and support.

POSTER NUMBER 10

AXIA: Aarhus X-ray Imaging Alliance
Maja Østergaard, Nina Kølln Wittig, and Henrik Birkedal
Department of Chemistry and iNANO, Aarhus University, Denmark

Aarhus X-ray Imaging Alliance (AXIA) is research infrastructure bridging clinical research and complex imaging at large scale facilities through access to in-house instrumentation, education and physical and medical know-how.

The Xradia 620 Versa (Carl Zeiss, Germany), a state-of-the-art X-ray microscope, is installed in the lab space of Henrik Birkedal at iNANO, Aarhus University. The microscope enables high-resolution (sub-µm) studies of for example bone and biomaterials as well as poorly absorbing soft tissues with resolutions paralleling that available at many synchrotrons. The datasets obtained in 3D imaging are very large. We specialize in handling these and have high-power computers available for data visualization and analysis.

The poster will present not only the core facility AXIA, but also a selection of applications within bone and other tissues.

We are experts in X-ray 3D imaging, and while the facility is aimed at bone research, the imaging systems we have available are much more widely applicable, and we are happy to assist scientists from both academia and industry regardless of your field of research.

POSTER NUMBER 11

The Core Facility for Integrated Microscopy
Clara Prats, Thomas Hartig Braunstein,
Core Facility for Integrated Microscopy, University of Copehagen

The Core Facility for Integrated Microscopy (CFIM) was officially inaugurated in September 2010. It is located at the Faculty of Health and Medical Sciences, University of Copenhagen.
CFIM offers a wide range of state-of-the-art light and electron microscopes. Scientists and students coming to CFIM find not only light and electron microscopes ready to use for their research, but also the necessary technical assistance and support. At the present time we have approximately 650 registered users.
In the past, light and electron microscopy have always been physically separated with little interaction. As our name indicates, our vision is to integrate different microscopy techniques, increasing the inter-disciplinary microscopical approach to scientific imaging questions.

POSTER NUMBER 12

AI-enabled automated compound screening for toxicity effects using healthy intestinal 3D organoids
Oksana Sirenko, Krishna Macha, Maja Hoi, Kenneth Seistrup, Auguste Kersulyte, Zhisong Tong, Giusy Tornillo, Misha Bashkurov, Robert Storm
Molecular Devices

A major side effect of anti-cancer drugs is intestinal toxicity, which often limits dosing. Traditional 2D cell models fall short in replicating clinical responses, whereas 3D organoids—derived from iPSCs or adult stem cells—more accurately mimic human tissue structure and function. Studies show that patients and their derived organoids respond similarly to drugs, highlighting the potential benefits of utilizing organoids in screening to improve therapeutic outcomes. Combining assay automation with high content imaging and advanced analysis using artificial intelligence (AI) will greatly increase productivity and scale the use of these models, making them valuable for preclinical toxicity screening.
We automated a compound toxicity assay using human and mouse intestinal organoids. Organoids were cultured in Matrigel domes with the CellXpress.ai™ Automated Cell Culture System, which handled media changes and TL imaging every 24 hours. For screening, organoids were plated in 96-well plates and treated with eight known intestinal toxins across seven concentrations.
Toxicity was assessed via phenotypic imaging using the ImageXpress® HSC.ai High Content Screening System with confocal optics. Organoids were stained for nuclei, mitochondria, and cytoskeleton markers, then imaged at 10X magnification. Images were analyzed with IN Carta® software using machine learning to quantify phenotypic changes. An unsupervised algorithm classified organoid types, followed by supervised training to distinguish affected from unaffected samples.
This workflow is suitable for automating toxicity assessment studies, significantly reducing manual cell processing while enhancing productivity and assay scalability. AI-powered data analysis allows for the automation of complex analysis steps, enabling reproducible and efficient compound testing.

POSTER NUMBER 13

Studying the Molecular Dance of Biomolecules at the ASiMoF Infrastructure
Line Mørkholt Lund, Thomas Breitenbach, Carsten Pedersen, Victoria Birkedal
Department of Chemistry and iNANO center, Aarhus University, Aarhus, Denmark

The Aarhus Single Molecule Fluorescence Infrastructure (ASiMoF) at Aarhus University is a cutting-edge research platform designed to explore the behavior and dynamics of (bio)molecules. Using a range of single molecule fluorescence approaches, ASiMoF enables high sensitivity imaging across a variety of environments, including solutions, surfaces, and within cells, as well as single molecule analysis of molecular conformations, interactions and dynamics.
ASiMoF is situated in a strong interdisciplinary environment with expertise in chemistry, molecular biology, biophysics, and nanoscience, and allows for high-resolution studies of molecular processes. The infrastructure supports analyses across spatial scales from FRET-based sub-nanometer, over super-resolution well-below diffraction limit to imaging several hundred millimeters, and time scales from sub-nanoseconds to hours, offering exceptional insight into the underlying behavior of molecules.
Designed for both academic and industrial use, ASiMoF offers access to state-of-the-art tools and expertise for researchers looking to delve deep into the molecular world. We provide a unique opportunity to visualize and quantify molecular events in real time and in complex environments.
ASiMoF was established with support from a Research Infrastructure Grant from the Novo Nordisk Foundation. For more information, visit the ASiMoF website at asimof.au.dk.

POSTER NUMBER 14

Core Imaging Library (CIL) - versatile reconstruction software for CT and other imaging
Jakob Sauer Jørgensen, Margaret Duff, Gemma Fardell, Casper da Costa Luis, Laura Murgatroyd, Evangelos Papoutsellis, Edoardo Pasca, Hannah Robarts, Danica Sugic, Franck Vidal, William Lionheart and Philip J. Withers
DTU Compute

The Core Imaging Library (CIL) is an open-source Python platform for processing and reconstructing Computed Tomography data - as well as other imaging problems. It provides a complete framework of data loaders, data handling and preprocessing, reconstruction algorithms and visualization tools. It supports both parallel-beam, cone-beam, 2D, 3D and higher-dimensional data such as energy or time resolved. CIL provides standard filtered back-projection reconstruction as well as an extensive modular suite of iterative algorithms and optimization tools to build custom reconstruction algorithms to handle various data scenarios. Examples in high-noise/incomplete data, non-standard scan geometry, energy-resolved neutron CT will be presented on the poster. CIL is available at https://ccpi.ac.uk/cil/ along with numerous Jupyter notebook demos and extensive documentation.

IMAGE CONTEST 2025

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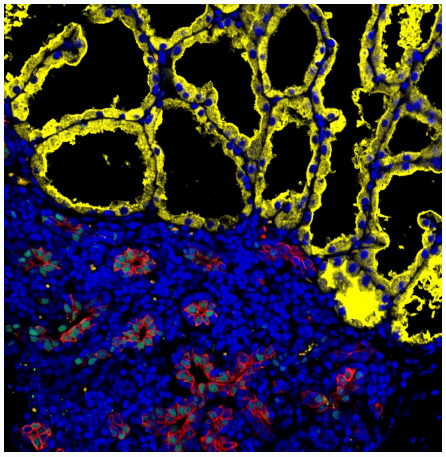


IMAGE 1 - Author: José Moreira

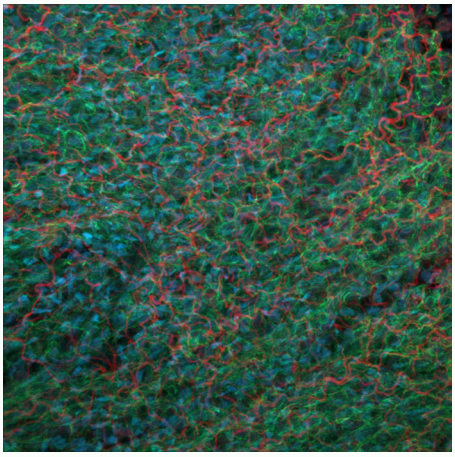


IMAGE 2 - Author: Emily McKaige

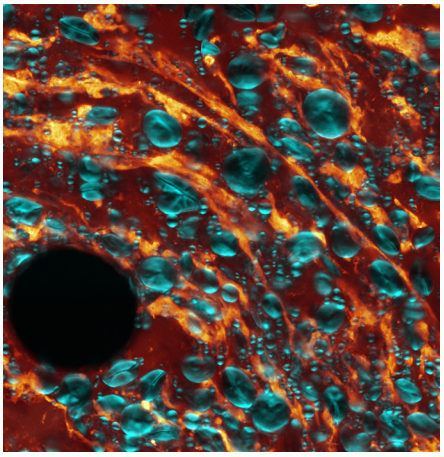


IMAGE 3 - Author: Franz Hermann

IMAGE 1 - Danish BioImaging Microscope Image Contest 2025
Author: José Moreira
Multiplex staining of breast tissue sample, showing c-Jun (green) expression in cytokeratin 15 positive epithelial cells (red), but not in CK15 negative casein (yellow) expressing lactating breast epithelium.

IMAGE 2 - Danish BioImaging Microscope Image Contest 2025
Author: Emily McKaige
This confocal image captures the intricate architecture of a 6-month-old zebrafish heart. Red highlights collagen fibers, green marks the muscle membrane, and blue (DAPI) stains the nuclei, offering insight into the microscopic landscape of cardiac tissue.

IMAGE 3 - Danish BioImaging Microscope Image Contest 2025
Author: Franz Hermann
Wheat dough visualized through 2-photon fluorescence of Rhodamine B stained gluten proteins (in orange-red) and second-harmonic-generation (SHG) of the semi-crystalline amylopectin present in starch granules (in cyan).The fibrous network wrapping around the gas bubble (in black) and the starch granules gives insight to how food assembles into a functional network on the microscopic level. By investigating food microstructure, we seek to unravel how processing, morphology come together to form the foods we eat on a daily basis

IMAGE 4 - Danish BioImaging Microscope Image Contest 2025
Author: Kapil Kumar
In this co-localization image, the commercially available MitoTracker green is highlighting the mitochondria and the synthesized red fluoroscent dye highlighting the nucleus in live CHO cell lines.

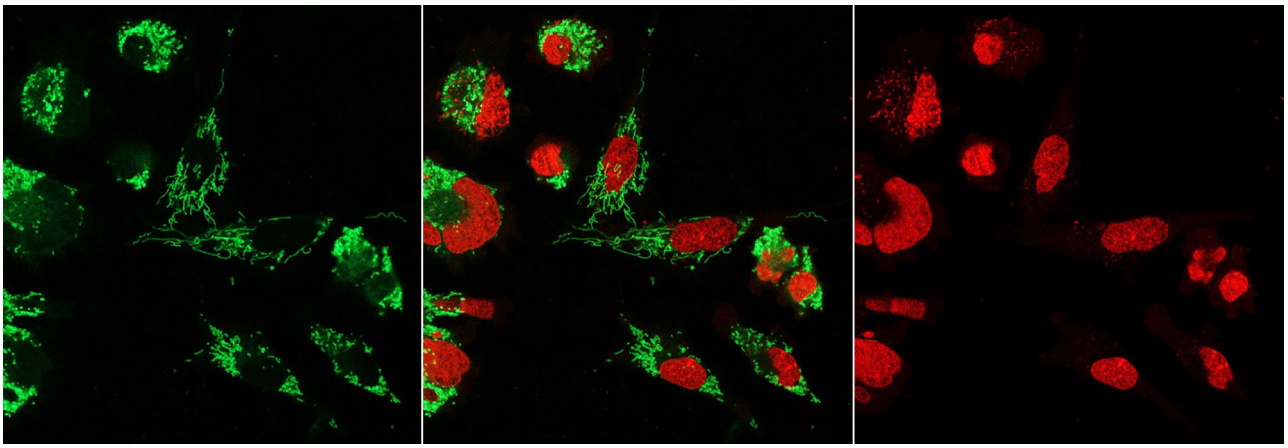


IMAGE 4- Author: Kapil Kumar

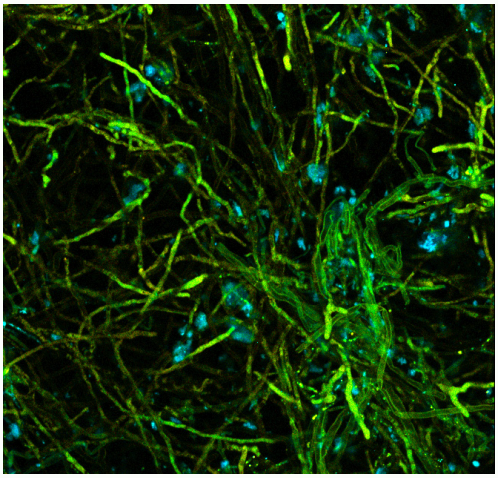


IMAGE 5 - Author: Jens Saalbrink

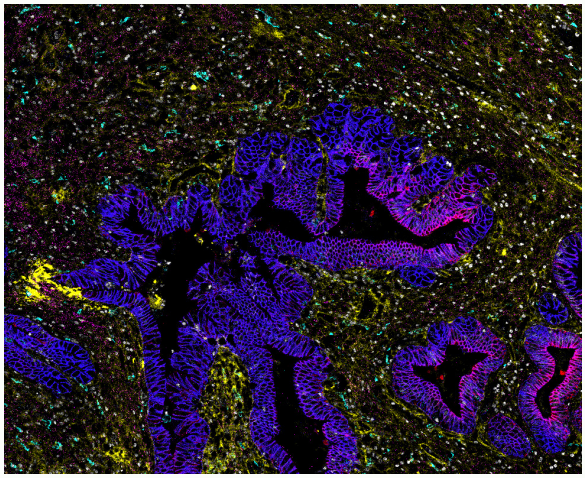


IMAGE 6 - Author: Xenia Goldberg Dahl

IMAGE 5 - Danish BioImaging Microscope Image Contest 2025
Author: Jens Saalbrink
Image of Fungi (Schizophyllum Commune) visualized through multiplexed Fluorescent Lifetime with Coherent-Anti-Stokes Raman Scattering. The time resolved signal differentiates the instantaneous stimulated Raman shift of 2935 cm^-1 originating from protein bodies (in blue) from the 2-photon autofluorescence from the mycelium network's hyphae (in green-yellow). The image's relevance is in the power of non-linear optics to enable label-free visualization of lesser explored fungi as a basis for investigating alternative sources for architectural biomaterials and food. Acknowledgement to Claudia Colmo, PhD student at Kgl . Akademi for providing the cultivated fungi.

IMAGE 6 - Danish BioImaging Microscope Image Contest 2025
Author: Xenia Goldberg Dahl
Fibrotic reaction to treatment of Pancreatic ductal Adenocarcinoma.

PRACTICAL INFORMATION

Location

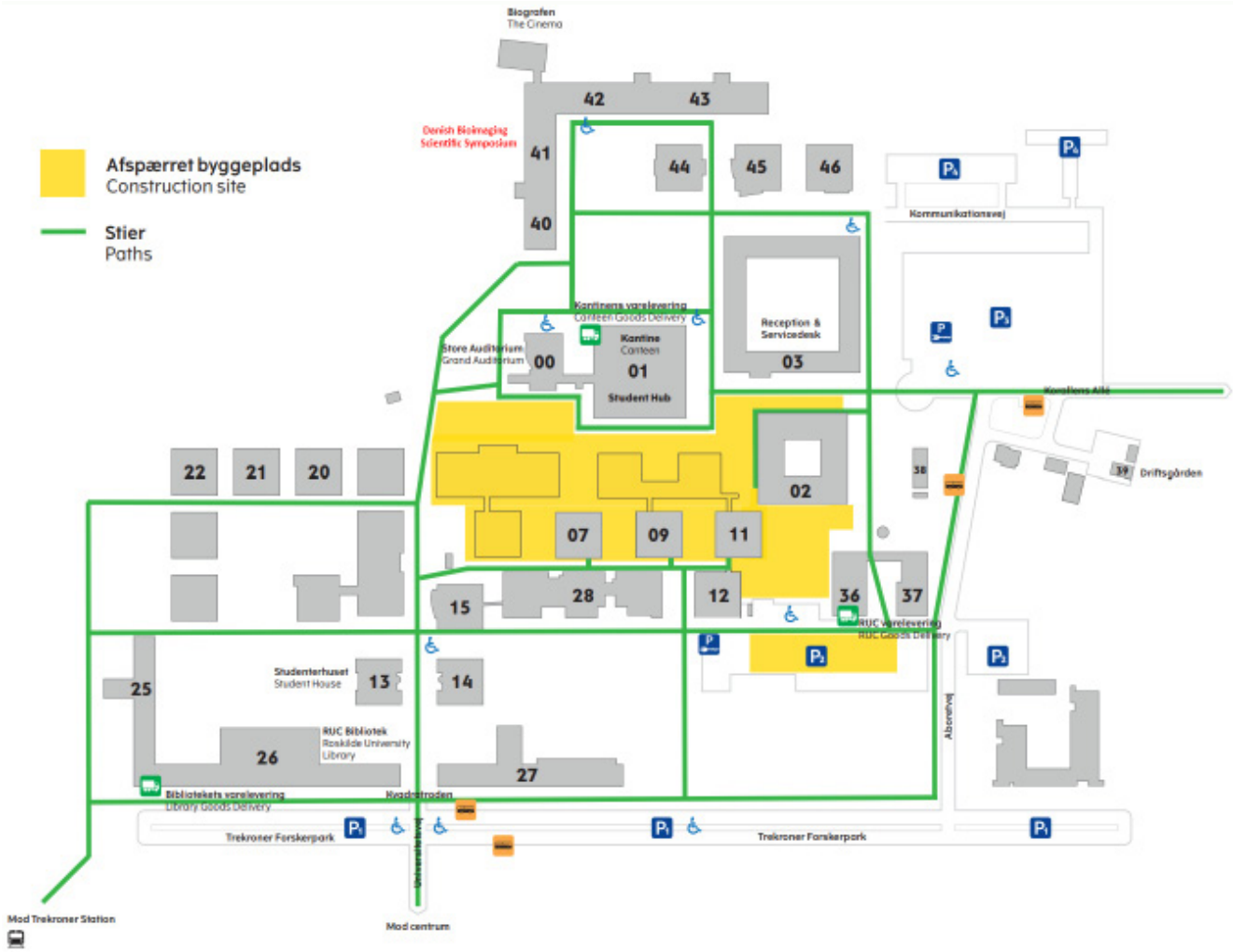
Roskilde University, Building 41, Room: 41.1-14.

Address: Universitetsvej 1, Roskilde

DK-4000

Denmark

The closest train station to Roskilde University is Trekroner Station. It's about a 10-15 minute walk from the station to the university.



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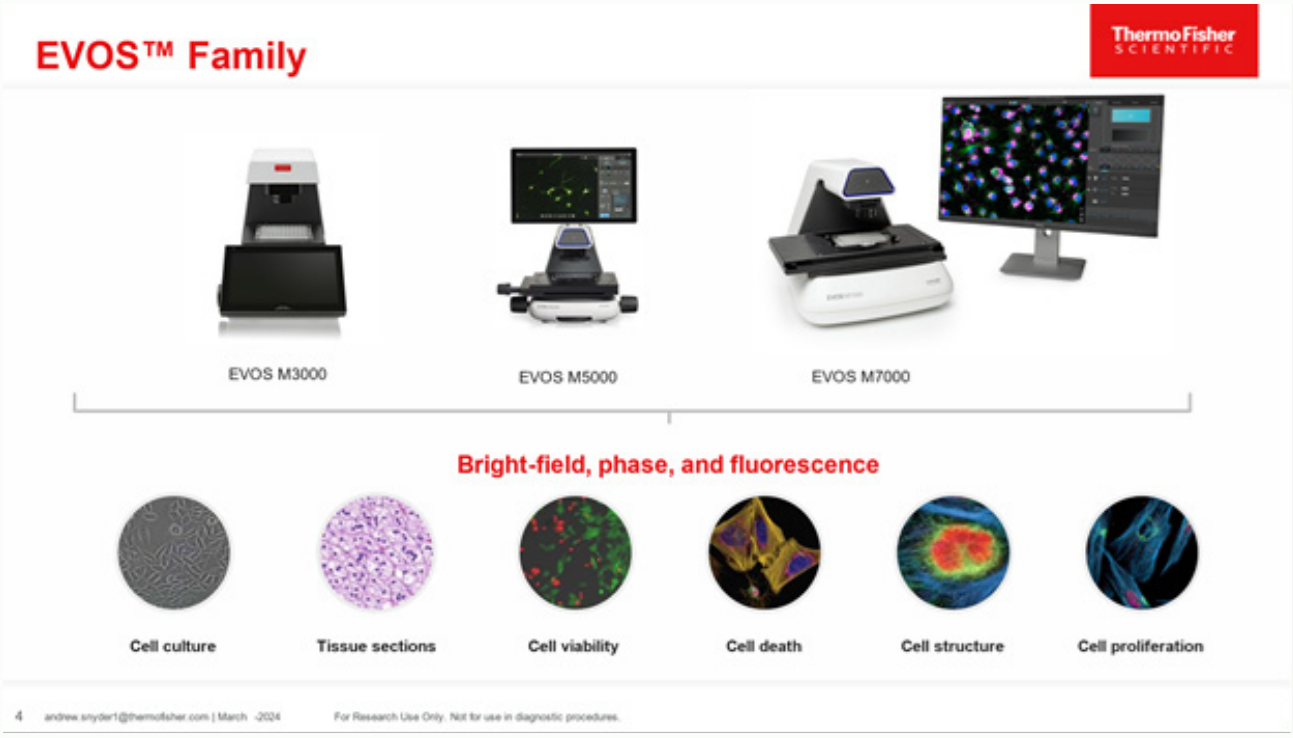

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In the field of microscopy, we have a tight collaboration with Nikon Instruments who is one of the leading microscope manufacturers. Nikon manufactures life science microscopes aimed at researchers and clinical professionals ranging from smaller upright and inverted microscopes to high-end systems dedicated to the most demanding applications such as super-resolution imaging, fast and sensitive imaging, deep tissue imaging and many more. Nikon's philosophy is that not one application is identical, and thus Nikon microscopes are produced to be as versatile as possible. The versatility of Nikon's frames allows us to configure systems designed specifically to each application and customer need. Whether it be simple widefield imaging, confocal, FLIM, super-resolution, multiphoton, spinning disk confocal, or something different, we have the solution.

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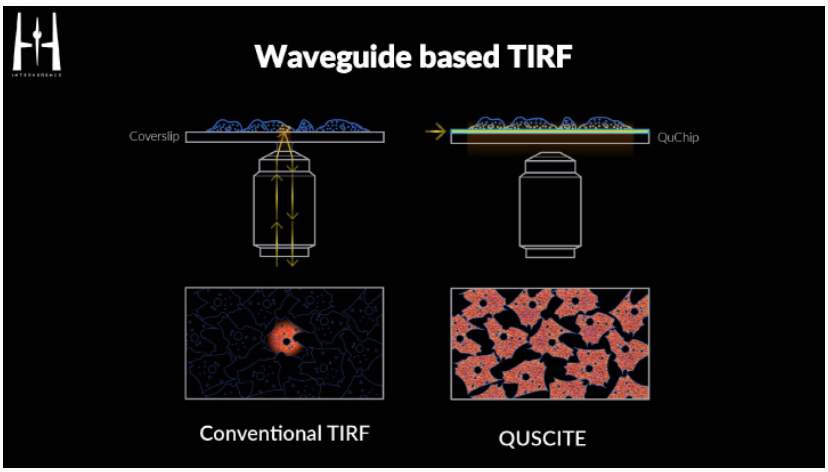

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In 2019, Triolab entered into an agreement with Leica Microsystems, and since then we have been able to make advanced microscopes and imaging solutions available to customers in the Danish market. The Leica brand is known and recognized for optical precision and innovative technology, and the company is one of the market leaders in this area.

As Leica representative, we offer microscopes for clinical diagnostic use as well as for research, education, and industry. In addition, our product range includes products for electron microscope sample preparation, cameras, software, and different solutions that allow for live cell imaging.

Due to our extensive product range and long experience in the field of clinical diagnostics, we have customers in all healthcare segments, and also veterinary institutions, pharmaceutical companies, and special university labs are among our customers.

Our skillful and highly committed personnel have a deep understanding of the market and our customers' needs, and they always meet our customers with an open mind, a friendly attitude, and a strong desire to find the best possible solution for each individual customer.

We have sister companies in Norway, Sweden, and Finland. And we are part of AddLife, a Swedish group specialized in selected niches within diagnostics, medical technology, biomedical research and laboratory analysis (www.add.life). AddLife is quoted on the NASDAQ Stockholm Main Market.

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