

MicroscopeHeaters.Com

ADVANCED MICROSCOPE INCUBATION TECHNOLOGY

Advanced Microscope Incubation Technology (AMIT™) Meets the “Physics of Life” and Biomechanical Research

Physics dictates that our Advanced Microscope Incubation Technology (AMIT™), with no vibration, and zero sample perturbation allows more accurate and precise measurements of the physical characteristics of cells and cellular organisms, especially when compared to conventional incubation systems.

Cellular Biophysical Measurements

Simultaneous Nanorheometry and Nanothermometry

Using Intracellular Diamond Quantum Sensors

Atature and Knowles groups

Cavendish Laboratory, University of Cambridge

<https://pubs.acs.org/doi/full/10.1021/acsnano.3c05285>

Scale invariance of mechanical properties in the developing mammalian retina.

Serwane Group, Ludwig-Maximilians-University, Munich

<https://www.biorxiv.org/content/10.1101/2024.10.21.619491v2>

Surface tension and elasticity measurements on 3D magnetic brain-like tissue spheroids

Wilhelm Group Institut Curie, Sorbonne Université,
PSL University, Paris

<https://institut-curie.org/publications/surface-tension-and-neuronal-sorting-magnetically-engineered-brain-tissue>

Macromolecular condensation buffers intracellular water potential.

Nature <https://doi.org/10.1038/s41586-023-0662>

Elongator stabilizes microtubules to control central spindle

asymmetry and polarized trafficking of cell fate determinants

Nat Cell Biol. <https://doi.org/10.1038/s41556-022-01020-9>

Dr Emmanuel Derivery et Al (2022)

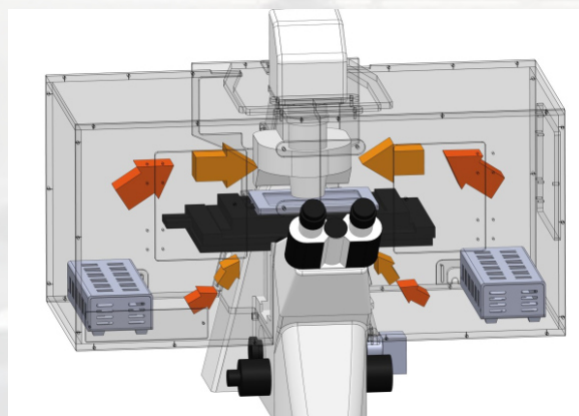
LMB MRC Cambridge

Live-cell three-dimensional single-molecule tracking reveals modulation of enhancer dynamics by NuRD

Prof Srinjan Basu et Al.

University of Cambridge, LMB MRC

<https://www.nature.com/articles/s41594-023-01095-4>



Zero Sample Perturbation
Zero Vibration



Hodson Group, Abberior Evident IX73,
University of Oxford



Biophysical Measurements Using Advanced Microscope Incubation Technology™

Simultaneous Nanorheometry and Nanothermometry Using Intracellular Diamond Quantum Sensors

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<https://pubs.acs.org/doi/full/10.1021/acsnano.3c05285>

Mission Statement

Custom Confocal Microscope Enclosure designed to allow multiple laser line inputs Vibration free Internal Incubation System

"We use diamond nanocrystals as biocompatible sensors for in vitro measurements. We combine subdiffraction resolution single-particle tracking in a fluidic environment with optically detected magnetic resonance spectroscopy to perform simultaneous sensing of viscoelasticity and temperature. We use our sensor to demonstrate probing of the temperature-dependent viscoelasticity in complex media at the nanoscale."

Scale invariance of mechanical properties in the developing mammalian retina.

Elijah Robinson Shelton, Michael Frischmann,
Achim Theo Brinkop, Rebecca Marie James,* and
Friedhelm Serwane† Faculty of Physics and Center for
NanoScience (CeNS), Ludwig-Maximilians-University,
Munich, Germany

<https://www.biorxiv.org/content/10.1101/2024.10.21.619491v2>

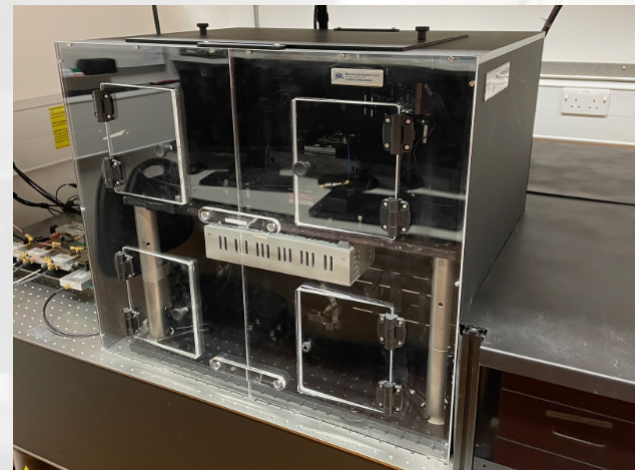
Mission Statement

Zeiss Inverted Microscope Enclosure designed around a custom magnetic tweezer system Vibration free Internal Incubation System SuperSeal™ to maintain elevated levels of CO₂

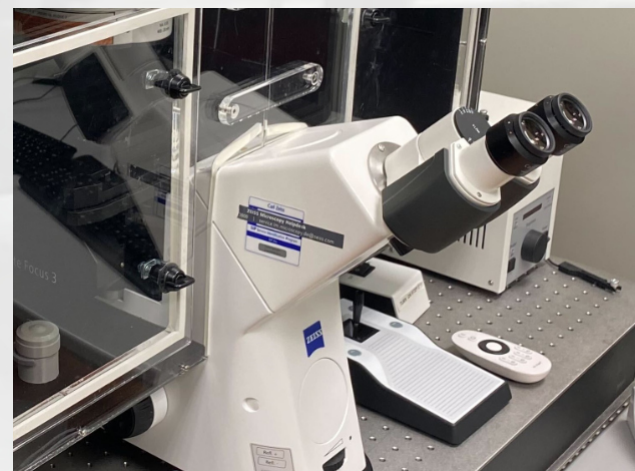
"Our lab specializes in mechanical characterizations of living biological tissue. Temperature control is crucial for both live imaging of cultured cells and organoids, as well as the calibration of force measurements. MicroscopeHeaters worked with us to understand the specific instrumentation requirements of our research and develop a custom live imaging incubation solution, including heating, humidity, and CO₂."

Dr Elijah Shelton - LMU Munich

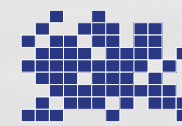
'We probed time-dependent tissue mechanics in an in vitro model of the developing retina using magnetic droplets in mouse stem cell-derived retina organoids. We recorded strain responses to an applied stress across four orders of magnitude in time, up to one hour. Dynamic creep compliance and tensile moduli followed a power law with an exponent consistent with a material just above the glass transition. Our findings demonstrate that neuronal tissue remodels in a scale-free manner, prompting the question of whether scale-invariant mechanical properties are a general motif of neurodevelopment.'



Atature and Knowles groups, Custom Enclosure, Cavendish Laboratory, Cambridge



Servane Group Zeiss Observer, LMU Munich



Single Molecule Imaging, Publications in Nature- With Advanced Microscope Incubation Technology™

Single Molecule Imaging

"We use Microscope Heaters Incubation system for our single molecule imaging with excellent temperature stability."

Dr Emmanuel Derivery at al.
MRC-LMB Cambridge

Mission Statement

The Derivery Group required two custom enclosures. The first was designed to accommodate four Prism camera systems on a Nikon Ti2. The second was designed to fit specific equipment onto a Zeiss 200

Macromolecular condensation buffers intracellular water potential.

Nature <https://doi.org/10.1038/s41586-023-0662>

Mission Statement

Using a Nikon Ti2 platform we designed an enclosure that allowed complete access above the sample area, accommodating a range of advanced illumination technologies.

A non-catalytic role for MLL2 in controlling chromatin organisation and mobility during the priming of pluripotent cells for differentiation

Prof Srinjan Basu et Al.

University of Cambridge

<https://www.biorxiv.org/content/10.1101/2025.02.21.639010v1.full>

Elongator stabilizes microtubules to control central spindle asymmetry and polarized trafficking of cell fate determinants
Planelles-Herrero VJ, Bittleston A, Seum C, Daeden A, Gaitan MG, Derivery E. (2022)

Nat Cell Biol. <https://doi.org/10.1038/s41556-022-01020-9>

Live-cell three-dimensional single-molecule tracking reveals modulation of enhancer dynamics by NuRD

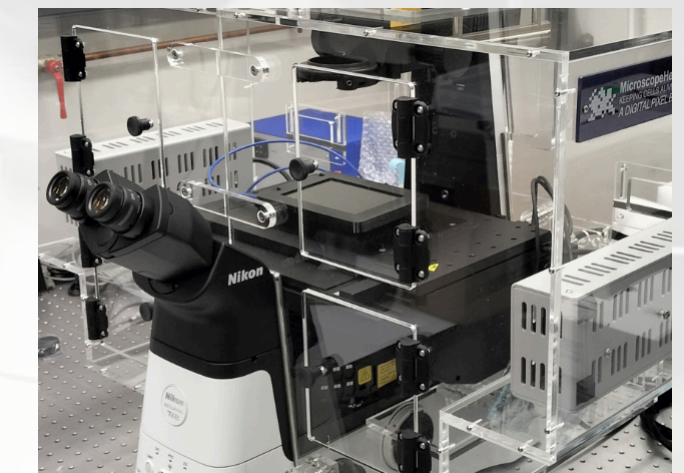
Prof Srinjan Basu et Al.

University of Cambridge

<https://www.nature.com/articles/s41594-023-01095-4>



Durham Group, Heater Cooler Nikon TiE - Sheffield



Basu Group, Nikon Ti2, Imperial College London



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ADVANCED MICROSCOPE
INCUBATION TECHNOLOGY

Precise Cellular Surface tension and Elasticity Measurements- With Advanced Microscope Incubation Technology™

Surface Tension and Neuronal Sorting in Magnetically Engineered Brain-Like Tissue

J. E. Perez, C. Villard, C. Wilhelm
Institut Curie, Sorbonne Université
PSL University, Paris 75005, France

<https://institut-curie.org/publications/surface-tension-and-neuronal-sorting-magnetically-engineered-brain-tissue>

Mission Statement

Enclosure designed around magnetic system
Vibration free Internal Incubation System
SuperSeal™ to maintain elevated levels of CO₂

"Engineered 3D brain-like models have advanced the understanding of neurological mechanisms and disease. Here AMIT™ incubation allows measurement of spheroid deformation when placed under a magnetic field. Tissue surface tension and elasticity can be directly inferred from the resulting deformation."

FRET FLIM and Super Resolution Microscopy

Light Tight Enclosure with Advanced Microscope Incubation Technology™

Orthogonal Fluorescent Chemogenetic Reporters for Multicolor Imaging

A two-color cell cycle sensor can detect, early cell cycles in zebrafish development, capable of detecting multiple protein-protein interactions by live-cell fluorescence microscopy.

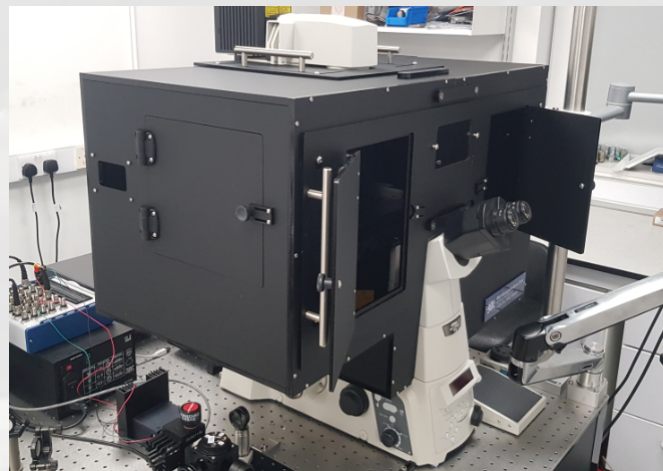
Prof Sergi Padilla-Parra et Al
Kings College London

<https://www.nature.com/articles/s41589-020-0611-0>

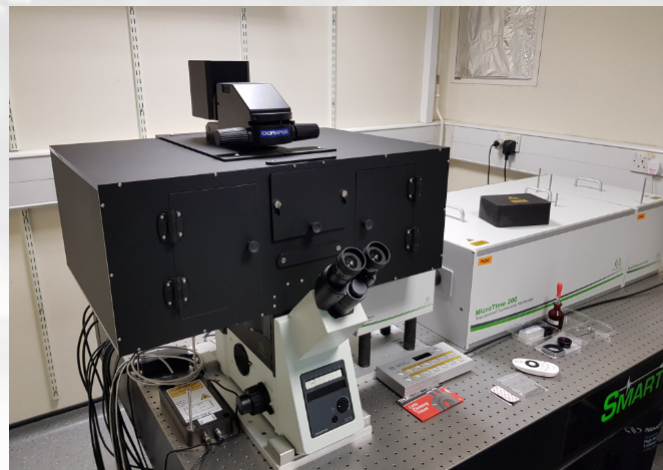
FLIM and FRET- Becker and Hickl

"Using the Becker & Hickl simultaneous FLIM and FRET system at the TiM 2025 workshop was truly excellent. The integration of 2P-imaging with live-cell incubation and CO₂ control worked very well, allowing us to measure NADH-FLIM, intracellular oxygen distribution and consumption in living cells"

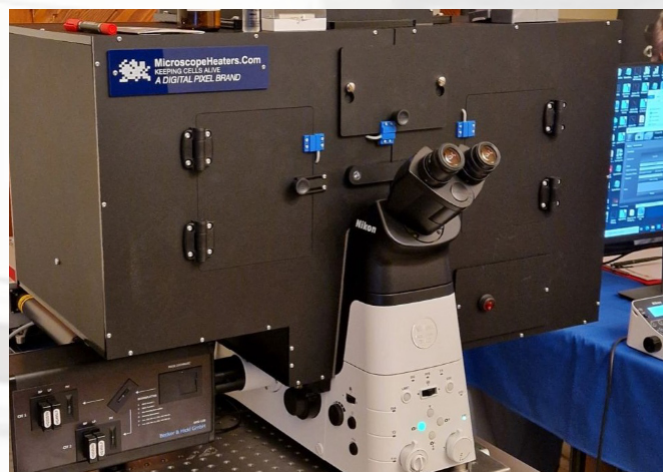
Dr Daniela N. S. dos Santos
Ulm University, Germany



Poland Group, Light Tight Enclosure - King's College London



Padilla-Parra Group, PicoQuant, Kings College London



Becker and Hickl FLIM at TIM25

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