Microscopy Imaging Center (MIC)

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Science

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Structure



of the Vetsuisse

Faculty

A polarity protein (pink) guides the formation of the "breathing pores" in grasses. (Michael Raissig, Institute of Plant Sciences, University of Bern) The MIC is the center of excellence for high-end microscopy in the life sciences at the University of Bern. The mission of the MIC is to disseminate expert knowledge and provide technical support in high-end microscopy, to implement new technologies, to administer the MIC instrument portfolio and to ensure central access to equipment. MIC provides teaching on Master and PhD level and offers training for scientific staff at all levels. Services of the MIC concern image analysis, large image data volume handling and processing, sample preparation and introduction into microscope operation. Yearly highlights of the MIC are the MIC Research Day, the Summer School for the students of the Cutting Edge Microscopy PhD specialization program and the MIC Symposium.

Profile

- Instruments, users and usage hours. 83 instruments are registered at the MIC. In 2022, this equipment was used by 508 researchers in a total of 82'323 usage hours
- Instrument types. 33 wide field microscopes, 3 slide scanners, 14 laser scanning microscopes, 4 two-photon microscopes, 5 spinning disc microscopes, 4 stereo microscopes, 6 transmission electron microscopes, 6 scanning electron microscopes, 1 light sheet microscopes, 2 atomic force microscopy systems, 1 mass cytometer, 1 imaging mass cytometer and 3 micro computed tomography (micro-CT) instruments
- Services. Web-based booking system for microscopes; Imaging and image and data analysis; Handling of large data sets; Sample preparation; Training; Newsletter; Publication of news, courses, events and other activities on the MIC webpage (www.mic.unibe.ch)
- Teaching and events. Lecture series on Advanced Microscopy. MIC workshops, MIC trainings, instrument demonstrations, MIC research day, MIC symposium
- PhD program Cutting Edge Microscopy (CEM). The main aim of the CEM program is to provide an interdisciplinary training program to PhD students to become first-class experts in biological imaging. The unique and interdisciplinary framework established by the MIC provides the necessary infrastructure and expert knowledge. The program is scientifically directed by MIC members Prof. Benoît Zuber and Dr. Steven Proulx and administered by the MIC coordinator Prof. Ruth Lyck. In 2022, 19 students participated in the CEM program of whom 6 students received their certificate of graduation
- Tight collaboration with Science IT support (ScITS) of the University of Bern for high quality support of MIC users in data handling and image analysis
- Excellent cooperation with the Graduate School for Cellular and Biomedical Sciences (GCB) and individual master's programs to optimize the MIC teaching portfolio
- External partners: Swiss Society for Optics and Microscopy (SSOM); Life Sciences Switzerland (LS2), Intersection Microscopy; Swissphotonics; Scientific Volume Imaging b.v. (SVI); Swiss Microscopy and Imaging Core Facility Network

Grants

- MIC members Prof. Britta Engelhardt and Dr. Steven Proulx, both Theodor Kocher Institute, received together with other applicants the SNSF Sinergia "Fluid Dynamics of the Central Nervous System: 3D Functional Anatomy & Pathophysiology in Mouse Models"
- MIC member Prof. Christian Soeller, Institute of Physiology, and other colleagues from the Faculties of Veterinary Medicine, Natural Sciences and Medicine received the SNSF R'EQUIP "A MINFLUX Optical Super-Resolution Microscop to Investigate Molecular Scale Structure-Function Relationships"

Nacht der Forschung 2022

At the Nacht der Forschung on September 10, 2022, the room of the MIC was decorated with various posters about the MIC and about microscopy. Activities included "Microscopy for everyone" on 6 teaching microscopes and an excursion into virtual reality, which beamed the guest into the brain of a mouse or into a fish head. In parallel, microscopists offered lectures on exciting topics. A total of around 30 helpers from the MIC committee, friends of the MIC and students of the PhD program Cutting Edge Microscopy were on duty in 3 shifts from 4:00 p.m. to mid night. Further activities of MIC committee members were offered in the University's main building by PD Dr. Stefan Tschanz and Prof. Benoît Zuber. Interested conversations and happy children's faces testified to the fascination of microscopy.



Summer School and Study Trip 2022

In May 2022, the students of the PhD program Cutting Edge Microscopy (CEM) visited the Institute de génétique et biologie moléculaire et cellulaire (IGBMC) in Strasbourg. A visit to the beautiful center of Strasbourg rounded off the program. On 30 June and 1 July 2022, the annual summer school for the CEM students took place in Zäziwil. The first day was dedicated to scientific presentations by the PhD students. An intensive training in scientific presentation techniques took place on the second day. The beautiful landscape, the pleasant accommodation and the Appenberg games contributed to a perfect learning atmosphere.



Study Trip to the Institute de génétique et biologie moléculaire et cellulaire (IGBMC)



Titan Krios G4 cryo-transmission electron microscope

New Electron Microscopes

Two state-of-the-art cryo-electron microscopes (EMs), the Aquilos 2 cryo-focused-ion beam scanning EM and Titan Krios G4 cryo-transmission EM, were set up at the Institute of Anatomy in 2022. This multi-million franc investment places UNIBE at the forefront of protein and cell structure biology. The MIC thanks the joint effort of MIC board with the MIC committee members Prof. Benoît Zuber, Prof. Wanda Kukulski and Prof. Dimitrios Fotiadis and the strong support of the Rectorate, in particular of the former and current Vice Rectors for Research Prof. Daniel Candinas and Prof. Hugues Abriel, as well as of the Swiss National Science Foundation, the Medical Faculty, and the Institute of Anatomy and the Institute of Biochemistry and Molecular Medicine. With this acquisition, the University of Bern joins EPFL and the Universities of Lausanne and Geneva in the world-renowned Dubochet Center for Imaging.

MIC Symposium 2022

The MIC Symposium 2022 on "Imaging cellular dynamics across scales" took place on November 18, 2022 at UniS. The invited scientific speakers Prof. Francesca Peri, University of Zurich, Prof. Suliana Manley, EPFL, Prof. Miki Ebisuya, EMBL Barcelona and Prof. Joachim Goedhart, University of Amsterdam spoke about latest achievements in imaging across scales. Prof. Christian Soeller and Prof. Olivier Pertz formed the scientific committee of the MIC and presented state-of-the-art microscopy at the University of Bern. The various presentations illustrated how each biological scale requires a complementary set of microscope technology, specific image analysis algorithms, as well as a variety of genetically encoded fluorescent probes. In the end, it was a spectacular day with stunning microscopy documenting how entertaining biological processes can be!



Prof. Olivier Pertz, who represented the Science faculty on the MIC board from 2018 to 2022, was ceremoniously bid farewell.