

Light Microscopy Core

The Light Microscopy Core, housed in the Health Sciences Research Building, is a multi-use core facility offering 24/7 access to a variety of microscopes facilitating quantitative imaging across the entire spectrum of light/fluorescence/atomic force microscopy. Core imaging modalities include: widefield, confocal, super resolution (structured illumination (SIM), stochastic optical reconstruction (STORM), Airyscan Fast), total internal reflection (TIRF), laser capture, multiphoton microscopy for intravital studies and hybrid atomic force/confocal for physical biomaterials characterization. The entire palette of advanced fluorescence measurements techniques are supported including: Fluorescence lifetime, Fluorescence Correlation, Fluorescence recovery after photobleaching, Fluorescence loss in photobleaching, Spectral unmixing, Second harmonic generation and Photoactivation with simultaneous imaging.

The core has a central preparatory laboratory, can supply most commonly used immunohistological supplies and reagents and allows the advanced and complex analysis of multidimensional imaging data via high end workstations and a substantial selection of custom and commercial image processing software, including Imaris with advanced MatLab options.

Rapid tissue clearing services, with an electrophoretic X-CLARITY system, for mouse brains and other small organs and tissue sections are available.

Extensive technical support is provided across all levels of microscope operation and data treatment. It ranges from basic investigator training on the instrumentation to allow independent use, over the assistance with advanced data acquisition modalities, custom adaptations of the hardware, programming application specific acquisition to imaging services only requiring a sample drop off. Further, data clinics are assisting the users to learn and perform advanced image analysis, image rendering and a robust quantitation of multidimensional data, including 3d object tracking, deconvolution, automated object tracing, counting and volume/area measurements and the characterization of topography and elastic modulus from nanomechanical tissue and cellular AFM data.

Equipment available includes the: Zeiss LSM 880 NLO, Nikon A1R, Nikon NSIM, Nikon NSTORM, Leica SP5, Zeiss PALM Laser Microcapture, X-Clarity Tissue Clearing System, Leica VT 1000S vibratome, RMC XI PowerTome microtome, Thermo Cryotome FSE, automated craniotomy robot, and a JPK Nanowizard 4/Nikon A1 hybrid.

Some highlights of the facilities' microscopes include capabilities of imaging at 40 nm resolutions with STORM, 1000 HZ acquisition rates for widefield microscopy, live cell imaging with the Airyscan fast mode at 96 HZ and 140 nm superresolution, imaging cleared tissue at a depth of 5.6 mm with diffraction limited performance and dual color intravital imaging with the multiphoton microscope at tissue depth of up to 1000 microns.