

NDIIF OPTICAL MICROSCOPY CORE USER GUIDE

Instrumentation Suite, Capabilities, and Image Analysis Workflows

Notre Dame Integrated Imaging Facility (NDIIF) • Core Reference Guide

OPTICAL MICROSCOPY CORE (OMC) RESOURCES

This reference guide details the state-of-the-art light, fluorescence, confocal, multiphoton, and light-sheet microscopy systems available in the **NDIIF Optical Microscopy Core**. These tools enable single-cell to whole-organism imaging across fixed, live, and optically cleared biological specimens.

1. Active Optical Microscopy Instruments

Instrument	System Type / Modality	Key Features & Typical Applications
Zeiss LSM 980	Advanced Laser Scanning Confocal	High-sensitivity, low-phototoxicity confocal imaging for organoids, spheroids, single-cell resolution, and dynamic live-cell processes [cite: 1.1.1, 1.2.2].
STELLARIS 8 DIVE	Multiphoton / Intravital Microscopy	Flexible multicolor multiphoton imaging exceeding \$1\text{ mm}\$ in tissue depth for intravital live animal studies [cite: 1.1.1, 1.2.2, 1.2.4].
Nikon A1R-MP	Two-Photon Confocal System	Equipped with 4 laser lines (\$405, 488, 561, 633\text{ nm}\$) [cite: 1.1.1, 1.2.2]. Two-photon mode allows deep imaging into thick tissues with minimal background and phototoxicity [cite: 1.1.1, 1.2.2].
Nikon C2+	Laser Scanning Confocal	Semi-automated upright confocal ideal for fixed samples, featuring 3 PMT detectors and 4 standard laser lines [cite: 1.1.1, 1.2.2].
Luxendo MuVi SPIM	Light-Sheet Fluorescence Microscope	Fast, low-phototoxicity 3D imaging ideal for long-term study of organisms, tissue explants, optically cleared samples, and 3D cell cultures [cite: 1.1.1, 1.1.2, 1.2.2].
Nikon CSU-X1	Spinning Disk Confocal	Optimized for high-speed, gentle imaging of living cells expressing fluorescent proteins or stained with synthetic dyes [cite: 1.1.1, 1.2.2].
Keyence BZ-X810	Automated All-in-One Microscope	Fully automated brightfield and widefield fluorescence system adaptable to large-area tile scanning and multi-well plate assays [cite: 1.1.1, 1.2.2].
Nikon AZ100	Multi-Zoom Macroscope	Covers continuous zoom magnifications (\$5\times\$ to \$400\times\$) for macro-to-micro brightfield and fluorescence imaging [cite: 1.1.1, 1.1.2, 1.2.2].
Nikon Eclipse 90i	Upright Widefield Microscope	Designed for fluorescent or chromogenic stained slides (H&E, IHC/DAB, Gram, trichrome) [cite: 1.1.1, 1.1.2, 1.2.2].

2. Image Processing & Data Analysis Software

Dedicated Analysis Workstations & Software Packages:

- **IMARIS Visualization Software:** Available on dedicated workstations for 3D/4D rendering, surface segmentation, cell tracking, and quantitative presentation of multi-channel datasets [cite: 1.1.1, 1.1.2, 1.2.1].
- **Nikon NIS-Elements:** Comprehensive software suite for acquisition control, 2D/3D deconvolution, spectral unmixing, and automated object measurement [cite: 1.2.1].
- **DeltaVision Software:** Specialized workstations available for image restoration, deconvolution, and high-contrast quantitative fluorescence analysis [cite: 1.2.1].

3. Support Services & Booking Information

- **Location & Hours:** Optical Microscopy Core laboratories are located in **Galvin Hall (Room 007)** [cite: 1.2.1]. Open Monday through Friday, 8:00 AM – 5:00 PM (24/7 access for trained independent users) [cite: 1.2.1].
- **Consultation & Training:** Core staff provide hands-on instrument training, assistance with experimental design, fluorophore selection, sample preparation (fixed/live/cleared), and assisted imaging [cite: 1.2.1].

- **Reservations:** Schedule instrument time and training sessions via the NDIIF iLab Portal (`nd.ilab.agilent.com`) [cite: 1.2.1].

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University of Notre Dame • Notre Dame, IN 46556 • imaging.nd.edu/services/optical-microscopy-core