MICRO AND NANO IMAGING CORE

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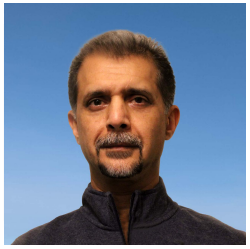
Revision AE

BU BME CORE FACILITIES

LEADERSHIP



Dr. Zahid Yaqoob, PhD
MNI Director

Matt Barber
BME Director

Dr. John White, PhD
BME Chair

FACILITY ADVISORS

(left to right) Dr. Jerome Mertz, Dr. David Boas, Dr. Anna Devor

The Micro and Nano Imaging (MNI) Facility is part of Biomedical Engineering Department's Core Facilities at Boston University. It is a center dedicated to teaching and research with an emphasis on optical microscopy of biological materials. Currently, we support over 13 million dollars of NIH research grants awarded to researchers at BU by offering access, training, and assistance in the imaging of tissues, cells, and bacteria with commercial imaging platforms.

BU BME CORE FACILITIES

BOSTON UNIVERSITY

FACULTY USERS

We are proud to be supporting over 13.5 million dollars of research grant funding!

NSF SBIR NIH National Institutes of Health *Turning Discovery Into Health*

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INDUSTRY PARTNERS

OLYMPUS

Prisma Bioscience
Illuminating Proteomes

Elevian

bioventus

We are supporting research in therapeutics, drug discovery, and fundamental science.

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Our Services

We offer consultation and imaging services to both internal and external researchers on a fee for service or fee for use model.

We also have extensive experience in manufacturing and have access to a high-precision machining facility with CNC machining, 3D printing, and wire EDM capabilities.

We offer consultation and imaging services in the following areas:

- Bright Field / Dark Field Imaging
- DIC / ZPC Phase Imaging
- Histology Slide Imaging
- Confocal Imaging

We also offer engineering services

- Optical systems and lens design
- Mechanical and Opto-Mechanical Design
- High precision additive and subtractive fabrication
- General prototyping services

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OLYMPUS FV3000

LASER SCANNING CONFOCAL MICROSCOPE

SYSTEM FEATURES

- INVERTED MICROSCOPE CHASSIS
- FOUR DETECTOR CHANNELS
  - 2x BI-METAL ALKALI
  - 2x GaAs/GaAsP DETECTORS)
- LAMBDA SPECTRAL DETECTION
  - 2 NANOMETER SPECTRAL BANDPASS
- GALVO AND RESONANT GALVO
- SOLID STATE DIODE LASERS
  - 405/445/488/514/561/640 NANOMETERS
- MOTORIZED XYZ STAGE
  - TILTING AND AUTOMATED STITCHING
- Z DRIFT COMPENSATION
- LIVE CELL COMPATIBLE*

*TOKIHIT FULL ENVIRONMENTAL ENCLOSURE WITH TEMPERATURE, CO_2 AND HUMIDITY CONTROL

OLYMPUS®

BU BME CORE FACILITIES

BOSTON UNIVERSITY

OLYMPUS FV3000

LASER SCANNING CONFOCAL MICROSCOPE

AVAILABLE OBJECTIVES

MODEL	MAGNIFICATION	N.A.	WORKING DISTANCE	IMMERSION
PLAPON	1.25X	0.04	5 mm	AIR
UPLSAPO10X	10X	0.4	3 mm	AIR
UPLSAPO20X	20X	0.75	0.6 mm	AIR
LCPLFLN20X	20X	0.45	6.60-7.80mm	AIR
PLAPON60XO	60X	1.42	0.15 mm	OIL
UPLSAPO100XS	100X	1.35	0.2 mm	SILICON OIL

SUITABLE FOR

- LIVE CELL IMAGING
- FRAP/FRET
- LARGE AREA/TILING
- LONG DRUATION STUDIES
- WELL PLATES AND SLIDES
- SPECTRAL DECONVOLUTION
- PSF DECONVOLUTION
- REFLECTION CONFOCAL AND DIC MICROSCOPY

OLYMPUS®

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OLYMPUS VS120

VIRTUAL SLIDE SCANNING SYSTEM

SYSTEM FEATURES*

- LED ILLUMINATION SOURCE
- COLOR BRIGHTFIELD IMAGING
- HIGH SENSITIVITY FLUORESCENCE IMAGING
  - DAPI
  - FITC
  - TRITC
  - CY5
- MOTORIZED XYZ STAGE
- AUTOMATED WORKFLOW
  - 100 SLIDE AUTOMATIC LOADING CAPACITY
  - VIRTUAL-Z SCAN MODE
  - AUTOFOCUS AND TISSUE IDENTIFICATION
- LARGE SCAN AREA (26MM X 64MM)
- SHADING CORRECTION

*ONLY COMPATIBLE WITH 25MM X 75MM X 1MM THICK SLIDES WITH NO. 1.5 COVERGLASS

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OLYMPUS VS120

VIRTUAL SLIDE SCANNING SYSTEM

AVAILABLE OBJECTIVES

MODEL	MAGNIFICATION	N.A.	IMMERSION
PLAPON	2X	0.08	AIR
UPLSAPO10X	4X	.16	AIR
UPLSAPO10X	10X	.4	AIR
UPLSAPO20X	20X	.75	AIR
UPLSAPO40X	40X	.95	AIR

SUITABLE FOR

- LARGE AREA/TILING
- HIGH THROUGHPUT HISTOLOGY
- FOUR COLOR FLUORESCENCE
- COLOR BRIGHT FIELD
- MONO-LAYER CELLS
- SECTIONED TISSUE AND SPHERIODS

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COMMON QUESTIONS

Can we image our own slides?

For internal users, we offer training to our registered users on both the confocal and the slide scanner. Once you have been trained, you will be given access to the instrument calendar. For room access, you will need to apply for access through BU Zaius. Training on the confocal is 3hrs and training on the slide scanner is 2 hrs. Your training will be billed at the rate for imaging assistance.

For external users, we will need an open PO to cover for any potential instrument damage prior to issuing you sponsored BU ID. Once you have received your BU ID, we can proceed with training. Sponsorships are valid for 1 year or until the PO expires, whichever comes first.

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COMMON QUESTIONS

What type of materials can you accommodate?

Our core facility is a biosafety level 1 and 2 facility and can handle

- Agents not known to consistently cause disease in immunocompetent adult humans, and present minimal potential hazard to laboratory personnel and the environment.

- Agents associated with human disease, but is rarely serious and for which preventative or therapeutic interventions are often available.

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COMMON QUESTIONS

What fluorescent dyes can you image?

As long as there is efficient excitation of the dye, the confocal microscope can be configured for your needs. Due to the wide variety of dyes, we recommend you speak with us once you have obtain the excitation and emission spectra for your desired dyes.

For the widefield slide scanner, there are only 4 preselected filter cubes available. We can image DAPI/FITC/TRITC/CY5. While it is possible for us to add filter additional cubes to this system, there will be an additional cost for tooling and installation.

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COMMON QUESTIONS

What thicknesses can you image?

The thickness of the sample depends on the imaging technique, the type of tissue, the quality and brightness of the stain, and a multitude of other factors.

For confocal, we typically do not recommend imaging deeper than 100um in well labeled, but highly scattering tissue.

For the slide scanner, we do not recommend anything thicker than 15um.

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COMMON QUESTIONS

Can you image slides?

Yes. Both our confocal and slide scanners are capable of whole slide imaging. However, we can only handle **25MM X 75MM X 1MM** slides with No 1.5 coverslips on the slide scanners. All slides must have a white label or a white labeling area. Colored slides are NOT recommended.

In the confocal, we can also accommodate 30mm well plates with No 1.5 cover glass bottoms, 6 to 356 well plates with No 1.5 glass bottoms. We can also custom design fixtures to fit your needs.

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COMMON QUESTIONS

Why are some parts of my image blurry?

While we take the upmost care in imaging your sample, proper tissue mounting is critical. Often, blurry images are due to uneven tissue mouting which causes part of the tissue to move out of the focal depth of the objective. This is most common on high magnification objectives when the depth of focus is very short. Another possibility is tissue folds or rips, which also causes the tissue to move out of the focal depth of the objective.

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COMMON QUESTIONS

Do you offer digital image processing services?

At this time, we are unable to offer this service.

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COMMON QUESTIONS

How much does this cost?

Our rates are calculated annually and published online at our website. For all imaging services, we will bill for the cost of equipment usage and personnel. As such, we highly recommend starting with the automated slide scanner to identify specific tissues and regions of interest in that tissue prior to requesting confocal imaging.

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COMMON QUESTIONS

Can you offer a quote?

The imaging requirements vary greatly between our users and cannot be easily estimated unless we can have your sample in-house for testing.

You will be billed once imaging is completed and the samples returned to you once the invoice has been paid. If you've registered with Boston University and have issued a PO for your service, we will return your samples once they have been imaged. You will be responsible for all shipping and handling fees.

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COMMON QUESTIONS

How long will it take to image my slides?

Depending on the complexity of the imaging and the availability of our staff, typical turn around time is 1-2 weeks after receipt of your samples.

Depending on the size of your data, we may share it with you via online or through physical media. We will keep **your data is confidential** and will be not be shared with anyone. However, if you wish your data to be removed from our systems, we will require a written request.