Becoming a user at the USR Advanced Light Microscopy Core

We have many instruments with overlapping capabilities and we strive to identify the most appropriate and cost-effective selection based on your experiment's needs, your experience, and your location.

To this end we offer the following services —

FREE CONSULTATIONS

- **Imaging goals, instrument selection and sample preparation.** Project planning advice prior to sample preparation is free and highly recommended. Describe your project by email to our team at almc@ohsu.edu. A staff member with relevant expertise will reach out to discuss your project with you one-on-one: virtually or in person.
- **Data analysis tools**. We have several multidimensional data visualization and analysis tools (Bitplane Imaris, Arivis Vision 4D, IstoVisio syGlass VR, Zeiss ZEN Blue, and Nikon NIS Elements). We are also willing to discuss open-source tools, such as FiJi/ImageJ, to find a solution that can be run on your personal computer. Describe your project by email to our team at almc@ohsu.edu. A staff member with relevant expertise will reach out to discuss your project with you one-on-one: virtually or in person.

TECHNOLOGICAL ADVICE

- **Evaluation of your sample**. We will work with you and your prepared sample on the microscope we recommend based on your project description. We will assess our instrument selection and help you establish efficient acquisition settings for high-quality data generation. Generally, this requires 60-90 minutes at instrument cost. Staff time is free for this initial session. Sample evaluation can be scheduled during business hours Mon-Fri.
- **Evaluation of data acquisition.** We will work with you and your image acquisition parameters toward improving quality and/or workflow efficiency. Schedule a 30-minute, staff-assisted session during business hours Mon-Fri. Staff time is free for this initial session.
- **Workflow development for data analysis**. We offer our expertise to establish analysis strategies for your data based on your written request and/or after free consultation sessions with us. Your presence is optional. This is offered to any customer during business hours Mon-Fri. Charges are workstation fee plus ~$70/hour for staff time.
- **Editing of methods sections.** We provide guidance on how to describe our equipment to enable reproduction of data acquisition. We reserve the right to charge staff time for efforts beyond 30 minutes, including back and forth communications, whether in person or via email.
- **Advice on data presentation.** Whether you are preparing your data for publication in print or for a poster or platform presentation, we offer tips and tricks on how to make your images pop. These are generally short sessions, but we reserve the right to charge staff time for all efforts beyond 30 minutes, including back and forth communications, whether in person or via email.

FULL SERVICE BY OUR EXPERT STAFF

- **Assisted imaging/instrument use**. We perform data acquisition for you, with or without your presence. For occasional users with intermittent needs, we consider this the most cost-effective approach to achieve consistent results. Assisted use is available Mon-Fri during business hours. Charges are instrument cost plus ~$70/hour for staff time.

- **Data analysis**. Core staff are available for hire for data analyses. Charges are workstation fee plus ~$70/hour for staff time. For lengthy projects, we can discuss effort-based billing for analysis support.

- **Data presentation.** We offer help with figure design and 3D rendering and animation for presentations or online distribution. Please reach out by email to identify team members with particular expertise and to schedule a workstation session. Charges are workstation fee plus ~$70/hour for staff time.

ONE-ON-ONE TRAINING

These guidelines are modified due to COVID-19. Under Level Two COVID-19 policies, previously trained users must recertify with core staff to regain independent instrument access. New users who can demonstrate microscopy experience may be considered for recertification. Novice users who can demonstrate frequent and sustained needs for instrument access may be considered for training, but must observe instrument use with either core staff or more experienced lab members prior to beginning training. Instruments vary in their available recertification and training options. Please contact core staff for more information.

- **For novice users: training to proficiency for unsupervised use of our equipment.** Training is instrument-specific and proficiency is not transferable, even for instruments capable of the same modality. The goal of our training is to ensure that you are comfortable with instrument operation toward achieving your research goal. Please contact us ahead of time with a project goal in mind so that we can direct you to an instrument that would be appropriate for your experiment.

  A thorough understanding of the principles behind an instrument's technology is needed to operate it competently. We therefore train in three stages. Each stage is comprised of training sessions, which involve instructing you in instrument operation and include opportunities for hands-on learning. Sessions will last 60-90 minutes, and should occur within two weeks of the previous session —

  - **Basic training:** We will explain principle and function of the instrument and show you how to capture an image of a core-provided sample. Charges are instrument cost plus ~$70/hour for staff time. **Under COVID-19 policies, this is two sessions — one with a core sample, and one with a user sample. Core staff are at the microscope with the user connecting remotely.**

  - **Advanced training:** We ask you to operate the instrument under our supervision and will show you how to capture an image of your sample. This session will include advanced modalities that are applicable to your research. Charges are instrument cost plus ~$70/hour for staff time. **Under COVID-19 policies, user is at the microscope, staff will connect remotely.**

  - **Solo session:** You operate the instrument independently with staff ready to assist if necessary. For scheduling purposes, the entire session will initially be booked with staff assistance to ensure staff availability. We will not supervise unless requested. We reserve the right to charge staff costs effort beyond 15 minutes. Charges are otherwise instrument operation cost only.

Depending on the instrument, previous user experience and experimental goals, the total cost of training for unsupervised use varies greatly. Please find below a table of cost estimates.

For novice users, we anticipate 2-4 staff-assisted sessions. Intermediate users are people who attend several assisted use sessions, or are trained on other, similar instruments in the facility or elsewhere. Expert users exhibit a combination of high-level proficiency and knowledge of our instruments. For example, an expert user may be trained on multiple instruments and/or modalities, and will have used our instruments frequently over the previous year or have demonstrable equivalent experience and knowledge gained at another institution or on other instruments. Intermediate and expert users may require fewer training sessions. Proficiency for unsupervised use is granted at our discretion.

Once “trained user” status is granted, users may schedule instrument use during off-peak hours (see below).

- **Specialized training:** Any additional instrument training necessary for acquiring interpretable data, or to accommodate changes in your experimental design. These session(s) incur instrument and staff costs.
- **Training on data analysis:** We provide one-on-one training specific to your data analysis needs. Charges are workstation cost plus ~$70/hour for staff time.

SCHEDULING AND POLICIES —

- **Online reservations:** We use calendars through iLab Operations Software for managing access to all our workstations and instruments. Instrument operation costs vary by instrument according to service contracts. Peak (e.g. 10 a.m.-2 p.m. Mon-Fri) and off-peak hours (evenings and weekends) are differentiated by higher reservation cost during peak hours. Only trained users are allowed to schedule off-peak hours. To ensure equitable access, users are limited to 8 peak-hours of use in a week on any given asset, off-peak access is unlimited. Instructions for getting an iLab account: https://www.ohsu.edu/research-cores/getting-started
- **Billing:** You will need an alias to make a reservation on an instrument or workstation. ALMC staff do not have the authority to grant you access to aliases in iLab; this task must be done by your lab’s Principal Investigator or financial manager. Reservations are billed at the end of the month. More information on managing aliases here: https://www.ohsu.edu/research-cores/managing-aliases
- **Cancellation policy**: Cancellations within 24 hours of a scheduled session are considered late and will be noted. Repeated abuse results in notification of superiors and a financial penalty.
- **Recertification for unsupervised use:** At our discretion, you may be asked to recertify your training due to a lengthy lapse in usage, or because of a significant hardware or software change.
- **Instrument etiquette**:
    - The iLab schedule is binding — please do not overrun your scheduled time. Plan ahead and allow for data transfer and cleaning within your scheduled time window.
    - Exit the software at the end of your session.
    - Check the iLab schedule at the end of your session and leave the instrument running for any other user scheduled on the same day.
    - If you are the last user of the day, you are responsible for turning off the system. If you cancel and you are the last user, please ensure shutdown of the system by notifying previous users, core staff, or shutting down the system yourself.
    - All users will be instructed during training on how to clean immersion objectives. Immersion objectives should be cleaned after every use.
    - Do not leave samples and trash behind.
    - Note any issues with operation in the green instrument issue notebook.
    - Notify staff of any violations of instrument etiquette.
- **Data**:
    - No Patient Health Information (PHI) is allowed on any of our computers at any time. This includes our analysis workstations.
    - Store data on data drives (e.g. D:\, E:\, F:\). Never store data on the desktop or the C:\ drive.
    - Core computer hard drives are for temporary storage only. Transfer your data for safety after each session and delete local data when successful transfer has been verified.

- Deletion of data on computer data drives is unannounced.
- Transferring data: We recommend that labs establish dedicated research data storage at OHSU's Advanced Computing Center (ACC). More information here: https://www.ohsu.edu/advanced-computing-center/acc-and-research-data-storage-rds
  Non-encrypted external hard drives are acceptable for certain instruments only. Contact core staff for advice.
- Only core staff may install new software and modify existing applications.

- **Urgent support during regular work hours:** Scheduled users who encounter instrument or computer issues can ping core staff on work cell phones during normal business hours. Non-urgent inquiries should be placed by email, with general questions directed to almc@ohsu.edu.

Stefanie Kaech Petrie	kaechs@ohsu.edu	c: 503-729-1991
Crystal Chaw	chaw@ohsu.edu	c: 971-930-5487
Brian Jenkins	jenkinsb@ohsu.edu	c: 971-645-9908
Hannah Bronstein	bronstei@ohsu.edu	c: 503-528-6620

- **Urgent support off-hours:** Please call Stefanie at 503-729-1991 for fastest response and text your question if she does not answer. Do not use email as she checks emails only during regular work hours.

- **Our areas are shared spaces:** Our microscope rooms are public places. Please work without gloves as we believe they can give a false sense of security. The only exception is while working on approved Biosafety level two (BSL2) projects (see below). Please clean up after yourself and respect the microscope work spaces.

- **Biohazard:** Our areas are generally considered BSL1 work spaces but can temporarily harbor contained and low levels of BSL2 agents under institutionally approved projects. Any work with live BSL2 samples requires Institutional Biosafety Committee (IBC) approval and notification of the ALM Core Director. PIs are responsible for seeking IBC approval prior to imaging in the core and users are required to follow IBC-approved guidelines for each session scheduled in the core. These include affixing appropriate signage to workspaces, preparing for accidental spills, cleaning after use, and removal of all hazardous waste after each session.

- **Vertebrate imaging.** PIs are responsible for seeking Institutional Animal Care and Use Committee (IACUC) approval for animal work in any areas assigned to the ALM Core. Core staff is not allowed to touch any animal subjects and is unqualified to assist with animal welfare.

ACKNOWLEDGEMENTS AND AUTHORSHIP

Use of data generated in a core facility for a grant application, progress report, or publication contains the implicit understanding that the PI and authors will acknowledge the use of the core facility. Facilities are supported by federal agencies and acknowledgements are essential for securing continuing support. If core personnel provide significant intellectual input into the results submitted for publication, it is reasonable and appropriate to include them as co-authors. Each case should be considered individually and the core director should be consulted for review prior to publishing.

INSTRUMENTS AND LOCATIONS —

Marquam Hill Campus — Acquisition

ZEISS LSM 980 Airyscan.2	LBRB 478	Advanced laser-scanning confocal for fixed and live samples
ZEISS LSM 900 Airyscan	LBRB 476	Laser-scanning confocal for routine imaging of fixed samples
ZEISS ELyra 7	LBRB 451	Lattice-based structured illumination for fast and gentle 'super'-resolution imaging
ZEISS Celldiscoverer 7	LBRB 461	Automated widefield for plates/dishes/chamber slides
Nikon CSU-W1 Spinning Disk	LBRB 474	Live cell imaging
IncuCyte *zoom*	LBRB 474	Incubator microscope for long-term timelapse imaging
GE/API CoreDv	LBRB 474	Deconvolution-based widefield imaging (thin samples)
ZEISS ApoTome.2	LBRB 478	Widefield imaging with optical sectioning for thin samples
ZEISS AxioZoom V16	LBRB 474	'Stereo'-zoom microscope (BF/FL) *offline during Level 2!*
ZEISS LSM 7MP	MRB 268	Intravital multiphoton microscopy
ZEISS AxioZoom	MRB 268	Intravital fluorescence zoom microscopy
Pelco BioWave	LBRB 430	Microwave fixation and antigen retrieval

Marquam Hill Campus — Analysis in LBRB 481

4 Workstations with Bitplane **Imaris** (3 seats); **ZEN** (3 seats); **NIS Elements** (1 seat); **syGlass** (1 seat VR).

South Waterfront Campus — Acquisition

ZEISS LSM 880 Fast Airy	KCRB 3161A	Advanced laser-scanning confocal for fixed and live samples with spectral detection and multiphoton excitation
ZEISS CSU-X1 Spinning Disk	KCRB 3161	Widefield or laser-based confocal imaging with camera-based detection
ZEISS AxioScan.Z1 'Sprint'	KCRB 3161	Automated slide scanner (BF/FL)
ZEISS AxioScan.Z1 'Marathon'	KCRB 3161	Automated slider scanner (BF/FL) for cyclic IF
ZEISS AxioZoom V16	KCRB 3161	'Stereo'-zoom microscope (BF/FL)
ZEISS LighsheetZ.1	KCRB 3161	Sheet illumination microscope for live and cleared samples
LifeCanvas SmartClear II	KCRB 3161B	Tissue clearing machine (CLARITY; Shield)

South Waterfront Campus — Analysis in KCRB, 3rd floor

2 Workstations with Bitplane **Imaris** (2 seats); **ZEN** (2 seats); **Arivis** (1 seat).

Abbreviations: BF, brightfield; FL, fluorescent; IF, immunofluorescence; KCRB, Knight Cancer Research Building; LBRB, Lamfrom Biomedical Research Building; MRB, Medical research building; LSM, laser scanning microscope.

General estimates of training costs based on user experience, instrument cost and imaging modality

We categorize users based on our personal assessment when meeting and working with new users.

Novice	No previous experience with microscopy.
Intermediate	Some experience with microscopy at OHSU or previous work places. **Most current users of the ALMC fall in this category**.
Expert	Demonstrated experience and understanding of microscopy principles verified through extensive interaction with core staff. Also applies to cross-training on similar modality on another instrument.

Imaging modality and instrument(s)	**Novice**	**Intermediate**	**Expert**
Standard widefield microscopy ZEISS Apotome (MH); ZEISS Spinning Disk (KCRB)	$200	$160	$80
Optical sectioning based on deconvolution GE/API CoreDv (MH)	$350	$250	$250
Optical sectioning based on Apotome imaging ZEISS Apotome (MH)	$400	$200	$80
Optical sectioning based on confocal microscopy ZEISS LSM 980 and ZEISS LSM 900 (MH); ZEISS LSM 880 (KCRB)	$600	$300	$200
'Super'-resolution based on Airyscanning ZEISS LSM 980 and ZEISS LSM 900 (MH); ZEISS LSM 880 (KCRB)	$600	$300	$200
'Super'-resolution based on SIM ZEISS Elyra 7 (MH)	$600	$400	$300
Spectral imaging ZEISS LSM 880 (KCRB)	$600	$300	$200
Large tissue imaging (thin sections) ZEISS Apotome (MH); ZEISS Spinning Disk (KCRB)	$400	$250	$100
Only staff-assisted use allowed during Level 2! Slide scanning ZEISS AxioscanZ.1 (KCRB)	$400	$350	$300
Large tissue imaging based on Airyscanning ZEISS LSM 980 and ZEISS LSM 900 (MH); ZEISS LSM 880 (KCRB)	$600	$300	$200
Large tissue imaging based on lightsheet microscopy ZEISS Lightsheet.Z1 (KCRB)	$1200	$800	$700
Live sample imaging based on widefield microscopy ZEISS Celldiscoverer 7 (MH) Incucyte (MH) ZEISS Spinning Disk (KCRB)	$600 $175 $450	$350 $175 $350	$350 $175 $150
Live sample imaging based on spinning disk confocal NIKON Spinning Disk CSU-W1 (MH) ZEISS Spinning Disk CSU-X1 (KCRB)	$450 $450	$450 $300	$350 $200
Live sample imaging based on Fast Airy ZEISS LSM 880 (KCRB)	$600	$300	$200
Live sample imaging based on lightsheet microscopy ZEISS Lightsheet.Z1 (KCRB)	$1200	$800	$700
Intravital imaging with multiphoton excitation ZEISS LSM 7MP (MH)	$400	$250	$200

MH, Marquam Hill Campus; KCRB, South Waterfront Campus