

Training and Use of Lago-X Imaging Unit for Small Animal Whole Body Imaging (updated 11/08/2024 TCH)

1. LAGO X CORE TRAINING

1.1. Facility Contact

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1.2. Lago X Core In-Person Training Information

- Please do not bring any mice or specimens to the training session as we have calibrated phantoms we use for instrument and software training.
- To get to the core, take the #62 or #63 elevator to the sub-basement level in Mitchell and proceed 25m towards DCAM, past the restrooms. You will see the iSAIRR (room TE-070) with a large glass plaque.
- Once you arrive and enter, please glove/gown/mask and enter TE-071, first room on your right, which is the location of both our Lago X and IVIS Spectrum.
- You should have card-swipe access to the iSAIRR's Optical Core (TE-071), where the IVIS Spectrum and Lago X reside. But **if you do not**, you will also need to complete a virtual tour of the iSAIRR online, pass a simple quiz, and request ID card swipe access to the facility from the ARC. To access the ARC's iSAIRR Virtual Tour, you need to log into the AALAS Learning Library website at <https://aalaslearninglibrary.org/login/signin>, then click "Group Courses" on the left side of the page, then click on "iSAIRR Virtual Facility Tour". Here you will see 4 options:

- 1). [iSAIRR Virtual Facility Tour \(which will give you access the Optical Core too\)](#)
- 2). [Facility Access Request \(request access to the Mouse Return Room TE-073\)](#)
- 3). [Cage Transport Request \(to the Mouse Return Room TE-073\)](#)
- 4). [Final Exam](#)

Once you have finished the learning module and passed the exam at the end (items 1 and 4 above), click on items 2 and 3 on the webpage for videos that instruct you on how you each can then request ID card swipe access to the iSAIRR (and its Optical Core) and transfer your mice to the iSAIRR's mouse room TE-073 (which is where all mice used for optical imaging are now housed) via the AIMS website.

1.3. ESHA-mandated X-ray Safety Training Course (Must be Completed by All Lago X Users)

Here is a link to the ESHA-mandated X-ray Safety Training Course (**course # rad-006 Cabinet X-ray Safety**) for Lago X users: <https://researchsafety.uchicago.edu/training/>. Once on the ESHA webpage, locate and click on the highlighted weblink below after which you will be asked to log into the ESHA portal via 2-factor authentication, using your CNet ID/password. Please note that you will likely need to search for the course # the first time you access the training, after which your information will be retained for mandatory annual refresher training.

Only individuals we train to operate the Lago X need this Radiation Safety Office instruction - other individuals present in the Optical Core who are *not operating* the Lago X are *not* required by Radiation Safety for such training.

2. TUTORIAL VIDEOS FOR USING THE LAGO-X IMAGING UNIT

Below are some short but useful orientation and training videos for the Lago X that you should review prior to your in-Core training with the Lago X. Most are 10-15 minutes or less.

Also, please complete the ESHA-mandated X-Ray Safety Course via the hyperlink below before your in- Core training on the Lago X. Everything below will only take you 2-3 hours to complete, at most.

2.1. IMAGING WITH THE LAGO X

How to Acquire Data Using Easy Mode

<https://www.youtube.com/watch?v=v07OPtxcPKY>

ToolBox Overview - Aura 4.0 Tutorial

<https://www.youtube.com/watch?v=odXUmMCOUGA>

How to Acquire Data Using the Group Acquire Feature - Aura 4.0 Tutorial

<https://www.youtube.com/watch?v=5jnD93ZONns>

2.2. BIOLUMINESCENCE IMAGING

How to Acquire BLI Data Using Luminescence Classic Mode

<https://www.youtube.com/watch?v=HILyzfeTE7I>

What Units Should You Use to Quantify Bioluminescent Signal?

<https://www.youtube.com/watch?v=GtY-tW4ZCqg>

How to Detect Both Strong and Weak Signals with Preclinical Optical Imaging

<https://www.youtube.com/watch?v=GA5zB7xI7Cw>

2.3. FLUORESCENCE IMAGING

How to Acquire FLI Data Using Fluorescence Classic Mode

<https://www.youtube.com/watch?v=BDfH3vV2MRY>

How to Perform ROI Analysis for FLI with Background ROIs

<https://www.youtube.com/watch?v=VG6d26srP2k>

How to Detect Both Strong and Weak Signals with Preclinical Optical Imaging

<https://www.youtube.com/watch?v=GA5zB7xI7Cw>

2.4. X-RAY IMAGING

How to Acquire X-ray Data

<https://www.youtube.com/watch?v=RmHD2Q3ZAbM>

How to analyze data from Living Image® with free Aura analysis software

<https://www.youtube.com/watch?v=PvDJO-ps1AQ>

3. LAGO-X SCHUDELING AND DATA RETRIEVAL

Scheduling: <https://oicf.uchicago.edu/phpscheduleit2/web/> Please only reserve the instrument when you are certain you will be imaging, and cancel any reservations you cannot use PRIOR to their commencement time, to avoid being billed for the hours that you do not use, at 1/2 normal rate. Please let me know if you have any questions, and feel free to use the phantoms in the locker marked "Optical Imaging".

Data Retrieval: To retrieve your Lago-X imaging data you will need to first establish a VPN connection, if off campus. (Cisco AnyConnect Secure Mobility Client is available from UChicago IT Services website for free, which is also the software you would use to access UChicago libraries and journals when off-campus.) Once you have established a VPN connection, or log in on campus, go to the Office of Shared Research Facilities (OSRF's) FTP server at: <https://coresdl.uchicago.edu/Login/> using your web browser (Chrome seems to work best) and enter your groups username and password (note case/capitalization):

T.-C. He group

Username: tche

Password: #W!4zV=8

Please note that we officially only retain your data on the OSRF FTP Server for **90 days** following acquisition (though we will likely leave it there longer). So you are strongly encouraged to retrieve your data shortly after image acquisition. Hope all is going well. Please do let me know if you encounter any difficulties.

4. DATA ANALYSIS

Here is the link where you can each download a free copy of the open-source software (Aura) that you can

use for Lago-X image viewing and quantitative analysis: <https://spectralinvivo.com/software/>

You will need to complete a Software Request Form to get it. Upon submitting the form you will be able to immediately download and install the software (Mac or PC version) onto your local computer.

4. Good Data Management Practices

Whenever you image, or do ROI analyses, using the Lago X's PC in the Optical Core, **please watch to be sure that you are saving your images and analyses to the D: drive** and not the C: drive to which it defaults. More specifically, be sure that you write your files to the "D:/DATA/{your PI name}/{your Cnet username}" folder. Per your training, I strongly suggest you do the following **AT THE START OF EACH IMAGING SESSION:**

- (1) Using Windows' File Explorer, create a folder with the date of your new imaging session on the D: drive. For example, if imaging on March 11th, make a new folder named "Study_03112024" within your D:/DATA/{your PI name}/{your Cnet username} folder
- (2) Launch Aura and begin imaging
- (3) Save your **first** image (*.ami) file (and first experiment (*.aura) ROI file, if doing analysis) to the new folder you just created (e.g., D:/DATA/{your PI name}/{your Cnet username}/Study_03112024). **All subsequent *.ami and *.aura files will then be stored there too until you change them, presumably when you come for your next Lago X imaging session.**

PS. LAGO X Specifications

Vendor Website: [Spectral Instruments Imaging](#)

Vendor Headquarters: Tucson, Arizona, USA

Key Features:

- **10 Mouse Capacity (BLI/FLI/X-ray):** Industry leading 25cm x 25cm field of view
- **Unprecedented Detection:** Previously unattained sensitivity for Bioluminescence and Fluorescence (BLI/FLI)
- **LED Fluorescence Illumination:** Cutting edge patented LED based illumination [14 Wavelengths/20 Filters \(see specifications\)](#); Be prepared for any fluorophore at any time. No need to change filters.
- **Unrivalled Sensitivity:** Minimum Detectable Radiance is 45 photons/sec/cm²/sr
- **Robust Design:** Built to perform for the crucial demands of imaging cores and CRO's
- **Mouse-friendly Platform:** Allows you to easily recover wandering mice
- **Anesthesia Compatible:** Compatible with all third party gas anesthesia systems
- **-90°C Absolute Cooled Camera:** Ultra cold for maximum sensitivity
- **Absolute Calibration:** Ensures quantifiable data
- **50kv X-ray Power:** Allows for large animal imaging (rats, guinea pigs, etc.)
- **Field Upgradable:** Lago units are field upgradable to include X-ray, Access Ports and Quantitative 3D Optical Imaging, with minimal downtime.
- **Aura Imaging Software:** 100% license free Aura Imaging software, available for PC & Mac users
- **Optical μ CT Coregistration:** Universal bedsenable coregistration with μ CT, PET & SPECT
- **Quantitative 3D Optical Imaging:** Enables automated quantitative analysis of bioluminescent reporter distributions across different animals, entire cohorts and study time points.

