

SUBJECT: Laser Safety Policy

1. **PURPOSE:** To establish and maintain a laser safety program that assures the safety of research personnel during the use of analytical equipment that contain lasers.

2. **DEFINITIONS:**

ACOS/R	Associate Chief of Staff for Research
AO/R	Administrative Officer for Research
CDSO	Collateral Duty Safety Officer
LSC	Laser Safety Committee
LSO	Laser Safety Officer
PI	Principal Investigator
RDC	Research and Development Committee
SRS	Subcommittee on Research Safety

3. **OVERVIEW:** The facility Laser Safety Officer (LSO), Laser Safety Committee (LSC), and the Subcommittee on Research Safety (SRS) are responsible for overseeing and monitoring laser usage within Research Service. All research staff using analytical equipment with lasers must comply with the manufacturer operating instructions and administrative procedures necessary for the safe use of this equipment.

4. **RESPONSIBILITIES:**

- a) The facility LSO (ext. 31-4574) has the authority to monitor and enforce staff compliance with laser safety requirements. The LSO will investigate laser-related accidents and initiate corrective action when needed.
- b) The Biomedical Engineering Service is responsible for the maintenance and service of all laser-containing equipment located within the Research Service.
- c) Principal Investigator (PI) will ensure that the users of laser-containing equipment within the Research Service:
 - i) Comply with all elements of the laser safety program.
 - ii) Follow manufacturer's operating procedures.
 - iii) Complete laser safety training prior to "first-time" laser use and annual laser safety training, if required.
 - iv) Laser Safety Training is found on-line in the Talent Management System (TMS) or may be provided by the LSO.
- d) Users of equipment with lasers listed in "Attachment A" will be responsible for:
 - i) Complying with all elements of the laser safety program
 - ii) Adhering to the manufacturers operating procedures
 - iii) Completing one-time laser safety training and annual laser safety training, if required.
 - iv) All laser related accidents shall be reported to the LSO for follow up and corrective action.
- e) The Research Department follows hospital policy regarding medical surveillance.

5. **PROCEDURES:**

- a) The LSO will use and enforce the American National Standards Institute (ANSI) Standards on lasers. All laser related accidents shall be investigated by the LSO.
- b) The LSO, LSC, and SRS oversee the Service's laser policies and procedures, and intervene when procedures are deemed unsafe.
- c) Currently, laser-containing equipment in Research, listed in "Attachment A", are categorized as Class 1 or 2 lasers during normal use. Since annual laser safety training is only required of users of Class 3B and 4, none of the current users of this equipment are required to complete this training annually. However, they are required to complete on-line training entitled "Laser Safety Training" in TMS or meet with the Laser Safety Officer for laser safety training before initial use of any laser equipment.
- d) The laser-containing equipment used within the Research Service is listed in "Attachment A". Users are to follow the manufacturer's operating instructions and **NEVER operate this equipment without all panels in place**. The laser enclosures represent engineering controls that provide user protection against the health hazards related to lasers. Safety precautions for each listed instrument are provided below and posted by each of these instruments.

REMINDER: Completion of laser safety training is required before initial use.

6. **REFERENCES:**

- 1) Facility Laser Safety Policy dated August 9, 2022.
<https://dvagov.sharepoint.com/sites/min/SiteDirectory/ECare/Environment%20of%20Care%20Plans/Forms/AllItems.aspx>
- 2) ANSI (American National Standards Institute) Z136.8-2021: Safe Use of Lasers in Research & Testing. <https://blog.ansi.org/ansi-z136-8-2021-safe-use-lasers-research-testing/>
- 3) ANSI Z136.1-2014: Safe Use of Lasers.
<https://blog.ansi.org/ansi-z136-1-2014-safe-use-of-lasers/>
- 4) ANSI Z136.3-2018: Safe Use of Lasers in Health Care.
<https://blog.ansi.org/2018/09/ansi-z136-3-2018-safe-use-lasers-health-care/>
- 5) 21 Code of Federal Regulations Part 1040.10.
<https://www.ecfr.gov/current/title-21/chapter-I/subchapter-J/part-1040/section-1040.10>
- 6) The Laser Institute (LIA) Laser Safety Standards.
<https://www.lia.org/resources/laser-safety-information/laser-safety-standards>
- 7) Olympus Confocal Laser Scanning Biological Microscope User's Manual.
<https://www.olympus-ims.com/en/user-manuals/>
- 8) Li-COR Pearl Trilogy Optical Imaging User's Manual. <https://www.licor.com/bio/pearl/resources>
- 9) Li-COR Odyssey CLx Digital Fluorescence Imager User's Manual.
<https://www.licor.com/bio/support/answer-portal/imaging-systems/odyssey-clx.html>
- 10) Laser Products – Conformance with EN 60825-1 and IEC 60825-1.
<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/laser-products-conformance-iec-60825-1-ed-3-and-iec-60601-2-22-ed-31-laser-notice-no-56>.

7. **SRS Approved:** August 29, 2023

8. **RESCISSIONS:** SRS-014 Laser Safety Policy. July 28, 2020

9. **EXPIRATION DATE:** N/A

10. **FOLLOW-UP RESPONSIBILITY:** Subcommittee on Research Safety (SRS)

11. **ATTACHMENTS:**

Attachment A: List of Laser-Containing Equipment Located within the Research Service

Attachment A: List of Laser-containing Equipment Located within the Research Service

	Laser	Class*	Location
1	BD FACSAria III (He/Ne, enclosed cabinet system)	*3B(1)	Research 3P-119
2	ABI Prism/7900 HT (EE57895) (Argon, enclosed cabinet system) Barcode reader	*3B(1) (2)	Research 4Q-107
3	Olympus FluoView FV3000 Biological Microscope (Diode laser, enclosed cabinet system) <i>*Per Olympus Rep; under normal operating conditions, there is no laser exposure risk to the user. Laser risk exists only when safety shielding has been removed for service/repair.</i>	*3B/4	Research 3P-117
4	Li-COR Odyssey CLx Digital Fluorescence Imager Enclosed Cabinet System 700 Channel Laser Source: Solid-state diode laser at 685 nm 800 Channel Laser Source: Solid-state diode laser at 785 nm	(1)	Research 4P-108
5	Li-COR Pearl Trilogy Optical Imaging Enclosed Cabinet, small animal imaging system.	(1)	Room 115 Building 49
6	Guava easyCycte Class 3B only when protective housing is removed.	*3B(1)	4P-126

*Note: This is the classification of the laser in the absence of safety shielding. Classification in parentheses is for the laser under normal usage (enclosed cabinet system).

1. BD FACSAria III Flow Cytometer. The laser is categorized as a Class 1 laser during normal operation. The laser/laser energy is contained within the instrument/protective housing, and require no special work area safety requirements except during servicing procedures which are performed only by trained technicians, and do not apply to the user. When all instrument panels and instrument doors are in place, the instrument poses no danger of exposure to hazardous laser radiation.
2. ABI Prism 7900 HT. The Laser is categorized as a Class 1 laser during normal operation. The laser/laser energy is contained within the instrument/protective housing, and require no special work area safety requirements except during servicing procedures which are only performed by trained technicians and do not apply to the user. When all instrument panels and instrument doors are in place, the instrument poses no danger of exposure to hazardous laser radiation.

The hand-held barcode reader contains a Class 2 visible-light laser. Unintentional viewing that might occur from a momentary over-scan of the light across another person's eye is not injury causing. Safety precautions to follow when using a barcode reader: (a) Do not stare into the laser beam. (b) Do not direct the beam toward your eye or the eyes of others.

3. Olympus FluoView FV3000 Confocal Laser Scanning Biological Microscope. This microscope is equipped with six lasers at 405, 445, 488, 561 and 640 nm wavelengths. *The laser/laser energy is contained within the instrument structure and poses no danger to the user under normal operating conditions.* Only when safety shielding has been removed, there is a potential risk of eye exposure from reflected or scattered laser light. Built in safety locks prevent the laser from functioning when the safety shielding has been removed.
4. Li-COR Odyssey CLx Digital Fluorescence Imager
Digital imaging eliminates darkroom expenses and hazardous wastes such as film processing chemicals, rinse water, and film. The Li-COR Odyssey CLx will scan up to 9 mini-blots, 6 microplates, or 30 slides at the same time. Some of the many applications the Li-COR Odyssey CLx is used for are: tissue section imaging, small animal imaging, protein gel documentation, nucleic acid gel documentation, and electrophoretic mobility shift assay without the need for radioisotopes.
5. Li-COR Pearl Trilogy Optical Imaging
This piece of equipment is used for small animal imaging; receptor targeting, transporter targeting, vascular and lymphatic imaging, biodistribution, bioluminescence, structural imaging.
6. Guava easyCyte Laser
Precise and accurate cell counting. easyCyte flow cytometers use novel microcapillary technology in a compact, user-friendly format, which is powerful enough to run your most complex assay