

IRRADIATOR CORE

Standard Operating Procedures

(last updated by Michael Nolan on 17 February 2022)

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Section 1: Use of the Irradiator

- The XRAD-320XL irradiator is available to researchers at NC State, and the surrounding community.
- Any user may opt to hire the Core to perform their irradiations.
- Internal users (i.e., NC State faculty, staff, and students) also have the option to perform their own irradiations. Training and approval for independent operation of the X-RAD involves a multi-step process:
 1. Complete the NC State University CVM Irradiator Access Form, found at: <https://forms.gle/PSrzBfG1q5QTziRk9>. Once the form is completed, it will be reviewed by both the Radiation Safety Office, and the PI of record for the irradiator. You will then be assigned to the necessary training course (# ehps-rs210 in NCSU Reporter) — that course is not public, so you cannot search for it — instead, you will receive an email with a link to the course.
 2. Upon completion of the training course, print the Competency Checklist (available via REPORTER) and arrange for the Core Manager to go through it with you and sign off on you being a “User”.
 3. The Core Manager will then approve you as a user, which will prompt our system to give you swipe card access to the room where the irradiator is housed. Note that completion of this approval process may take up to five business days.
 4. Please note that refresher training for the basic radiation safety course will be required every four years.

Section 2: Communications

- Rather than relying on emailing and/or calling individuals, communication with Core Personnel should be directed to our **generic email**, which is monitored by staff on a regular basis.
 - o cvmirradiatorcore@ncsu.edu

- Internally approved XRAD320XL Users and Superusers will be added to a group email (**listserv**) for ease of communication.
 - o Group-x-rad@ncsu.edu

Section 3: Scheduling Irradiations

- Users who hire the Core to perform their irradiations should work with the Core Manager to schedule their procedures.

- Internal users who perform their own irradiations must schedule those using our Google calendar.
 - o *If you would like to schedule a time to use the X-RAD equipment, please send an email to cvmresearchoffice@ncsu.edu to be added to the X-RAD scheduler. Once you have access to the Google calendar, you can book the equipment during open times.*

 - o *NOTE: only those who have gone through training can schedule unassisted use of the X-RAD machinery. CVM Research Office personnel will only give you access to the scheduling calendar if you have been approved as a User by the Radiation Safety office.*

Section 4: Use Fees

- Users are invoiced for use of the equipment, and services provided. The current fee rates are listed on our webpage: <https://cvm.ncsu.edu/research/labs/research-irradiation-core-facility/>
- Usage will be billed in one-hour increments; each scheduled usage represents a minimum of one-hour of billable time.
- New projects will require protocol setup and dosimetry. Therefore, a minimum of one-hour of consultation will be billed for new projects; more than one hour may be billed for complicated projects (e.g., those requiring special dosimetry, consultation with a radiation biologist or physicist, etc.).
- The Core will send invoices on the 10th of every month, for the prior month's usage (if there is any usage). Invoices are sent by email, and users have the option to pay by check, credit card, or ACH payment.
- External Users:
 - o For **external users**, a service agreement document will be provided to you. This document outlines expectations and liabilities. The document must be fully executed prior to any service.
 - o For the Core to process payments made by External users, we will need:
 - *Name, email and phone number for the billing contact person*
 - *Department (if applicable) and Company Name*
 - *Company Address*

Section 5: Biosecurity

- **External Users:** External Users will coordinate with the Irradiator Core; one of our staff members will meet you at a designated location, take your samples/animals, irradiate them per our agreed upon specifications, and return them to you.
 - o *Based on public health related restriction and both regulations set by the College and University, visitors may or may not be allowed to enter NC State buildings.*

- **Internal Users:** Please see Section 5.

Section 6: Facility Disinfection Protocols

- What follows is the standard sanitation protocol for NC State Animal Research Facilities.
- All bedding and animal waste (e.g., feces) MUST be removed from the facility immediately upon completion of your scheduled work.
- Users who fail to adhere to these protocols will have their User approval revoked.

Sanitation of Research Equipment Used with Animals

Purpose: This policy describes the requirement and procedures to clean and sanitize research equipment that is used with animals and to prevent the spread of microbial agents that may cause sub-clinical and clinical diseases that could jeopardize the validity and reproducibility of research data, or complicate its interpretation.

Scope: This procedure applies to all faculty, students, and staff who work with live animals in their labs or common animal use areas, as well as those maintaining equipment or devices in the animal research facility.

Responsibility

It is the responsibility of the individual(s) using a common procedural area to disinfect all equipment and work surfaces that may come in contact with animals prior to and after each use as described below.

It is the responsibility of the individual(s) using a procedural area or equipment in their own lab to disinfect all equipment and work surfaces that may come in contact with animals prior to and after each use as described below.

General Sanitization Procedures

All portable and fixed equipment as well as surfaces that come in contact with animals must be cleaned and disinfected prior to and after each episode of use by the personnel using the equipment and/or procedural areas (e.g., IVIS Imager, irradiator, behavioral testing apparatus, anesthetic chamber, irradiation pie cage, animal restraint device, stereotactic surgical frame, countertop and work surface, etc.).

Use of Peroxigard disinfectant is required for optimum disinfection. Minimum contact time is 1 minute for complete virucidal and bactericidal activity.

Note: ethanol and isopropyl alcohol are inadequate to appropriately disinfect surfaces and may lead to contamination or infection between animal uses.

Disinfection

1. Any direct or indirect contact bedding used in chambers (e.g. paper towels) must be removed prior to sanitation and replaced with fresh, clean substrate following testing.
2. Ensure any gross contamination with feces, urine, blood, or other body tissues are cleaned prior to disinfection using paper towels.
3. Apply peroxigard liberally and directly on all equipment surfaces and benchtops used.
4. Allow to sit for 60 seconds.
5. Wipe with paper towels, but do not dry completely – allow a thin film of moist disinfectant to remain for enhanced activity.
6. For sensitive equipment, you may elect to spray a paper towel with disinfectant and wipe surfaces to avoid damaging sensitive equipment or items that need protection from direct moisture exposure.
7. Once the procedure is complete, repeat steps 1-6.

Section 7: Animal Irradiations

- All animal irradiations MUST be approved by the NC State IACUC.

- External Users:
 - o *If your animal work and animal irradiations are approved by another IACUC, we can add your approval to our Core's blanket protocol using a simple form:*
 - **Non-NC State Collaborator Core Facility Use Form**; a copy of this form is available on our website; complete and return it to the Core Manager who will then have it processed by the NCSU IACUC
 - o *If your animal work is not approved by another IACUC, then we can add it to our blanket IACUC protocol for the Core – this is also done using the Non-NC State Collaborator Core Facility Use Form; you will be billed for time taken to prepare/submit this form.*

- Internal Users:
 - o *All NC State users must have an approved IACUC prior to scheduling use of the device.*
 - o *Please use our Safety Plan number for your irradiations: 1673. And the Radiation Safety approval number is: 891.*

Section 8: Liabilities

- The X-RAD 320XL is located within a vivarium at NC State CVM. The facility is not germ-free.

- The Core can provide advice for experimental design and irradiation conditions. And the Core will provide dosimetry services to establish your protocols in our equipment. However, it is acknowledged that experimental design and conditions are ultimately the responsibility of the client.
 - o *Please schedule and budget your project with the knowledge that experimental conditions will likely need optimization; even when following published protocols and/or protocols that have been successful on other irradiation devices, it is common to need to do considerable optimization when starting on a new piece of equipment.*

- Users/Clients are responsible for the well-being and humane treatment of any animals undergoing irradiation in our facility. If the Core is assisting with anesthesia and/or animal handling for an irradiation, the client acknowledges the low but real risk of unintentional animal losses (deaths) when handling and anesthetizing research animals.

- **External Users**
 - o Will be required to fully execute a **Service Agreement** (see website for downloadable form).
 - o Exhibit A (Statement of Work) will be derived from the Irradiator Request Form that is submitted online (<https://forms.gle/qJ9zXiMCc1gk3zBz6>)
 - o Exhibit B (Details and Schedule) will include an up-to-date version of the Irradiator Core SOP (this document, a copy of which can be found on our website).