LABORATORY SAFETY PLAN

Northeastern University

Department of Bioengineering

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CONTENTS

ABBREVIATIONS

ANSI	=	American National Standards Institute
BioE	=	Northeastern University Department of Bioengineering
BSL (BL)	=	Biological safety level
CHP	=	Chemical Hygiene Plan
DLAM	=	Northeastern University Division of Laboratory Animal Medicine
DSO	=	Department Safety Officer
EHS	=	Northeastern University Office of Environmental Health and Safety
FT	=	Fulltime (full-time)
GHS	=	United Nations' Globally Harmonized System of Classification and Labeling of Chemicals
HF	=	Hydrofluoric acid
IRB	=	Institutional Review Board
IACUC	=	Institutional Animal Care and Use Committee
LSO	=	Laboratory Safety Officer
LSP	=	Laboratory Safety Plan
NEU	=	Northeastern University
NFPA	=	National Fire Protection Association
NUID	=	Northeastern University identification number
OSHA	=	US Occupational Health and Safety Administration
PI	=	Principal investigator (usually a NEU faculty member)
PPE	=	Personal protective equipment
PT	=	Part-time
RAM	=	Radioactive material
REU	=	Research Experience for Undergraduates (a program of the National Science Foundation)
SDS	=	Safety Data Sheet (formerly known as Material Safety Data Sheet or MSDS)
TA	=	Teaching Assistant

OVERVIEW

The LSP presented herein is intended to present authorized personnel (laboratory user and workers) within the BioE policies and procedures for the safe use of BioE laboratory facilities. Analytical methods and experimental activities conducted within laboratories vary among research groups and classes. It is not possible to review all methods and activities that are or may be performed in BioE laboratory facilities in this manual. Policies and procedures presented in this manual should serve as minimum requirementsfor all BioE laboratory user and workers. Laboratory users and workers must receive training specific to each activity and method from their PI, course instructor, course TA, or supervisor, as appropriate.

Many parties work collaboratively to ensure the safe operation of BioE laboratories, including: Department Chair, PIs, Faculty, and the DSO. Primary responsibility for laboratory safety rests with the laboratory user and worker.

Before beginning work in any BioE laboratory facility or office/writing area directly connected to a laboratory, the laboratory user and worker must:

- Read this LSP in full
- Review the EHS website
- Review the CHP, including the NEU plan for laboratory safety management (Appendix G of CHP)
- Complete all required safety trainings
- Complete the BioE Facility Access Request Form

After beginning work in BioE laboratory facilities, the laboratory user and worker must:

- Develop good personal laboratory safety habits
- Wear all required PPE
- Inform appropriate personnel of any laboratory deficiency that may pose a safety hazard
- Plan and conduct each analytical method and experiment in accordance with proper laboratory safety procedures and this LSP
- Ensure that their work area is decontaminated, clean, and tidy, and that all chemicals, biologicals, and laboratory equipment are properly stored at the end each experiment or the end of each work day, whichever is sooner.
- Complete all required refresher safety trainings
- Complete required safety training(s) before using new methods, procedures, or materials used in experiments

IN THE EVENT OF FIRE:

1. **EVACUATE THE BUILDING**
2. **ACTIVATE THE NEAREST FIRE ALARM PULL STATION ON YOUR WAY OUT OF THE BUILDING, IF POSSIBLE**
3. **CALL 911 TO REPORT THE FIRE**
4. **THEN CALL NEU PUBLIC SAFETY AT 617-373-3333 TO REPORT THE FIRE**
5. **THEN REACH OUT TO BioE EMERGENCY CONTACTS (see laboratory door signage and Table 1)**

IN THE EVENT OF A HAZARDOUS MATERIAL EXPOSURE, AND ANY OTHER EMERGENCY:

1. **FOR EXPOSURES, WASH/FLUSH THE EXPOSED AREA(S) FOR 15 MINUTES**
2. **CALL NEU PUBLIC SAFETY AT 617-373-3333**
3. **THEN REACH OUT TO EHS and BioE EMERGENCY CONTACTS (see laboratory door signage and Table 1)**

Know your location and be specific about the nature of the emergency.

Laboratory information and emergency contact numbers are posted on laboratory doors. Table 1 provides additional emergency contacts at the university and department level. Only office telephone numbers are provided. **To reach these contact after hours, call NEU Public Safety at 617-373-3333.**

TABLE 1: UNIVERSITY AND DEPARTMENTAL EMERGENCY CONTACTS*

For chemical spills, exposures, and other emergencies		
NAME	**TITLE**	**CONTACT INFORMATION**
Evan Saravo	Laboratory Safety Program Manager, EHS	e.saravo@northeastern.edu 617.373.4015
Lee Makowski	Department Chair, BioE	l.makowski@northeastern.edu 617.373.3006
Helen Markewich	Department Safety Officer, BioE	h.markewich@northeastern.edu 617.373.8591
Andrew Sullivan	Hazardous Material Program Manager	a.sullivan@northeastern.edu 617.373.6030
Esther Cohen	Business Manager, BioE	e.cohen@northeastern.edu 617.373.6405
For biological spills, exposures, and emergencies		
NAME	**TITLE**	**CONTACT INFORMATION**
Getzabel Guevara	Biosafety Specialist, EHS	g.guevara@northeastern.edu 617.373.2432
Lee Makowski	Department Chair, BioE	l.makowski@northeastern.edu 617.373.3006
Helen Markewich	Departmental Safety Officer, BioE	h.markewich@northeastern.edu 617.373.8591
Esther Cohen	Business Manager, BioE	e.cohen@northeastern.edu 617.373.6405
For spills of radioactive material (RAM) and RAM exposures		
NAME	**TITLE**	**CONTACT INFORMATION**
Christopher S. Bingel	Radiation Safety Manager, Laser Safety Officer EHS	c.bingel@northeastern.edu 617.373.2769
Lee Makowski	Department Chair, BioE	l.makowski@northeastern.edu 617.373.3006
Helen Markewich	Departmental Safety Officer, BioE	h.markewich@northeastern.edu 617.373.8591
Esther Cohen	Business Manager, BioE	e.cohen@northeastern.edu 617.373.6405

For laser exposures and related emergencies		
Christopher S. Bingel	Radiation Safety Manager, Laser Safety Officer EHS	c.bingel@northeastern.edu 617.373.2769
Lee Makowski	Department Chair, BioE	l.makowski@northeastern.edu 617.373.3006
Helen Markewich	Department Safety Officer, BioE	h.markewich@northeastern.edu 617.373.8591
Esther Cohen	Business Manager, BioE	e.cohen@northeastern.edu 617.373.6405
For any injury or hazardous material exposure in a BioE facility		
NAME	**TITLE**	**CONTACT INFORMATION**
Environmental Health and Safety	Incident Reporting	ehs@northeastern.edu 617-373-2769
Helen Markewich	Departmental Safety Officer, BioE	h.markewich@northeastern.edu 617.373.8591
Lee Makowski	Department Chair, BioE	l.makowski@northeastern.edu 617.373.3006
Esther Cohen	Business Manager, BioE	e.cohen@northeastern.edu 617.373.6405
For veterinary or laboratory animal-related emergencies		
Division	**Time of day**	**CONTACT INFORMATION**
Division of Laboratory Animal Medicine-Institutional Animal Care and Use Committee (DLAM-IACUC) https://dlam.neu.edu/emergency-contact/	Mon-Fri 8:00 AM – 4:00 PM	DLAM@northeastern.edu (617) 373-3958
	○ After working hours ○ Weekends (Saturday, Sunday) ○ Holidays	1. Call the Work Order, Facilities Customer Service: (617) 373-2754 2. Request that the DLAM or Animal Care "On Call Person" contact you.

* Only office telephone numbers are provided. **For home and mobile numbers, call NEU Public Safety at 617-373-3333.**

FIRE & FIRE-RELATED EMERGENCIES

If you observe a fire, or if the fire alarm is activated in any building:

- Activate the fire alarm system by pulling a fire alarm station on your way out of the building.
- If time permits, stabilize lab procedures, turn off stoves and ovens, and unplug or disable any device that could make a dangerous situation even worse.
- Leave the building via the nearest exit. Warn others as you leave.
- Do not use elevators.
- Feel doors before opening, and close doors and windows as you leave if safe to do so.
- Report the fire to the local fire department by calling 911 then contact NUPD by calling (617) 373-3333 once outside.
- If trapped, keep the doors closed and place cloth under them to keep out smoke. Signal for help by hanging an object (e.g. jacket or shirt) out window to attract attention.
- Remain a safe distance away from the building and await further instructions. Keep roadways open and beware of approaching emergency vehicles. Notify emergency responders of anyone trapped or any special conditions in the building.
- Do not go back in the building for any reason until an authorized university official deems it safe to re-enter.

Refer to the NEU Emergency Guidebook for more information.

There are fire extinguishers located in every BioE laboratory. All fire extinguishers are maintained and inspected by the university's fire safety program. If a fire extinguisher is used, or discharges accidentally, notify the DSO immediately.

Provide the fire/police teams with the details of the problem upon their arrival. Special hazard information is essential for the safety of the emergency responders.

EXPOSURES AND SPILL EMERGENCIES

For details on emergency response to chemical exposures, biological exposures, and spills, consult the Exposures and Spills sections of this document.

STUDENT, STAFF, AND FACULTY EMERGENCY CONTACTS

Each NEU student, staff, and faculty member is required to list an emergency contact with the university. BioE also maintains a list of emergency contacts for its personnel. If a BioE student, staff, or faculty member is incapacitated in an emergency, asks for their emergency contact to be notified, or it is otherwise judged that their emergency contact should be notified, contact:

1. NEU Public Safety at 617-373-3333 and request that officers reach out the emergency contact of the affected individual(s). Be sure to have the individual's full name and, if possible, NUID.

2. The BioE Business Manager or the BioE Department Chair at the details listed in Table 1 to request that they reach out to the emergency contact of the affected individual(s).

LABORATORY TRAINING & ACCESS

Each laboratory user and worker is required to receive the appropriate training from NEU EHS before accessing any BioE laboratory facility or office/writing area directly connected to a laboratory. Each laboratory user and worker is required to submit verification of his/her training to the DSO. Prior to assignments involving new laboratory methods or techniques that may result in new exposure situations; the laboratory user and worker must obtain the appropriate training as determined by the PI and/or the DSO.

All laboratory users and workers must have an active status with the university as an active student, staff member, visiting scholar, volunteer or faculty member. Visiting scholar, volunteer, and other positions for individuals who are not active NEU students established without the participation of NEU Human Resource Management are not permitted. For details and guidance, contact the BioE Business Manager.

LABORATORY SAFETY TRAINING – EHS

- EHS training requirements for BioE students, staff, and faculty are available on the BioE website available here
- Each laboratory user and worker must have an active myNortheastern account to complete EHS training.
- PIs must ensure that all laboratory members are listed as members of the laboratory in BioRaft, and that their job activities and hazards are kept up-to-date. For questions on how to do this, contact the DSO or EHS.
- For instructions on how to access online trainings, see the instruction document here.
- **Important:** laboratory users and workers may be required to complete additional training depending on the type of experimental methods, equipment, and materials with which they work.

ACCESS

Once the laboratory user and worker has read the LSP, fulfilled his/her training responsibilities and submits the signed BioE Facility Access Form to the DSO, access will be granted and his/her laboratory work may begin.

Beginning in July 2018, keycard access to office/desk, laboratory, and other BioE facilities facilities is granted with the following term limits:

- **Faculty:** indefinite access
- **Permanent staff:** indefinite access
- **Temporary staff, Co-ops:** access expires at the end of the term of employment/co-op agreement
- **PhD students:** access expires after six years unless the PI requests a shorter interval
- **MS students:** access expires after three years unless the PI requests a shorter interval
- **BS, BS/MS students:** access expires after at 5pm on the last day of each semester, unless the PI requests a different interval
- **Summer programs:** access expires after at 5pm on the last day of the program. Note that BioE does not typically grant keycard access to high school students.

If any laboratory user or worker requires access beyond the terms listed above, contact the DSO to request an extension.

Note that if the individual loses status with NEU due to resignation, withdrawal or removal from academic program, nonpayment of tuition, or other causes, their keycard access will be automatically revoked by NEU.

BioE student, Co-ops, and temporary staff who started work prior to July 2018 may have their access expiration updated retroactively, according to the terms listed above, at any time by the DSO.

No student, staff member, or faculty may work alone in a BioE laboratory facility.

When working outside of normal business hours, BioE students, staff and faculty are encouraged to use the SafeZone app to notify NEU Public Safety of their whereabouts, as well as to notify their faculty advisor/PI and colleagues of their work schedule.

UNDERGRADUATES

Undergraduates must be supervised when working in BioE laboratory facilities according to the NEU Policy on Restricted Access and Supervision Requirements for Laboratories and Support Rooms. Undergraduates attending a BioE class in a laboratory facility may not be left unattended. A TA or faculty member must be present at all times.

Undergraduates may not use an autoclave without direct supervision by a graduate student, postdoctoral researcher, or faculty member. Undergraduates may not receive Husky Card access to autoclave rooms.

VISITING RESEARCHERS & SCHOLARS

Periodically, visiting researchers, undergraduate students, and high school students become involved in research activities requiring access to BioE laboratories. BioE encourages external collaboration and the participation of qualified researchers at all levels. All laboratory workers must have an active status with the university. All laboratory workers must have a NEU email account and Husky card. **Visiting researchers attached to or sponsored by departments other than BioE must notify the BioE Business Manager of:**

- The start date and end date of their work in BioE facilities
- The name and contact information of their sponsoring faculty member or faculty advisor
- The name of their primary department at Northeastern

As with BioE students, faculty, and staff, visiting researchers accessing BioE laboratories must complete appropriate training.

Note that for high school students and other minors, additional approvals and paperwork are required. Refer to the High School Students & Other Minors section for details.

HIGH SCHOOL STUDENTS AND OTHER MINORS

Any visit, course, program, or research/work employment of high school students or other minors in any BioE facility must be reviewed and approved by:

- NEU Office of Risk Services
  - Paperwork is required
- NEU EHS
  - Email details to the ehs@northeastern.edu and biosafety@northeastern.edu
- BioE Department Chair
- BioE Business Manager
- BioE DSO

High school students and other minors visiting, working in, or participating in a program or course in any BioE facility may not be granted keycard access to any BioE facility.

High school students and other minors may not work or be present in any BioE facility without direct supervision by a graduate student, postdoctoral researcher, or faculty member.

SHORT-TERM VISITORS

Short-term visitors include vendor technical sales representatives, service and installation representatives, potential research collaborators, potential students, faculty, and staff during an interview, and other visitors who will spend **five days or less** in a BioE laboratory facility **and who will perform no laboratory work other than instrument/equipment installation, repair, and training**. These visitors may enter the BioE laboratory spaces without completing safety trainings if:

1. They remain clear of all chemical, biological, radiological, laser, and other hazards.
2. They are escorted at all times by a BioE faculty member, staff member, or graduate student designated by a PI.
3. They wear closed-toed shoes.
4. They wear long pants or skirts that reach the ankle.
5. They wear all required PPE.
6. They comply with the no food or drink rule.
7. They comply with laboratory rules concerning personal electronics and other items.
8. They comply with all other laboratory rules.

Short-term visitors who will spend less than one day in a BioE laboratory space **and who will perform no laboratory work** of any kind may visit laboratory spaces without completing safety trainings if:

1. They remain clear of all chemical, biological, radiological, laser, and other hazards not associated with the work they are performing.

2. They are escorted at all times by a BioE faculty member, staff member, or graduate student designated by a PI.

3. They wear closed-toed shoes.

4. They wear the appropriate PPE for their work.

5. They comply with the no food or drink rule.

6. They comply with laboratory rules concerning personal electronics and other items.

7. They comply with all other laboratory rules.

WINTER HOLIDAYS

From December 24 through January 1 of each year, BioE is closed for business. Department business and research support services are not available during this time period, including but not limited to:

- Procurement

- Package/mail receiving and distribution
- Hazardous waste collection and supplies delivery
- Biohazardous waste collection and supplies delivery
- Transportation and moving
- Laboratory operations and moving support
- Changes or updates to facility cardkey access

Researchers are discouraged from working in department facilities, especially in laboratory facilities, during the winter holidays. If researchers must work in these facilities during the winter holidays, they are encouraged to use the SafeZone app to notify NEU Public Safety of their whereabouts, as well as to notify their faculty advisor/PI and colleagues of their work schedule.

No student, staff member, or faculty may work alone in a BioE laboratory facility.

FACULTY TRAVEL, LEAVE & SABBATICALS

Per NEU Policy (NEU CHP Appendix G), if faculty will be traveling away from the university (personal travel, business travel, or sabbatical), or if they will have limited telephone, mobile phone, and internet access for any length of time, they must designate another full-time NEU faculty member or postdoctoral researcher who is familiar with their laboratory research to supervise the laboratory. This individual must:

1. Be familiar with the traveling faculty member's research and laboratory methods;
2. Be in close physical proximity to the traveling faculty member's laboratory;
3. Have a full-time, active status with NEU;
4. Be a faculty or staff member – Students and visiting scholars may not be designated;
5. Not travel, be on sabbatical, or be on leave for any portion of the traveling faculty member's absence;
6. Must agree to supervise the laboratory of the traveling faculty member **in writing to the Department Chair**;
7. Must be approved in writing by the Department Chair;
8. The DSO may be designated only if he/she meets the criteria listed above.

Research faculty must notify the DSO and Department Chair of the designated faculty supervisor before their travel begins.

LABORATORY SAFETY OFFICERS (LSO)

Each PI must designate a LSO. The responsibilities of the LSO include managing the chemical inventory, orienting new researchers to the PI's laboratory, and notifying the PI and DSO of any safety concerns. For a complete list of the current BioE LSOs, contact the DSO.

LABORATORY SIGNAGE

NEU laboratory doors are posted with emergency information to inform occupants and Boston Fire Department personnel of the presence of hazardous materials inside each laboratory. Posted information includes NFPA diamonds, BSL level (or BL level), the presence of radiation or other hazards, emergency contact information, and other important information.

PIs are required to keep their laboratory signage up-to-date in BioRaft. Laboratory signage should be reviewed and revised every 6 months or any time a new hazard or hazardous material is introduced into the laboratory, whichever is more frequent. Remember that some reagents typically used for biological methods are also hazardous chemicals, and should be included in the chemical inventory (e.g. ethidium bromide, cholera toxin). For questions about how to update laboratory signage in BioRaft, contact the DSO or EHS.

Laboratory users and workers must be know how to interpret NFPA diamonds. NFPA diamond information is available here and summarized as follows:

NFPA has developed a system for indicating the health, flammability, reactivity and special hazards for many common chemicals through use of the NFPA 704 Diamond (Figure 1).

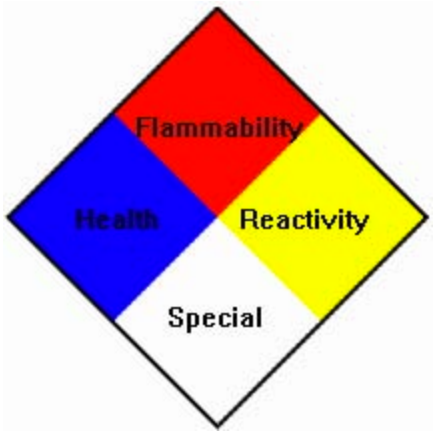

FIGURE 1: NFPA DIAMOND

The NFPA 704 Hazard Identification System provides:

1. Planning guidance to the fire departments
2. Immediate information to firefighters, emergency responders, and others who may be involved in an emergency situation
3. For students, staff, and faculty, a means of identifying hazardous materials and areas in which they are stored.

How to interpret NFPA diamonds:

- Numbers: The higher the hazard rating on the NFPA diamond, the higher the hazard.
    - 0 = minimal hazard, 4 = severe hazard
- Blue = Health
- Red = Flammability
- Yellow = Reactivity/Instability
- White = Special hazards
    - ~~W~~ = water reactive or water incompatible
    - OX = oxidizer
    - SA = simple asphyxiant gas (nitrogen, helium, neon, argon, krypton or xenon)
    - Other symbols you may see include
        - RAD = radioactive material or radiation
        - OXY = compressed oxygen
        - G = compressed gas(es)
        - LHE = liquid helium
        - LN2 = liquid nitrogen

Important:

- NFPA diamonds give a general idea of the inherent chemical hazards in a laboratory.
- Not all chemicals have been rated with the NFPA system.
- The quantity of a chemical can influence the degree of hazard present.
- NFPA diamonds generally do not address biological hazards.

MINIMIZING CHEMICAL & BIOLOGICAL REAGENT STOCKS

Since chemical and biological reagent storage space is limited and many reagents can become useless or even dangerous as they age, it is the goal of BioE to minimize the use of chemicals whenever practical. As research goals are contemplated, PIs, and laboratory user and workers, should evaluate their processes, taking projected use quantity into account. Refrain from ordering large quantities of material when a small quantity is all that is needed, even if the price is better for the larger container.

NEU offers a chemical recycling program whereby research groups can offer unused, unwanted chemicals and reagents to other research groups throughout the university.

Reach out to the DSO with questions on small-quantity suppliers, sharing chemicals among BioE faculty, and the NEU Chemical Recycling program.

Minimizing chemical use makes sense at all levels since it reduces procurement costs, storage demand, risk, and disposal costs.

CHEMICAL, BIOLOGICAL, & RADIOLOGICAL INVENTORIES & PROCUREMENT

Before purchasing a chemical or biological material, researchers must assess the following:

1. **Proper handing requirements, including**
    a. PPE
    b. Decontamination
    c. Spill response and specialist spill kits
    d. Any first aid measures or materials, e.g. calcium gluconate gel for working with hydrofluoric acid (HF)
2. **Storage requirements, including**
    a. Storage temperature
    b. Segregation from incompatible chemicals and materials
    c. Ventilation
3. **Disposal requirements**
4. **Whether the laboratory is approved for use of the chemical or material, for example:**
    a. All BioE laboratories are approved for use of BSL1 and BSL2 materials only
    b. Alcohol burners and liquid oil burners are prohibited in all NEU facilities
    c. Protocols involving perchloric acid must be reviewed and approved by EHS, the BioE DSO and ISEC laboratory management before implementation. ISEC fume hoods are not rated for all uses of perchloric acid.
    d. Purchases of and protocols involving hydrofluoric acid (HF) must be reviewed and approved by EHS, the BioE DSO and ISEC laboratory management before implementation.
    e. Purchases of and protocols involving peroxidizable chemicals must be reviewed and approved by the BioE DSO and ISEC laboratory management before implementation.
    f. Equipment containing or procedures involving liquid mercury must be reviewed and

approved by EHS, the BioE DSO and ISEC laboratory management before purchase or implementation.

5. **Whether the material must be registered**

    a. The chemicals listed in Appendix A of the NEU Chemical Hygiene Plan must be registered with and approved by NEU EHS prior to purchase and use.

        i. The registration form is available here.

    b. Each PI must develop a written SOP for the storage, handling, and disposal of chemicals listed in Appendix A of the NEU Chemical Hygiene Plan. Storage procedures must comply with the CHP.

    c. Some chemicals and biological materials must be registered with the Federal Select Agents and Toxins Registry.

    d. All radioactive material (RAM) must be reviewed, approved, and purchased by EHS Office of Radiation Safety using an online form.

Resources to make these assessments include:

1. **The SDS provided by the vendor**
2. **Technical data sheets**
3. **Technical specifications**
4. **Federal and academic databases:**

    a. For hazardous materials

    b. For drugs, herbs, and supplements

    c. For chemicals

    d. For pesticides and other toxicological information

5. **BioE DSO**
6. **EHS**

All PIs are required to maintain a chemical inventory in BioRaft:

1. The chemical inventory must comply with the CHP and the EHS Chemical Inventory guidelines.
2. The chemical inventory must be accessible by all lab members (i.e. all lab members must be listed as a lab member in BioRaft).
3. Remember that some reagents typically used for biological methods are also hazardous chemicals, and should be included in the chemical inventory (e.g. ethidium bromide, cholera

toxin).

HAZARD LABELING ON CONTAINERS

- Manufacturer labels on chemical containers will often contain some information on any hazards associated with the chemical, including GHS pictograms and statements. **However, this information is rarely comprehensive.**
- Consult the SDS for more details on hazards, storage requirements, incompatible materials and chemicals, PPE requirements, and other details.
- EHS offers online training about GHS labeling. OSHA also offers resources on this labeling system.
- SDS are available from databases, suppliers, and manufacturers, including:

Source	Notes
Avantor	Formerly known as Mallinckrodt Baker
Bio-Rad	
Fisher Scientific	
Matheson	Compressed gases
Public Health Agency of Canada	Pathogen SDS
Praxair	Compressed gases
Sigma-Aldrich	
SIRI SDS database	EHS recommended site (mirror link here)
ThermoFisher Scientific	
VWR	

TRANSPORTATION OF CHEMICALS, BIOLOGICAL MATERIALS, & RAM

Chemical transportation requirements vary based on the type of chemical, the starting location, and the destination. The following steps are **required** when planning and executing chemical transport.

When transporting within a laboratory space, take proper steps to prevent spills and exposures, including:

1. Chemicals

    a. Place chemical container(s) in secondary containment.

    b. Use a sturdy cart with a substantial rim around the edge and wheels large enough to negotiate uneven surfaces without tipping or stopping.

    c. Follow all EHS rules and requirements for transporting this material.

    d. Consult with the DSO and EHS on additional containment or transport requirements, and on approved transport routes within the building.

2. Compressed gas tanks (except for liquid nitrogen and helium)

    a. Safely and properly remove the regulator from the tank.

    b. Cap the tank using the rigid cap provided by the supplier.

    c. Use an approved tank transport cart or dolly with proper restraints to transport the tank.

    d. Consult with the DSO and EHS on additional containment or transport requirements, and on approved transport routes within the building.

3. Liquid nitrogen and helium tanks

    a. Safely and properly ensure that the dispensing valve is closed.

    b. Secure any dispensing hose(s).

    c. If the tank has wheels, carefully roll the tank to transport it.

    d. If the tank does not have wheels, consult with the DSO and EHS for transport requirements.

    e. Follow all EHS rules and requirements for transporting this material. Consult with the DSO and EHS on additional containment or transport requirements, and on approved transport routes within the building.

4. Biological materials

    a. Place biological materials in leak-proof, shatter-proof secondary containment labeled with a biohazard label.

    b. Decontaminate the outside of the leak-proof, shatter-proof secondary containment.

    c. Follow all EHS rules and requirements for transporting this material.

    d. Consult the project's biosafety registration, the DSO, and EHS Biosafety for additional guidance

5. Radioactive material (RAM)

    a. Consult the project's RAM permit and protocols, the Radiation Safety Officer, the DSO, and

EHS Radiation Safety Program for containment, packaging, transport, and paperwork requirements

When transporting <u>within the same building through public corridors or other non-laboratory spaces</u>, take proper steps to prevent spills and exposures, including:

1. Chemicals
    a. Place chemical container(s) in secondary containment
    b. Use a sturdy cart with a substantial rim around the edge and wheels large enough to negotiate uneven surfaces without tipping or stopping.
    c. Follow all EHS rules and requirements for transporting this material.
    d. Consult with the DSO and EHS on additional containment or transport requirements, and on approved transport routes within the building.
2. Compressed gas tanks (except for liquid nitrogen and helium)
    a. Safely and properly remove the regulator from the tank.
    b. Cap the tank using the rigid cap provided by the supplier.
    c. Use an approved tank transport cart or dolly with proper restraints to transport the tank.
    d. Follow all EHS rules and requirements for transporting this material.
    e. Consult with the DSO and EHS on additional containment or transport requirements, and on approved transport routes within the building.
3. Liquid nitrogen and helium tanks
    a. Safely and properly ensure that the dispensing valve is closed.
    b. Secure any dispensing hose(s).
    c. If the tank has wheels, carefully roll the tank to transport it.
    d. If the tank does not have wheels, consult with the DSO and EHS for transport requirements.
    e. Follow all EHS rules and requirements for transporting this material.
    f. Consult with the DSO and EHS on additional containment or transport requirements, and on approved transport routes within the building.
4. Biological materials
    a. Place biological materials in leak-proof, shatter-proof secondary containment labeled with a biohazard label.

b. Decontaminate the outside of the leak-proof, shatter-proof secondary containment.

c. Place the secondary containment inside an opaque box such that the biohazard label is covered.

d. Follow all EHS rules and requirements for transporting this material.

e. Consult the project's biosafety registration, the DSO, and EHS Biosafety for additional guidance

5. Radioactive material (RAM)

    a. Consult the project's RAM permit and protocols, the DSO, and EHS Radiation Safety Program for containment, packaging, transport, and paperwork requirements

When transporting <u>between buildings</u>, take proper steps to prevent spills and exposures, including:

1. Chemicals, compressed gas tanks (except for liquid nitrogen and helium), liquid nitrogen and helium tanks, biological materials, radioactive material (RAM), other hazardous materials:

    a. Follow all EHS rules and requirements for transporting this material. Note that there are additional restrictions for transporting hazardous materials on outside streets, on sidewalks, and over the railroad and subway tracks.

    a. Consult with the DSO and EHS on containment, transport, and documentation requirements, and on approved transport routes. Note that a licensed hazardous material transport company may need to be engaged for transport of some types of materials.

CHEMICAL SEGREGATION

Proper segregation and storage of chemicals is important for the health and safety of the all laboratory workers and building occupants. Improper storage can result in hazardous situations that may endanger laboratory user and workers, building occupants, passersby, and physical property.

SDS, the DSO, and EHS are resources for questions on chemical segregation and storage requirements. Some general segregation and storage guidelines include:

1. **Never** store chemicals only by alphabetical order. Segregate all chemicals according to hazard class then place alphabetically, if desired.

2. **Avoid** storing chemicals in a fume hood;

3. Return all chemicals to their appropriate storage areas at the end of the day;

4. Flammable chemicals that need to be refrigerated or frozen must be stored in approved explosion-resistant cold storage that has been labeled as such. Note that most refrigerators and freezers are **<u>not</u>** rated for flammables storage.

5. Never stack bottles on top of each other;

6. Store chemicals only on sturdy shelving;
7. Do not store liquid chemicals above the eye level of the shortest person in the research group.
8. Bottles of flammable liquids should not be stored near combustible materials.
9. Store FLAMMABLE and COMBUSTIBLE chemicals in approved flammables cabinets
10. Segregate REACTIVES from IGNITABLES
11. Segregate ACIDS from BASES, store them in separate corrosives cabinets
12. Segregate CORROSIVES from FLAMMABLES
13. Segregate strong OXIDIZERS from EVERYTHING
14. Store liquid and solid OXIDIZERS in separate secondary containment
15. Store liquid and solid ACIDS in separate secondary containment
16. Store liquid and solid BASES in separate secondary containment
17. Store WATER-REACTIVE chemicals in their own secondary containment and away from water or water sources
18. Store TOXIC chemicals in their own secondary containment
19. Keep chemicals away from heat, ignition sources, and direct light
20. Store liquid and solid FLAMMABLES and COMBUSTIBLE chemicals in separate secondary containment
21. Store FLAMMABLE ACIDS in flammables cabinets in their own, chemical-specific, secondary containment
22. Store ORGANIC REACTIVES separately from INORGANIC REACTIVES (metals)

Some hazardous chemical combinations include:

1. Acid + Oil or Grease = Fire
2. Flammable Liquid + Hydrogen Peroxide = Fire/Explosion
3. Acid + Caustic = Heat/Spattering
4. Aluminum Powder + Ammonium Nitrate = Explosion
5. Caustics + Epoxies = Extreme Heat
6. Sodium Cyanide + Sulfuric Acid = Lethal Hydrogen Cyanide
7. Chlorine Gas + Acetylene = Explosion
8. Ammonia + Bleach (or other Chlorine source) = Toxic Chloramines (i.e., Mustard Gas)

Resources on chemical segregation and storage include:

1. DSO
2. EHS
3. Cole Parmer chemical compatibility database

COMPRESSED GASES

Compressed gases can present a physical, asphyxiation, freezing, and chemical hazard, depending on the particular gas.

General guidelines:

- Compressed gas deliveries must be met, inspected, and signed off by a research group faculty or representative
    - When placing the order, provide the mobile and office phone number of the individual assigned to receive the delivery.
    - Inspect tanks for leaks, dents, and other defects
    - Inspect labels for the correct gas contents
    - Inspect tanks for the most recent hydrostatic test date. Do not accept tanks that are beyond their test date.
- Gas cylinders must be properly restrained at all times, even when empty.
- Gas cylinders must be properly labeled as full, in-use, or empty.
- Keep compressed gases away from heat and ignition sources.
- Do not store flammable compressed gases, flammable liquids, or flammable solids next to compressed oxygen or other accelerants.
- Compressed gas cylinders must be transported using approved carts or dollies.
- The cylinder valve must be accessible at all times.
- The main cylinder valve must be closed as soon as the gas flow is no longer needed.
- Do not store gas cylinders with pressure on the regulator.
- Use wrenches or other tools provided by the cylinder supplier to open a valve if available. **Do not use pliers to open a cylinder valve.**
- Use soapy water to detect leaks. Leak test the regulator, piping system and other couplings after doing maintenance or modifications.
- Do not lubricate an oxygen regulator or use a fuel/gas regulator on an oxygen cylinder. Using oil

or grease on the high pressure side of an oxygen cylinder can cause an explosion.

- If at all possible, avoid the purchase of lecture bottles. These cylinders are not returnable and it is extremely difficult and costly to dispose of them. Use the smallest returnable sized cylinder.
- Alert the DSO and EHS **prior** to the first purchase of toxic, reactive, or flammable gases.

Cryogenic gas guidelines:

- Users of cryogenic gases such as liquid nitrogen and liquid helium must:
    - Complete the EHS online Cryogenic gases training
    - Wear appropriate clothes for the work, including covering all exposed skin
    - Wear the appropriate PPE for the work, including specialized cold gloves, eye protection, and face shield.
    - Store cylinders with the pressure relief valve (PRV) and rupture disk facing away from walkways, workstations, and other high-traffic area.
    - Never dispense cryogenic liquids in an unventilated room. Leave the room door open when dispensing cryogenic liquids.
    - Do not allow frost to build up on valve handles or on the PRV.
    - Do not accept cryogenic gas cylinders if the pressure gauge indicates a higher pressure than the tank rating and the PRV is not releasing gas. For example, if a liquid nitrogen tank's pressure gauge reads 40 psi and the PRV is labeled to release gas at 22 psi but it is not releasing gas, do not accept the tank.
    - Contact the gas supplier to return a cryogenic gas cylinder if the PRV is releasing gas rapidly and does not stop.

EXPOSURES

If any chemical, biological, radiation, laser, or other exposure occurs, contact NEU Public Safety at 617-373-3333 and follow instructions.

For any exposure, complete the following incident report paperwork within 24 hours:

- If the affected individual(s) are students: use this form
- If the affected individual(s) are non-student staff or faculty: use this form and/or this form

CHEMICAL EXPOSURES

- Follow the instructions in section 2.6 of the CHP.

BIOLOGICAL EXPOSURES

- Remove contaminated PPE and clothing.
- Wash the affected area with soap and water for 15 minutes. Or use an emergency eyewash and/or safety shower for 15 minutes, as required.
- Either during the washing or immediately afterwards, call NEU Public Safety at 617-373-3333
- Notify your PI/supervisor, EHS, and DSO
- Have a paper copy of the biosafety registration, the product data sheet, and the SDS for each biological hazard involved in the exposure available for emergency responders
- Be prepared to provide emergency responders with details of the exposure (e.g. skin contact, needlestick, eye contact, ingestion, etc) and the sequence of events

RADIOACTIVE MATERIAL (RAM) EXPOSURES

- Remove contaminated PPE and clothing.
- Consult the SDS and the lab radioactive material manual for proper exposure first aid (e.g. flushing affected area(s) with water for 15 minutes).
- Use an emergency eyewash and/or safety shower for 15 minutes, as required.
- Contact NEU Public Safety at 617-373-3333
- Have a paper copy of the SDS for each RAM involved in the exposure available for emergency responders.
- Be prepared to provide emergency responders with details of the exposure (e.g. skin contact, needlestick, eye contact, ingestion, etc) and the sequence of events

LASER EXPOSURES

- Contact NEU Public Safety at 617-373-3333
- Have a paper copy of the technical data for each laser involved in the exposure available for emergency responders (including class, type, and wavelength).
- Be prepared to provide emergency responders with details of the exposure (e.g. skin exposure, eye exposure, exposure duration, etc) and the sequence of events

SPILLS

CHEMICAL SPILLS

Follow the NEU EHS spill response guidance and requirements as listed in sections 2.5 and 2.6 of the CHP.

Every BioE laboratory user and worker should try to anticipate the types of chemical spills that can occur, know what to do in the event of a major spill and a minor spill, familiarize themselves with minor chemical spill clean-up procedures, and ensure the necessary equipment (spill kits and personal protective equipment) to respond to a minor spill is readily available. SDS contain special spill clean-up information and should also be consulted.

CHEMICAL SPILL KITS

"Universal" chemical spill kits, appropriate for spills of most acids, bases, toxics, and solvents, are available in some NEU laboratory facilities such as ISEC. Some materials, such as hydrofluoric acid (HF) and oils, require specialized spill kits.

It is the responsibility of the PI to provide the appropriate spill kits for the materials in their laboratory. For assistance in selecting the appropriate spill kit(s), consult the DSO or EHS.

BIOLOGICAL SPILLS

Follow the spill response requirements for biological spills are listed in the biosafety registration for laboratories using biohazards and in the NEU Biosafety Plans and Manuals.

Every BioE laboratory user and worker should try to anticipate the types of biological spills that can occur , know what to do in the event of a major spill and a minor spill, familiarize themselves with minor biological spill clean-up procedures, and ensure the necessary equipment (disinfectants and personal protective equipment) to respond to a minor spill is readily available. Biosafety registrations contain special spill clean-up information and should also be consulted.

SPILLS OF RADIOACTIVE MATERIAL (RAM)

Spill response requirements for spills of RAM are listed in Appendix D of the NEU Radiation Safety Manual.

Every BioE radiation worker should try to anticipate the types of spills that can occur, know what to do in the event of a major spill and a minor spill, familiarize themselves with minor spill clean-up procedures, and ensure the necessary equipment (cleaning materials and personal protective equipment) to respond to a minor spill is readily available. The NEU Radiation Safety Manual contains special spill clean-up information and should also be consulted.

WASTE

CHEMICAL HAZARDOUS WASTE DISPOSAL

Laboratory chemical hazardous chemical waste must be disposed of in accordance with local, state, federal and NEU requirements. **Anyone who generates or manages chemical hazardous waste must complete online and classroom Hazardous Waste training from EHS, complete an annual online refresher training, and manage hazardous waste according to these trainings.**

Every BioE laboratory user and worker should become familiar with the Hazardous Waste Management section of the EHS website.

Consult EHS and the DSO with questions on chemical hazardous waste management.

BIOHAZARDOUS WASTE DISPOSAL

All BioE personnel who generate or handle biohazardous waste must complete classroom Biosafety training and online Regulated Medical Waste training. Autoclave online and classroom training is required for some laboratories.

NEU policies and procedures for biohazardous waste disposal are available here.

RADIOACTIVE MATERIAL (RAM) WASTE DISPOSAL

All BioE personnel who generate or handle RAM waste must complete classroom and online Radiation Worker training, training by the NEU Radiation Safety Officer in waste management, and training from the PI.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

It is the responsibility of the PI or supervisor to provide students and staff with appropriate PPE for the tasks performed. Consult the DSO and EHS for assistance with selecting appropriate PPE.

EYE PROTECTION

Eye protection is required for all personnel and any visitors to BioE laboratory facilities. Appropriate styles of safety glasses, goggles and face shields must be worn based on the nature of the task and materials. Assess each laboratory method and protocol for risks and select eye protection accordingly:

- Safety glasses are inadequate splash protection when bulk quantities of chemicals are handled and/or splashes to the face are possible.
- Do not wear contact lenses when working in the laboratory.
- Eye protection must be worn even if a laboratory worker also wears eyeglasses.
- To protect from impact, eye protection must meet the appropriate ANSI standards.
- For work with lasers, eye protection must be selected based on the laser class, wavelength, and other parameters. **Not all tinted safety glasses are appropriate for all lasers.**

RESPIRATORY PROTECTION

Use ventilation or respiratory protection to control inhalation standards. Check the label and SDS for information on a substance's inhalation hazard and special ventilation requirements.

Take appropriate precautions before using these substances. Controlling inhalation exposures via engineering controls (ventilation) is always preferred.

If respirators are required, consult with the DSO and EHS on the appropriate type, style, and fitting **before** beginning work. Respirators must be used in conjunction with a complete Respiratory Protection Program mandated by OSHA.

CLOTHING & GLOVES

Laboratory clothing and glove requirements:

1. Close-toed shoes that cover the entire top of the foot and toes (e.g. ballet flats, loafers, sandals, and Crocs are not acceptable)
2. Long trousers or skirts that reach the ankles
3. No sleeveless tops
4. Long hair tied back

5. No very loose-fitting clothes, long fringe, or floaty/drapey clothes
6. No easily combustible fabrics or fabrics that easily melt
7. No dangling jewelry
8. No ties
9. No contact lenses
10. Laboratory coat. NEU provides blue, cuffed, flame-retardant laboratory coats for use. These coats are available and laundered free of charge. For questions on how to access clean laboratory coats and return soiled ones for laundering, contact the DSO.
11. Appropriate eye protection for the task being performed. Laboratory users and workers must wear eye protection at all times in BioE laboratory facilities.
12. Appropriate gloves for the task being performed. Consult the DSO and EHS for help determining the appropriate glove style and material of construction.
13. Additional PPE as required by the task and/or materials, including but not limited to chemical resistant apron, respiratory protection, arm protection, safety-toe and safety-shank boots, specialty eye protection, and chemical resistant suits.

PPE COMMON SENSE

- **Touching doors and other public surfaces while wearing gloves.** Since Facilities and other personnel move around the laboratory spaces without gloves, the doors and other public surfaces cannot be contaminated. Door handles, all other parts of doors, and any other public surfaces should be handled only with clean hands without gloves. This includes all laboratory door handles, including the inner door handles of side labs, the autoclave room, teaching laboratory doors, pass-through doors, and any other public surfaces. This is to protect everyone who works in the BioE laboratories from chemical and biological hazard exposure.
- **Do not re-use disposable gloves**
- **Remove gloves without exposing yourself to contaminants on gloves.** Consult the DSO or EHS with questions.
- **When removing PPE, remove in the following order:**
    1. Gloves
    2. Eye protection
    3. Laboratory coat
- **Disinfect eye protection after use if the eye protection is used by more than one person in a research group or laboratory**
- Wash hands after removing PPE and before leaving the laboratory

FOOD & DRINK

- Food and drink are prohibited in all BioE laboratory facilities.
- BioE refrigerators, freezers, and microwaves must be clearly labeled “no food or drink”.

SAFETY SHOWERS

Safety showers provide a high volume of water for rapidly rinsing a contaminant off of a person's skin and clothing. Laboratory personnel must familiarize themselves with the location of the safety shower(s) in the laboratory/ies in which they work. They must always know the location of the nearest safety shower.

Do not block or obstruct safety showers.

EYEWASH STATIONS

Eye wash stations provide a high flow of water to flush a contaminant from eyes. : Once the eyewash is activated, hold opened eyes in the eyewash water flow for 15 minutes.

Do not block or obstruct eyewashes. Keep eyewash dust covers in place when eyewash is not in use.

FIRST AID KITS

PIs must provide and resupply first aid kits for use in their laboratory/ies.

CHEMICAL FUME HOODS & BIOLOGICAL SAFETY CABINETS (BSC)

GENERAL GUIDELINES (not exhaustive)

- Complete online EHS Laboratory Chemical Fume Hood training prior to using a chemical fume hood.
- Complete classroom and online Biosafety training prior to using a BSC.
- Never use an inoperative fume hood or BSC.
- Never use a fume hood or BSC with an expired certification. The unit must have a label listing the expiration date. Notify the PI and DSO of any expired units.
- Do not store chemicals in fume hoods or BSCs.
- Do not use BSC to work with hazardous or volatile chemicals. It can release harmful fumes into the laboratory and damage the BSC filter.
- Use fume hoods and BSCs at the appropriate sash height.

- Do not block air intake of fume hoods or BSCs.

LASER FACILITY ENGINEERING CONTROLS

Engineering controls, special signage, and interlocks to prevent accidental exposure to laser beams are required for facilities using lasers that are not fully enclosed:

- Laser facilities must be inspected and approved by the EHS Laser Safety Officer prior to a laser being energized. Laser facility workers and users must be trained on the engineering controls and interlocks specific to the facility(ies) in which they will work, **prior** to beginning work.

OPEN FLAME

Open flames in the laboratory must be generated using Boston Fire Department approved devices. **Alcohol burners are prohibited by the Boston Fire Department.** Approved alternatives include:

- Lab Micro Burner
- Butane Micro Burner
- Fireboy Safety Burner

LABORATORY HOUSEKEEPING

It is the responsibility of the laboratory workers, users, and PIs to ensure proper laboratory housekeeping, including:

- Work surfaces cleaned and decontaminated at the end of each workday
- Floors clear of trash, debris, and obstructions
- Egresses and fire exits unobstructed
- Safety showers and eyewashes unobstructed
- Minimum clearance of 36 inches from ceiling- and/or wall-mounted sprinkler heads
- Minimize cardboard and other combustible storage materials
- Do not leave used gloves or consumables on work surfaces
- Properly decontaminate the BSC and switch it off at the end of each work day

PERSONAL ITEMS IN LABORATORY FACILITIES

Cell phones, tablets, earphones, earbuds, laptops, other personal electronics, notebooks, writing implements, and other tools or items that are used outside of the laboratory areas should not be placed on laboratory benches, handled with gloved hands, or handled with contaminated equipment or

hands. This is in order to protect individuals themselves and others in BioE, at Northeastern, at home, and in public from the risk of exposure to hazardous materials.

LABORATORY FURNITURE

Furniture from writing areas, common seating areas, offices, and any other non-laboratory space may not be brought into or used in a laboratory space because of the risk of contamination with hazardous materials. Laboratory furniture may not leave laboratory spaces for the same reason.

LABORATORY AUDITS & INSPECTIONS

EHS will conduct annual Laboratory Safety audits of each laboratory. If a laboratory has a Biosafety Registration, EHS Biosafety will perform a separate annual Biosafety Audit.

Research laboratories must undergo a self-inspection at least annually. The inspection must be administered by the DSO with the LSO and/or the PI in attendance. Results and findings will be documented and sent to the Department Chair. Self-inspections will be performed using the following forms:

1. Laboratory self-inspection checklist
2. Biosafety inspection checklist

LABORATORY CLOSE-OUT

When a student researcher, postdoctoral researcher, or staff member will be leaving BioE laboratory facilities upon graduation or end of employment:

1. The individual must clear their laboratory and desk/office work space of personal items.
2. Properly dispose of any chemicals, biological materials, RAM, or other materials that will no longer be used by the research group.
3. Complete and safely shut down all experiments or transfer them to a colleague with the guidance and approval of the PI.
4. Decontaminate and clean all work spaces.
5. Place any used laboratory coats in the soiled laboratory coat bin.
6. Return all NEU property to the PI and/or DSO. Note that NEU Asset Disposition may be required.
7. Notify the DSO of the date of their last day at NEU.
8. Complete the BioE Researcher Facility Close-Out Form and submit to the DSO.

When a PI relocates or closes their laboratory:

1. **Prior to** relocation or closing-out, consult with the DSO and EHS for required procedures to decontaminate, pack, move, and or dispose of the laboratory equipment and hazardous materials safely. Note that NEU Asset Disposition may be required.
2. Review the EHS Laboratory Decommissioning Procedure
3. Notify EHS of the relocation and/or close-out and complete the required paperwork:
    a. Biosafety Registration Amendment or Biosafety Registration Termination via BioRaft
    b. Biosafety/IACUC Addendum
    c. IACUC Protocol Amendment (Supplement A)
    d. Written (email) notification to the Radiation Safety Officer if the laboratory has RAM
    e. Human subjects research amendment application(s)
    f. Complete the EHS Laboratory Decommissioning Form (see last section of linked document)

COMPLIANCE

It is the responsibility of the PI to ensure compliance of their research activities.

BIOSAFETY REGISTRATIONS

PIs and researchers using any biological materials must consult EHS Biosafety to determine if a biosafety registration is required. Projects involving human materials, non-human primate materials, infectious materials or organisms, toxins, recombinant DNA or organisms, transgenics, or some types of synthetic DNA will require a biosafety registration.

Amendments to approved registrations must be submitted per EHS policy, including for:

- Protocol changes
- Location changes

Biosafety plans and manuals can be found here.

ACUTELY HAZARDOUS CHEMICALS & SELECT AGENTS AND TOXINS

1. The chemicals listed in Appendix A of the NEU Chemical Hygiene Plan must be registered with and approved by NEU EHS prior to purchase and use.
    a. The registration form is available here.
2. Each PI must develop a written SOP for the storage, handling, and disposal of chemicals listed in Appendix A of the NEU Chemical Hygiene Plan. Storage procedures must comply with the CHP.
3. Some chemicals and biological materials must be registered with the Federal Select Agents and Toxins Registry.

RADIOACTIVE MATERIAL (RAM)

Researchers must obtain a permit from the EHS office of Radiation Safety prior to beginning any work with RAM.

All RAM must be reviewed, approved, and purchased by EHS Office of Radiation Safety using an online form.

Amendments to approved registrations must be submitted per EHS policy, including for:

- Protocol changes
- Location changes

HUMAN SUBJECTS RESEARCH

Research involving human subjects, including some clinical samples and patient data, must be reviewed and approved by the NEU Institutional Review Board (IRB) and the Office of Human Subject Research Protection. Contact the Office of Human Subject Research Protection to determine IRB compliance requirements.

Amendments to approved registrations must be submitted per IRB requirements, including for:

- Protocol changes
- Location changes

ANIMAL RESEARCH

Research involving animals may need to be reviewed and approved by the NEU Institutional Animal Care and Use Committee (IACUC) and the Department of Laboratory Animal Medicine (DLAM). Contact DLAM to determine IACUC compliance requirements.

Amendments to approved registrations must be submitted per EHS policy, including for:

- Protocol changes
- Location changes

Laboratory safety rules will be enforced as follows:

1st violation	1. immediately don appropriate PPE 2. decontaminate or properly discard affected device(s), supplies, or equipment 3. verbal warning
2nd violation	1. immediately don appropriate PPE 2. decontaminate or properly discard affected device(s), supplies, or equipment 3. written warning 4. LSO and PI notified in writing
3rd violation	1. immediately don appropriate PPE 2. decontaminate or properly discard affected device(s), supplies, or equipment 3. written warning 4. LSO and PI notified in writing 5. Husky card access to **laboratory areas** suspended until the individual completes a laboratory safety walkthrough together with the Department Safety Officer and the Laboratory Safety Officer for their research group
4th violation	1. immediately don appropriate PPE 2. decontaminate or properly discard affected device(s), supplies, or equipment 3. written warning 4. LSO and PI notified in writing 5. Husky card access to **writing area/office area and laboratory areas** suspended until the individual completes a laboratory safety walkthrough together with the Department Safety Officer, the Laboratory Safety Officer for their research group, and their PI
5th violation	1. immediately don appropriate PPE 2. decontaminate or properly discard affected device(s), supplies, or equipment 3. written warning 4. LSO and PI notified in writing 5. Husky card access to **writing area/office area and laboratory areas** suspended until all online and classroom EHS trainings (initial or refresher) required for laboratory access are taken again.
6th and subsequent violations	1. immediately don appropriate PPE 2. decontaminate or properly discard affected device(s), supplies, or equipment 3. written warning 4. matter referred to Department Chair 5. Husky card access to **writing area/office area and laboratory areas** suspended pending Department Chair action.

In ISEC, as of summer 2019:

Door handles, all other parts of doors, and any other public surfaces should be handled only with clean hands without gloves. This includes all laboratory door handles, including the inner door handles of side labs, the autoclave room, teaching laboratory doors, pass-through doors, and any other public surfaces. This is to protect everyone who works in the BioE laboratories from chemical and biological

hazard exposure. Anyone observed violating this rule will lose lab and writing area access until they repeat Fundamentals of Laboratory Safety online training.