# Lawrence Hall of Science
# Safety Manual

## EMERGENCY PHONE NUMBERS

Fire - Police - Ambulance: 911
• From campus phones and all other landlines dial 911 -- no prefix required
• From cellular phones* for emergencies on or near Campus, dial (510) 642-3333

*Calling 911 from cellular phones will work, but response time may be longer because calls are routed through the California Highway Patrol, who may assign the response to an agency other than campus police (e.g. Berkeley PD, Oakland PD, etc).

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| UC Police (24-hour service) | see above or (510) 642-6760 [2-6760**] |

The **Visitor Services Desk** (VSD) is the center of communications at The Lawrence. Emergency personnel often enter via the front door of the building and the VSD staff direct them where to go. *Please notify the VSD of any emergencies as soon as it is safe to do so.*

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|---|---|
| Visitor Services Desk (VSD) | [2-9058**] (internal use only)<br>(510) 643-5956 [3-5956**] |
| Office of Environment, Health & Safety (EH&S)<br>Spill clean-up and general information 8 AM - 5 PM | (510) 642-3073 [2-3073**] |
| Physical Plant – Campus Services (PPCS)<br>24-hour service: elevators, building repairs, etc. | (510) 642-1032 [2-1032**] |
| Facilities & Information Technology<br>Cory Welch (Room 105 LHS) | (510) 812-0209 |
| LHS Facilities Management Office<br>lhsbuilding@berkeley.edu | (510) 664-5610 [4-5610**] |

**From landlines at The Lawrence or on campus use the abbreviated version of the phone number. All landlines for UC Berkeley are area code 510 and begin with 642, 643, or 664. In the remainder of the Safety Manual landlines will include the abbreviated version in [bracket] format.

# I. INTRODUCTION

For your own personal safety it is essential that:

- you are aware of the potential hazards in your working area,
- you know who to contact in the event of an emergency,
- you know the procedures to follow in the event of an emergency.

All staff should receive safety training so that they can avoid hazards; communicate the nature of emergency events and seek the right help; and know the procedures to follow to assure safe evacuation. To ensure that you receive this information, The Lawrence requires that all staff:

- read the The Lawrence Safety Manual ("Safety Manual") annually,
- complete any additional required safety training for each laboratory and tool shop employee, in person or online, as assigned by designated unit supervisor or delegated representative, and
- participate in any building evacuation drills/trainings.

This Safety Manual is intended as a training tool and a reference for employees. It presents a summary of emergency procedures and guidelines for some of the most common potential safety concerns. It is not intended to supersede University, State, or Federal safety regulations. All persons working in The Lawrence are required to read this manual and comply with its provisions. For any safety concerns not directly addressed in this manual, please contact your supervisor, the Safety Committee, and/or Lawrence leadership. In the event of a building closure (e.g. due to smoky air, power outage, etc) information will be posted in the All Staff Google Space. All employees are given access to the Safety Manual via the onboarding checklist upon hire. It is also available on The Lawrence's staff website.

All employees are required to complete the EHS Workplace Safety Program training. This training is assigned via UC Learning Center upon hiring. The employee's supervisor receives an email when the training has been completed and/or if it is overdue. In addition, faculty, principal investigators, and supervisors have direct responsibility for implementing procedures and practices in their own units.

In the event of any problem or question, the following sources of information and assistance are available at all times:

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|---|---|---|
| Lawrence Building Manager | Cory Welch, 105 LHS | 510-812-0209 |
| Lawrence Facilities | lhsbuilding@berkeley.edu | 510-664-5610 [4-5620] |
| Safety Committee Members | see Safety Manual Section VII | |
| Office of Environment, Health and Safety (EHS) | | 510-642-3073 [2-3073] |
| EH&S website | | https://ehs.berkeley.edu/ |

Many additional safety training opportunities are available to staff through EH&S. You can visit their web site at https://ehs.berkeley.edu/training. Other training that is required for working in laboratory spaces is administered through UC Learning and will be assigned as appropriate.

UC Extension and many communities also offer programs in emergency preparedness, response and recovery. Much of this training, when successfully completed, provides additional certification in aspects of safety. Staff may voluntarily bring these to the attention of their supervisor or the The Lawrence Safety Committee for possible inclusion in emergency event planning.

## II. EVACUATION PLAN

### Evacuation Procedures and Routes

**When the alarm sounds, or you are directed by your supervisor or other building personnel, evacuate the building immediately.**

When exiting, in the event of fire or earthquake, close the door, for a bomb threat, leave the door open. If the room is clear, place the "Evacuated" hang tag on the door handle. This tag should be on the interior door handle or near the door. If no tag is available, use a sticky note or tape a note to the door that says "evacuated."

**Exit the building via the stairways.** Do not use the elevators.

**Follow the appropriate evacuation route based on your location in the building when the alarm sounds/emergency occurs.** Maps showing evacuation routes, exits, fire alarms and extinguishers are posted by elevator doors. Note that not all building exits are used in the planned evacuation routes.
Level A Evacuation Route Map
Level B Evacuation Route Map
Level C Evacuation Route Map
Level D Evacuation Route Map

**While evacuating, check rooms/spaces along your evacuation route.**
Efforts to check rooms/spaces should be limited to five minutes. If possible/appropriate affix an evacuation door tag or sticky note with "evacuated" written on it to doors where the space has been checked. If access is not possible, a sticky note on the door should indicate that.

**Assist the injured and people with disabilities when possible.** Do not move the seriously injured unless *not* moving them could lead to further injury (e.g. imminent threat of fire). Ask disabled persons how best to assist them. If someone is hearing impaired be sure they know there is an emergency. If it is necessary to leave someone in the building, leave them in a secure place such as the stairwell, ideally at a Designated Waiting Area in the staff stairwell (B, C, or D level just inside the stairwell) or on the mezzanine behind the auditorium on B-Level.

After you have evacuated the building, immediately report the location and condition of the person(s) to senior staff with a radio (e.g. building supervisor).

**Immediately upon exiting the building, staff should report to their emergency assembly area:**

- **Outdoor Nature Lab** (B/C/D Level)
- **Forces That Shape the Bay** (A Level/Shop)
- **Vista Parking Lot** (Front Entrance, Plaza and surrounding areas/roads/parking lots)

Notify the assembly area coordinator which rooms/spaces were checked, and report any problems. Then report to a roll taker. Keep at least 50 feet away from the building in case of building damage/falling materials. Do not block service roads or parking areas by trying to immediately drive away in your car.

During evacuation, follow instructions of staff wearing safety vests and/or yellow Lawrence caps and/or carrying megaphones. Do not re-enter the building until police or fire personnel determine that it is safe to do so and the fire alarm has been silenced and reset.

**Emergency Information:** KALX 90.7 FM (campus run radio station) provides information about the campus during prolonged emergencies or power outages. Additional, general information about local hazards for campus and the Bay Area can be found here.

### Emergency/Evacuation Equipment & Supplies

**Evacuation Equipment:** High visibility vests have been distributed to Safety Committee and other key people so that during an emergency they will remain visible to public and staff. Additional vests, megaphones, and large stop signs are stored in Pauley Hall and in the Prep Hub on C-levels. Staff from these areas are responsible for bringing the supplies to their emergency assembly areas.

**Emergency Backpacks:** Emergency backpacks have been distributed to all classrooms, Visitor Services Desk, and several offices throughout the building. Staff in these rooms are responsible for bringing the backpacks out to their emergency assembly areas during an evacuation.

**Walkie-Talkie Radios:** Museum Floor and Visitor Services Desk staff should keep their radios on, at a volume they can hear/respond to, on Channel 1 (the main channel). Other channels should not be used unless directed to do so for specific needs during the evacuation/emergency.

**Emergency Supplies:** Additional emergency supplies for long-term emergencies (e.g. where people need to remain at the Lawrence for 24-48 hours) are stored in trunks on A-level (in Pauley Hall) and D-level (at the base of the stairwell leading to the staff parking lot).

## III. EMERGENCY RESPONSE

### General

**For any emergency that does not involve an alarm and evacuation (e.g. shelter in place), information will be shared via the All Staff Google Space and All Staff email list.** As appropriate, supervisors will also individually notify staff and public notices will be posted on the Lawrence website and social media accounts. Additional information regarding hazards affecting our general area (e.g. earthquake) can be found on the campus Office of Emergency Management website.

### Building Closures

**In the event of a building closure (during business hours or after hours) due to emergency (e.g. smoke advisory, road closures, etc) staff will be notified via All Staff Google Space and All Staff email list.** Supervisors will also individually notify staff. Public notices will be posted on the Lawrence website and social media accounts. Staff should assume that the building remains closed until they are notified by one of the channels above that the building has reopened.

### Fires

**If a fire alarm sounds, turn off any electrical equipment you are operating and evacuate the building immediately.** Close all doors to prevent fire from spreading. Exit the building via the appropriate evacuation route (see section II above, “Evacuation Plan”). Use stairwells, not elevators. NOTE: In the event of a fast-moving wildfire outside of the building, instructions will be given to shelter in place in the auditorium.

**To report a fire: pull the nearest fire alarm and call 911 to give the location and extent of the fire.** State the room number and if there are any special circumstances, such as the presence of animals or dangerous chemicals. Call the Visitor Services Desk [2-9058] so they can share this information with the emergency responders, and/or alert the building supervisor, and/or find a staff member with a radio and ask them to alert the building supervisor. Fire alarm pulls are located on each level throughout the building (look for red signs protruding from the wall marking their locations).

**When feasible, if you are trained, attempt to put out the fire with a fire extinguisher.** If your lab or office does not have a fire extinguisher, there are extinguishers located throughout hallways on each floor. (Look for red signs protruding from the wall or on surface cabinets). When fighting a fire, always position yourself between the exit and the fire to ensure an escape route. **If the fire cannot be contained, evacuate immediately.**

### Earthquakes

**Shelter under a sturdy desk, table or counter.** If possible, move away from experimental setups, tall bookcases, and glass windows. If outside, move into open areas away from overhead power lines.

**Do not attempt to leave the building during the earthquake.** If outside, remain outside.

**When the shaking stops, leave the building immediately.** In case of possible gas leaks, do not light matches and do not operate electrical switches or appliances.

**Do not use phones (landlines or mobile) except to report extreme emergencies.** Help keep landline networks from being overloaded by replacing any receivers that have been knocked off their hook. Minimize use of mobile networks to keep bandwidth available for emergency personnel. There are emergency phones located in the Vista Parking Lot and outside the D-Level doors in the Staff Parking Lot.

### Power Failure

**In the event of a long-term (>30 minutes) building wide power failure, the building will be closed and all staff and visitors will leave the building until power is restored.** Emergency low-level lighting will automatically come on throughout the building and has a run time of 90 minutes without external power. The emergency generator will turn on within 10 minutes of the power outage and provide power to the Animal Discovery Zone and the Cafe kitchen area. The elevator will go to D-level and doors will open. Emergency backpacks in classrooms and other locations have flashlights for short-term lighting needs beyond the automatic emergency lighting. WiFi will not work without regular building power, and bathrooms will not have sufficient lighting for regular use. Note: Weekends may result in slower response times from campus services (up to 90 minutes) in the event of an issue such as the elevator not returning to D-level and doors opening.

**Help clear the building as you would for any building evacuation.** The facilities team will leave the building last. Please assume you should leave the building/premises unless you have specific duties for closing/securing the building or are staffing a camp, event, etc (see below).

**When the building is closed to the public, clear the building for the rest of the day.** Updates will be sent via the All Lawrence Google Space and duplicated on email. End all events and send participants home. Facilities will help event coordinators to cancel/reschedule interrupted events as needed. If participants are unable to leave immediately (e.g. waiting for a ride during inclement weather), work with the Facilities team to determine the best place for them to wait.

**When the building is open, including during camps, the building will close and all visitors should leave the building.** Visitor Services will work with Facilities to assist any visitors that are unable to leave immediately. Visitor Services will determine how to handle any customer service issues (e.g. if refunds are appropriate, etc). They will communicate directly with visitors. Camp staff should take campers outside (Outdoor Nature Lab, Plaza, Forces area, etc) until parents can be contacted and campers picked up, depending on weather conditions, time of day, etc. Camp staff may need to rely on off-site/remote staff to send messages to parents (WiFi will not work).

## Shelter in Place

**If a shelter in place order is issued (by The Lawrence's Director, Leadership Team, or external first responders such as fire or police) all staff, visitors, campers, etc should remain in the building.** A shelter in place order is issued in the event of an external threat (e.g. fast-moving wildfire). Staff messages will be sent out by email, gchat, and via a text phone tree. The Executive Assistant to the Director will serve as communication lead for staff. Communication for visitors and campers will be handled by the Visitor Services Desk, floor staff, camp staff, and any event leads. Long term messages for visitors, if needed, will be handled by the marketing and web team. Updates will be shared as information becomes available, no less than once per hour. Messaging will include immediate information, and longer term information (e.g. to not come to the building for the remainder of the day). Messaging will go to all staff, regardless of actual location, via multiple channels (see above).

**In the event of an external threat (e.g. fast-moving wildfire), everyone should move to rooms without external windows.** As many people as possible should move to c-level spaces such as interior classrooms, theater, and c-level hallways to provide a safe space, and bathroom access if necessary for long term emergencies. Other spaces that may be used as necessary include exhibit halls and planetarium. Other spaces may be deemed usable depending on the nature of the shelter in place order. Note: there are no restrooms inside the building on A-level. In the event of a fire outside the building, facilities will turn off the air-intake system to minimize smoke in the building. In the event of needing to lock external doors, facilities and production studio staff will ensure all external doors are locked.

## Injuries

**For life-threatening or serious medical emergencies call 911.**

**Make a follow-up call to the Visitor Services Desk,** [2-9058**] (internal use only) OR (510) 643-5956 [3-5956**], to alert them to the nature of the emergency and where to send emergency personnel when they arrive.

For less serious injuries or illness, basic first aid supplies can be obtained at the Visitor Services Desk in the Level A lobby. All classrooms are also equipped with first aid kits for minor injuries.

**REPORT ALL EMPLOYEE INJURIES** (even small ones) to your supervisor, and visitor injuries to the Visitor Services Desk [2-9058] using an incident/injury report form. To fill out an incident report, follow the form instructions and submit the form the **same day** the incident occurred. The current Incident Form is available on the Staff Website (Home // Resource Management // Policies & Reports // (login required)). Other Risk Services forms, e.g., for vehicle accidents and property loss, are at https://riskservices.berkeley.edu/forms-waivers.

## Elevator Failure

If you are trapped inside the elevator, call for help by pressing the red alarm button on the control panel or by using the emergency phone in the elevator. If there are people trapped inside the elevator, try to communicate to them that help is on the way.

Report elevator problems to the Building Manager (510) 812-0209, room 105 LHS or to the Visitor Services Desk [2-9058]. During non-business hours, report emergencies directly to Physical Plant Services, (510) 642-1032 [2-1032].

## Flooding or Plumbing Failure

**Call for Help Immediately.**

- Visitor Services Desk (510) 642-9058 [2-9058]
- Facilities & IT Manager (510) 812-0209
- LHS Facilities Management Office (510) 664-5610 [4-5610]
- Physical Plant after-hours (510) 642-1032 [2-1032]
- Police (510) 642-6760 [2-6760]

If flooding occurs around energized electrical devices or floor receptacles, do not touch equipment. Facilities personnel will cut the power source at the main electrical panel. Do not step into flooded areas unless power is off.

## Hazardous or Toxic Spills

Call EH&S (510) 642-3073 [2-3073] for assistance with chemical spills of any quantity involving material on the following list:

- carcinogens and mutagenic materials
- radioisotopes
- biohazard materials
- highly toxic chemicals
- concentrated acids and bases

If the spill presents an extreme hazard, evacuate the area, pull the fire alarm, dial 911 and give the exact location and nature of the spill. If the spill occurs on an upper floor, notify the lab or office below immediately. Notify the Visitor Services Desk [2-9058] so they are aware of the spill and can direct any emergency personnel.
If you are unfamiliar with the toxicity of the substance you are working with, contact your supervisor or the Building Manager.

All minor spills should be cleaned up promptly.

## Biological Spills

In the event of a biological spill involving small to moderate amounts of body fluids (e.g. vomit, blood, etc.) contact facilities or the Visitor Services Desk [2-9058] for clean up assistance. If

assistance is not available, biological spill cleanup kits can be found in all classrooms, at the Visitor Services Desk, in Holt and Pauley Halls, and on D-level by the center stairwell exit into the staff parking lot. Instructions for use are provided in the kits.

### Gas Leak or Utility Failures

**Call for Help Immediately.**

- Visitor Services Desk (510) 642-9058 [2-9058]
- Facilities & IT Manager 510-812-0209
- LHS Facilities Management Office (510) 664-5610 [4-5610]
- Physical Plant After-Hours (510) 642-1032 [2-1032]

If necessary, evacuate the building by pulling a fire alarm and notify UCPD by calling 911 or (510) 642-6760 [2-6760]. In the event of gas leaks, do not operate any electrical switches as this may produce sparks.

## IV. FIRE SAFETY

### Fighting Small Fires

**Always pull the fire alarm first (or send someone to do this) before attempting to fight a fire.** Do not try to fight a fire unless you are trained, you feel it can be done safely, and there is a clear escape route.

Know where the closest fire extinguisher is located. Be sure to use the proper type of extinguisher. If your laboratory or office does not have its own extinguisher, there are several available throughout the building on each floor. Red signs protruding from the wall mark extinguisher locations. Familiarize yourself with extinguisher locations.

Before opening any doors to investigate a possible fire, feel the top part of the door with the back of your hand. If it is hot, do not open the door. If the door is cool, open it a crack to see if the fire is still confined and small; if not, close the door and leave immediately.

If the fire is small, and conditions are safe, enter the room and try to extinguish the flames. Use a fire extinguisher if you are trained to do so. Remember to direct the extinguisher at the base of the fire and to pull the pin. Be careful to keep yourself between the fire and the door. Do not allow the fire to block your exit from the room.

If you are able to put out a fire successfully, you still need to report it to the Facilities and IT Manager ((510) 812-0209) and or UCPD (510) 642-6760 [2-6760], and remain at the site to make a report to the Fire Department or UCPD when they arrive.

NOTE:  Fire extinguisher training is offered periodically without charge to The Lawrence employees. Announcements will be placed in the All Hall Google Space when a training has been scheduled.

The Lawrence orders all of its fire extinguisher(s) through the Building Manager from PPCS. Extinguishers installed by PPCS will be appropriately mounted for accessibility, and are automatically scheduled for annual inspection and necessary refills. Extinguishers placed in laboratories, machine shops, and other areas have a designated LHS staff person responsible for doing a basic monthly inspection (e.g. lab manager).

## Fire Prevention

**Storage of flammable liquids**

In areas where combustibles are used and stored, remove all open flame devices and use grounded electrical devices in good service condition.

No more than 20 gallons of flammable liquids may be stored outside of a flammable storage cabinet in any one location, provided the following rules are observed:

- Containers shall be no larger than 1-gallon (safety containers may be 1- or 2- gallon);
- No more than ten 1-gallon non-safety containers may be kept outside storage cabinets;
- Anything beyond the first ten gallons must be stored in safety containers (the number of 2-gallon safety cans shall not exceed five).
- Quantities exceeding the above totals shall be stored in approved metal, flammable liquid storage cabinets. The total amount of flammable liquids stored in the approved cabinets within labs or classrooms shall not exceed 30 gallons.
- Use only metal or approved containers for combustible waste. More information can be found on the EH&S website: https://ehs.berkeley.edu/sites/default/files/safe_storage_of_hazardous_chemicals.pdf
- The responsibility for following these requirements rests with the supervisor or person responsible for the laboratory/shop space where the chemicals are stored.

**Maintenance**

- Remove all combustibles and obstructions from corridors and exit ways.
- Waste containers should be emptied on a weekly basis. If this is not done, notify the Building Manager (510-812-0209)
- Report problems with fire alarms, fire extinguishers, or other built-in fire protection to the Building Manager (510-812-0209) or the Campus Fire Marshal (510) 642-4409 [2-4409]. Other potential fire hazards should also be reported, for example: defective exit doors or defective exit lights, obstructed corridors or accumulated waste materials.
- Smoking is not allowed anywhere on campus/University property (inside or outside buildings).

Special training courses, films and technical training advice are available from EH&S Training Staff (510) 642-3073 [2-3073] or visit https://ehs.berkeley.edu/training. Applicable online safety courses and in person orientation tours are available to all Lawrence staff. Contact the Safety Committee chairs (see section VIII) to schedule an in-person safety orientation of the building. Additionally, be sure to familiarize yourself with alternative exits from your workspace(s) and around the building. Ask a colleague or your supervisor to walk through the building with you to point them out if you are new to working in the building. And remember, do not use an elevator during an emergency evacuation.

## V. LABORATORY SAFETY

### Personal Laboratory Safety

- Wear safety glasses or face shields when working with hazardous materials or equipment.
- Wear gloves when using toxic or hazardous agents. They should be removed before leaving the lab, using phones, opening refrigerators, using cabinets or other handles, or entering common areas.
- Wearing chemical and fire resistant laboratory coats is recommended. When handling dangerous substances wear gloves, laboratory coats and safety goggles. Shorts and sandals/open-toed shoes should not be worn in the lab.
- Do not use any equipment unless you are trained and approved as a user by your supervisor.
- Pregnant women should take special care with exposure to radiation and certain chemicals, which can be harmful to fetal development. Call EH&S at (510) 642-3073 [2-3073] for information or contact your physician. Check the Materials Safety Data Sheets (MSDS) provided by the chemical manufacturer for additional information.
- Wash hands thoroughly with soap and water before leaving the lab.
- Tie back hair when working near flames or entangling equipment. Remove any dangling jewelry or accessories (e.g. scarves).
- If leaving a lab unattended, turn off all burners and lock the doors.
- Working alone in laboratories is not recommended. If you must work alone, notify someone of your location, and when you have finished your work.
- Never mouth pipette. Refer to your Lab Supervisor for proper pipette techniques.

### General Laboratory Safety

- Maintain aisles at least 28" wide and keep them clear.
- Maintain unobstructed access to all exits, fire extinguishers, electrical panels, emergency showers and eyewashes.
- Do not use corridors for storage or work areas.
- Make sure all cabinets, bookcases, etc., taller than 42” are anchored.
- Shelves 48" or higher and all shelves with chemicals should have restraining straps or lips.

- All highly toxic materials should be stored in secondary containers to avoid hazardous leaks
- Do not store heavy items above table height. Any overhead storage of supplies on top of cabinets should be limited to lightweight items only. Also, remember that a 36" diameter area around all fire sprinkler heads must be kept clear at all times.
- Areas containing biohazards, radioisotopes and carcinogens should be labeled with appropriate signage. However, do not post signs unnecessarily and be sure that the labels are removed when the hazards are no longer present.
- Post shutdown instructions next to any piece of equipment that may run unattended. List clear instructions and the name and phone numbers of the person to contact regarding that piece of equipment in case of an emergency.
- Make sure all chemical reagents are clearly and currently labeled with the substance name, concentration, date and name of the individual responsible.
- Avoid using extension cords whenever possible. If you must use one, obtain a heavy-duty cord that is electrically grounded, preferably with its own fuse and install it safely. Extension cords should not go under doors, across aisles or be hung from ceilings.
- Check with your supervisor about procedures before using paint, adhesives or other organic compounds. Use volatile and flammable compounds only in a fume hood. Procedures that produce aerosols should be performed in a hood to prevent inhalation.
- Gas burners and hot plates should never be left unattended when in use.

## VI. CHEMICAL STORAGE AND WASTE DISPOSAL

Each laboratory is required to have a Chemical Hygiene Plan that provides specific guidelines for that work area. The lab supervisor maintains the Chemical Hygiene Plan.

Laws regulate the recycling and disposal of many kinds of wastes. Be aware of the various policies cited below and refer to them before you dispose of anything. EH&S has provided a step-by-step decision-making aid at https://ehs.berkeley.edu/dispose-waste. If you have waste that needs to be disposed of, contact LHS Building (lhsbuilding@berkeley.edu) for further direction.

### Chemical Storage

- Arrange chemical storage by chemical compatibility. Store strong acids and bases away from organic compounds and segregate incompatible chemicals. Do not use an alphabetical shelving method. Useful information on chemical compatibility can be found in Dangerous Properties of Industrial Materials by N.J. Sax, the Merck Index, the Aldrich Chemical Catalog, the Flinn Catalog as well as the EH&S MSDS Program at https://ehs.berkeley.edu/hazardous-materials/safety-data-sheets-formerly-msds.
- Comply with fire regulations concerning storage quantities, types of approved containers and cabinets, proper labeling, and inventory. If uncertain about regulations, contact the

Building Manager (510-812-0209) or visit EH&S Hazardous Materials Management web site https://ehs.berkeley.edu/hazardous-materials.

- Secure all pressurized containers (e.g. $C0_2$ tanks). Install restraining lips on shelves.
- Date chemicals at time of purchase, and make sure all containers are properly labeled.
- Maintain up-to-date inventory records for chemicals, radioisotopes, carcinogens, and any biohazards. State law requires the University maintain a complete chemical inventory as part of a Hazardous Materials Management Program. All labs must submit a chemical inventory to EH&S and update it annually.
- Do not store food in laboratories, refrigerators or in cold rooms containing substances such as chemicals, radioactive compounds, or biological samples.
- Do not dispose of food waste in laboratory waste bins.

### Building Trash & Recyclables

Only non-hazardous materials are allowed in building trash and recycling containers. Disposal of hazardous chemicals or medical waste in the building trash is strictly prohibited. Absolutely no bags or containers that are labeled **medical waste, biohazard waste, infectious, or sharps waste** may be put in the regular building trash.

All food waste should be disposed of in compost bins, which are emptied nightly, to avoid attracting insects and rodents. Do not dispose of food waste in office waste bins, as those are emptied less frequently. Never dispose of food waste in laboratory-designated waste bins.

Many laboratory chemicals that you may consider non-hazardous are in fact regulated by the EPA or the California Department of Health Services and are considered hazardous. Therefore, unless you are absolutely sure that a chemical is not classified as hazardous, do not put it into the building trash. Instead, package it for pickup and hazard determination by EH&S, or consult EH&S before putting in the trash.

What CAN go in the Building Trash

- Sugars and some salts
- Powdered detergent
- Non-hazardous proteins
- Sand and clay
- Broken or waste glassware (Must be put in a cardboard box, taped closed and labeled "Broken Glassware". Leave for pickup by custodians.)
- Uncontaminated plastic pipettes (Must be sealed in a separate box or put in the same box with broken glass.  DO NOT leave it loose in trash.)
- Autoclaved, non-medical waste (Must be packaged in white bags labeled "Non-medical" and taken directly from the lab to the building dumpster.)

What must be packaged for EH&S

- All hazardous lab chemicals
- Copy machine toner
- Photographic chemicals

- Pesticides
- Paint and paint thinner
- Waste solvents
- Waste oil
- Empty containers with chemical residues
- Hazardous household chemicals
- Fluorescent light tubes and bulbs

Special disposal location for:

- Batteries (bottom shelf on shelving unit in the loading dock near shipping room)

What must be disposed of in an e-Waste (“Electronic Waste”) cage (cages requested by Building Manager from E&S):

- Computers (harddrives must be erased, see IT staff for support)
- Monitors
- Desk calculators
- Cables
- Other electronic equipment

### Drain Disposal

**Campus policy prohibits the drain disposal of hazardous wastes or any material causing violation of the East Bay Municipal Utility District (EBMUD) Wastewater Discharge Permit limitations.** Absolutely no carcinogenic, chemically hazardous or biohazardous waste is to go down the drain. Failure to comply with EBMUD requirements for campus drain disposal can lead to substantial fines or restrictions on laboratory water use. Complete EH&S guidelines for drain disposal of chemicals can be found at https://ehs.berkeley.edu/environmental-protection.

General Guidelines

What CANNOT go down the drain:

- Solutions containing any heavy metals
- Poisons
- Organic solvents
- Strong acids and bases
- Photographic fixer*
- Chromic acid/sulfuric acid glass washing solutions
- Waste paint and paint thinner
- Motor oil
- Methanol
- Radioactive and biohazardous wastes

What CAN go down the drain:

- Liquid detergents (in small amounts, large amounts should be disposed of through EH&S)

- Sugar and non-hazardous protein solutions
- Some dilute acids and bases (pH<10 or pH>5.5)
- Liquid, non-medical waste which has been neutralized/decontaminated with bleach to final concentration of 1%.

If there is any uncertainty if something can go down the drain, please contact lhsbuilding@berkeley.edu to get more information.

*NOTE: Although photo fixer is not allowed down the drain because it contains silver, photo developer CAN go down the drain if the pH is not too basic (pH must be less than 10).

## VII. HAZARDOUS WASTE MANAGEMENT

University of California, Berkeley (UC Berkeley)'s hazardous waste is divided into four categories: 1) chemical, 2) biological (e.g., recombinant DNA and biohazardous), 3) radioactive, and 4) sharps. The information that follows will help you understand how to use the Office of Environment, Health & Safety (EH&S) online "Hazardous Waste Program" (HWP) to manage your hazardous wastes, and find other related guidance on the EH&S web site. (Hyperlinks are used frequently so it is best to read this fact sheet online at https://ehs.berkeley.edu/sites/default/files/hazardous-waste-fact-sheet.pdf ).

### Training

Prior to using the Hazardous Waste Program, you must complete the fifteen minute, online Hazardous Waste Management training. This satisfies the legal training requirement for UC Berkeley personnel who generate, label, store, treat or dispose of hazardous waste. Go to https://ehs.berkeley.edu/, enter your CalNet ID, and take the one-time training. If you do not have a CalNet ID, see your department administrator or go to the CalNet ID website.

### Chemical Waste Labeling, Treatment, and Storage

**Step 1: Characterize Your Waste**
Prior to generating hazardous waste, you must characterize it by determining the hazardous properties. By doing this first, you will be able to choose a compatible container to collect the waste, know how to label the container and stay within the accumulation time limits (described below under "Store"). For assistance, refer to Appendix X of the California Code of Regulations for a list of chemicals which are presumed to be hazardous waste, read the MSDS for each chemical component, and understand that a chemical waste is hazardous if it meets any of the following hazardous waste characteristic definitions:

- **Flammable/Ignitable** (1) Liquids (with less than 50% water by weight) with a flashpoint of less than 140 F° (60° C) (e.g., gasoline, benzene, alcohols, acetone, and ethers); (2) solids that can cause fire through friction, absorption of moisture, or spontaneous chemical changes, and when ignited burn so vigorously and persistently that it creates a hazard; and (3) ignitable compressed gasses.

- **Corrosive** (1) Liquids with a pH of ≤ 2 (e.g., sulfuric acid); (2) liquids with a pH ≥12.5 (e.g. potassium hydroxide); (3) solids, that when mixed with an equivalent weight of water, produce a solution having a pH ≤ 2 or ≥ 12.5 (e.g., hydrated lime, acetamide, cupric bromide).
- **Reactive** (1) Liquids or solids that are normally unstable and readily undergo change without detonation, react violently with water, or generate toxic gasses or fumes when mixed with water; (2) chemicals containing cyanide or sulfur and which generate toxic gasses when exposed to pH conditions between 2 and 12.5; (3) chemicals which are capable of detonation if subjected to a strong initiating source, or heated under confinement; or (4) chemicals capable of detonation at standard temperature and pressure. Examples: pyrophoric liquids, sodium cyanide, potassium sulfide, potassium metal, dry picric acid.
- **Toxic** This is the default hazard waste characteristic for chemical waste that is not flammable, corrosive or reactive. Unless you have documentation, such as a toxicity assessment or bioassay testing, which clearly shows that the waste is non-toxic, label your waste as toxic and manage it through the HWP. EH&S staff can assist you with sampling and waste analyses.
- **Oxidizer** This is a secondary hazardous property. Indicate on the waste label the primary hazard of the oxidizer in addition to "Oxidizer" (e.g., Piranha waste is a corrosive acid and an oxidizer). Oxidizers cause or enhance the combustion of other materials and are a fire hazard if stored or transported incorrectly.

**Step 2: Store Waste Properly**

- Store chemical waste in containers that are compatible with the waste, that are in good condition, and are kept closed.
- To avoid spills due to overfilling or chemical expansion, please fill waste containers no more than 80% of their capacity.
- Segregate incompatible chemicals to minimize the risk of dangerous reactions (see the EH&S Safe Storage of Hazardous Chemicals Booklet) and segregate unknown chemicals from all other chemicals.
- Place containers of compatible chemicals in secondary containment, such as plastic tubs.
- Store chemical waste as close as practical to where it is being generated. The expectation that the container is being routinely monitored by the person generating the waste, and moving the container too far from the laboratory may be a violation.
- Store chemicals that off-gas (e.g., piranha waste) in containers with vented caps to avoid high pressure build up in the container over time. Containers and vented caps are made available upon request from the HWP. Store containers with vented caps in a fume hood.

**Step 3: Create a Waste Label**

You are required to label your container of chemical hazardous waste just before you add any amount to the container.

Go to https://ehs.berkeley.edu and enter your Cal Net ID. Click on "Create Label" and select "Chemical Waste." Enter the required data fields for your container of waste. Enter the type of chemical using the drop down menu (preferred), or type in the name of the chemical.

If your waste is in the drop down, the HWP will automatically select the hazard property. You should revise the selection if you know it to be inaccurate. If you don't select a hazard, the HWP by default selects "toxic."

**Step 4: Print a Copy of Waste Label**
Fold the label as instructed and place it inside a label holder (available for free from HWP, or use a plastic zip bag) so the phrase "Hazardous Waste" is clearly visible. Peel the backing off of the adhesive and affix the label to the container. If the holder is too large to conveniently affix, put your waste container inside a larger container.

Accumulating different chemical wastes into a single container is permitted as long as the chemicals are similar and compatible. For example, mixing high-BTU organic solvent waste is acceptable but you would never add mercury (this renders solvents non-recyclable and expensive to dispose). As contents are added to the container, write them on the label (or nearby clipboard) or enter them into the HWP so that you will be able to account for 100% of the chemical constituents. Do not depend on your memory when it is time to request a pick up! The "accumulation start date" is automatically included on the container label when you print it.

**Step 5: Submit a Pick-Up Request**
Request a pickup of your chemical waste before reaching the quantity and time limits. Submit a pick-up request:
1) within 6 months of the accumulation start date, OR
2) immediately if the quantity of any single waste type is approaching 55 gallons, OR
3) immediately if the chemical is acutely or extremely hazardous and if the quantity is approaching 1 quart or 2.2 pounds. Note that the HWP will warn you if your waste contains acutely or extremely hazardous waste.

**Additional Information**
Performing an operation to render a hazardous waste non- or less-hazardous is optional. Laboratory personnel may neutralize or precipitate, or perform other treatment, and then dispose of the non-hazardous component down the drain or in the municipal trash, but only under certain conditions. Some residues from treating laboratory hazardous waste may still be hazardous, and need to be disposed of as such. Treatment is heavily regulated and the requirements are described in a separate EH&S fact sheet, "Bench Top Treatment of Laboratory Hazardous Waste."

If you determine that your aqueous waste is not hazardous, it still might be legally prohibited from drain disposal. You need to understand the drain disposal restrictions prior to disposing of chemicals in the drain. Please read the Guidelines For Drain Disposal Of Chemicals at

University of California, Berkeley. Drain disposal of laboratory and shop waste is limited to occasional disposal of small amounts of non-hazardous waste chemicals.

EH&S sends email reminders to generators when containers are nearing the 6 month storage time limit. Follow the HWP on-line instructions to submit a request for pick up.

You are not required to package your waste containers into cardboard boxes. EH&S will pick up your hazardous waste from your storage/containment location. Designating a waste storage area in your laboratory or shop, such as a chemical storage cabinet, will assist our staff in locating the chemicals.

Setting up a Recharge Account. At the time of disposal, you will select the appropriate recharge account from a drop down list of accounts associated with your department. Only authorized, financial staff members are able to modify or create new accounts at https://ehs.berkeley.edu/recharge. If you enter a chemical that is not in our database, review the recharge rates or call EH&S at (510) 642-3073 [2-3073] for an estimate of your disposal costs. The recharge cost estimates are based on how you describe the waste. If EH&S determines that the composition of your waste is different than described, the final recharge cost may be adjusted up or down.

### Universal Wastes Picked up by EH&S

Use the Hazardous Waste Program to manage and dispose of batteries, mercury-containing devices and non-empty aerosol cans. Select "Universal Waste" (instead of "Chemical Waste") and enter the required information to print a label.

### Universal Wastes Picked up by Other Departments

Facility Services (from campus) collects electric lighting and fluorescent light tubes removed during building maintenance operations. Excess and Surplus collects electronic devices and CRTs. Please let lhsbuilding@berkeley.edu know if you have these materials to dispose of, they will provide further instructions.

### Unknown Chemicals

Unknown chemicals are wastes for which there is incomplete information about the chemicals comprising the waste. If one or all of the components making up the waste are not known, create a label for chemical waste and enter “unknown” as the sole component OR enter it along with the known components. Any information that you can provide will make identification and disposal safer, and less costly. Segregate unknown chemicals from all other chemicals. The hazardous property of “toxic” is automatically assigned for labeling purposes. You may override the toxic designation if you know the hazardous property, and EH&S will assign the most appropriate hazards after further testing the waste.

## Controlled Substances

Controlled substances are drugs and are highly regulated. Disposing of controlled substances requires the completion of the Schedule II or III-V forms and Client Information forms, provided on the EH&S Controlled Substances Disposal Program website. Send completed forms to EH&S and please refer to the "Managing and Disposing of Unwanted Controlled Substances" fact sheet. The HWP also allows users to enter controlled substances and print out the forms. Filling out the forms via HWP does not require completing a Client Information form. The controlled substances quantities cannot be entered via HWP and must be entered by hand when printed.

EH&S arranges a time to pick up controlled substances, typically within 10 days of receiving the request. Keep the controlled substances locked up until you release them to EH&S.

## Recombinant DNA and Biohazardous Waste

Recombinant DNA waste must be autoclaved or disinfected in a white autoclave bag prior to disposal as regular trash. Refer to the "Management of BSL1 Recombinant DNA Waste" fact sheet. If you generate recombinant DNA waste from biosafety level 1 research, and do not have access to an autoclave, you may place it in a red bag and manage it as biohazardous waste.

Biohazardous waste management is described in the EH&S fact sheet, "Biohazardous Waste and Recombinant DNA Waste Management in Biosafety Level 2 and 3 Laboratories." In general, store biohazardous waste in red bags inside closed, rigid containers. Both the bags and outer container must be marked with the words "Biohazardous Waste" (or "BIOHAZARD" and the international biohazard symbol). If you work in a building with a central biohazardous material pickup location (see the fact sheet noted above for a list of buildings), do not use the HWP to label or dispose of your biohazardous waste. Instead, take the waste to the biohazardous waste storage room in your building (you must affix a bar code label to the outer container first, available by contacting EH&S at ehs@berkeley.edu).

If you work in a building without a biohazardous waste storage room, use the HWP to create a label for biohazardous and sharps waste and request an EH&S pick up directly from your laboratory. NOTE: The Lawrence does not have a biohazardous waste storage room.

## Radioactive Waste

Procedures for managing and disposing of radioactive wastes remain the same, using the Radiation Safety Inventory System (RSIS) [requires authorization]. Please reference the Radiation Safety Manual for detailed instructions.

## Radioactive Mixed Waste

When radioactive materials and hazardous chemicals are combined, the resultant mixture is a radioactive mixed waste. Radioactive mixed wastes are the most difficult and expensive waste to dispose and manage. You will be recharged at full cost for mixed waste disposal fees.

In addition to the standard Radioactive Waste Program requirements for disposal, mixed waste disposal requires that the waste container be labeled as hazardous waste when the first drop of material is generated. To complete a hazardous waste label you will use the Hazardous Waste Program. To use the HWP you will need a CalNet ID and you will complete the ~15 minute hazardous waste training. Once completed, follow these steps:

1. Create a label by filling in the required fields and write "Mixed Radioactive Waste" in the comments field.
2. Print the label, and affix it to each container of mixed waste.
3. Request a pick up of the mixed waste before 6 months has elapsed. Use the Radiation Safety Information System (RSIS) to request a pick up of radioactive and mixed waste, not the HWP. When requesting a pickup in RSIS another label will be printed with the radioactive and chemical details. Both labels must be affixed to the waste container.
4. After pick up, EH&S will delete the waste item from the HWP tracking system.

Small quantities of mixed waste may be rendered non- or less- hazardous by meeting laboratory "Bench Top" treatment regulations. See the Bench Top Treatment fact sheet for more details.

## Sharps

Sharps are items that pose a physical hazard such as puncture to or cutting of the skin. Examples are broken glass, needles, razor blades, or pipettes. There are two classes of sharps waste: 1) contaminated with chemical, biohazardous, or radioactive materials, and 2) uncontaminated. The proper management of contaminated and uncontaminated sharps is thoroughly explained in the EH&S "Sharps: Handling and Disposal" fact sheet and summarized below:

**Sharps Contaminated With Chemical, Biohazardous, or Radioactive Materials**
Dispose of chemically contaminated sharps as chemical waste.

Place biohazardous waste sharps into an appropriate sharps container marked with the words "Sharps Waste" (or with the word "BIOHAZARD" and the international biohazard symbol). If you work in a building with a centralized, biohazardous waste storage area, you may dispose of sharps containers in a container that is provided inside the biohazardous waste storage room (you must affix a bar code label to the outer container first, available by contacting EH&S at ehs@berkeley.edu).

Dispose of radioactive material contaminated sharps as radioactive waste. If your sharps are contaminated with a combination of chemical, biohazardous, or radioactive materials, please contact EH&S for disposal guidance.

**Uncontaminated Sharps**
Needles and blades, even if they are uncontaminated, must be placed into a sharps container and disposed of as biohazardous waste. Uncontaminated sharps other than needles and blades

are disposed of by placing them into a puncture proof container and labeling the container with the words "Non-hazardous Sharps."

If the HWP is temporarily unavailable when you need a label, you must still label your hazardous waste container with specific information. If the EH&S web site is functional, you may print a blank label and write in the start date, the hazardous characteristic, physical property, and the chemical components. The label can be found at: https://ehs.berkeley.edu/sites/default/files/blankhazwastelabel.pdf. If the EH&S website is down, call EH&S at (510) 642-3073 [2-3703] to have a label emailed to you. As soon as possible, enter the information into the HWP so that you receive an email reminding you to have the waste picked up within the allowable accumulation times.

## VIII. SAFETY COMMITTEE

Cory Welch
Co-Chair
Executive Director, Building
cwelch@berkeley.edu
(510) 812-0209

Brian Campbell
Curriculum Developer, FOSS
brcampbell@berkeley.edu
(510) 664-4747 [4-4747]

Alondra Blandon
Animal Discovery Zone Lead
ablandon@berkeley.edu
(510) 642-9680 [2-9680]

Randy Brittain
Operations Supervisor
rlbrit@berkeley.edu
(510) 642-9058 [2-9058]

Ime Edokpayi
Associate Director, Community Engagement and Outreach
iedo@berkeley.edu

Benjamin Frazier
Public Education Specialist, Learning Design Group
jazzchemist@berkeley.edu

Reyna Hamilton
Program Director, Public Engagement
rlhamilton@berkeley.edu
(510) 642-9019 [2-9019]
(707) 359-9727

Joanna Oren Massey
Youth STEM Pathways Coordinator
joannaoren@berkeley.edu

Anna Maurer
Systems Administrator
annam@berkeley.edu
(510) 643-1984 [3-1984]

Kathryn Thomas
Materials Preparation Manager
KLThomas@berkeley.edu
(510) 642-7501 [2-7501]