

Safety Matters

Are You Buying a Laser? by Muhammad Akram and Terrence Jaimungal

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The main hazards of lasers used in research are the highly-focused, energy-dense beams of monochromatic light and the high voltage needed to operate such equipment. Injuries can happen in an instant and result in lifelong damage or death from electric shock. Lasers present a unique package of hazards, and their use at Columbia University is addressed in the [CU Laser Safety Program](#). Three aspects of the Laser Safety Program that are the most relevant to laser end-users are:

Laser Registration-Plan Ahead Before a Class III or IV laser can be purchased or transferred from another institution, the user must complete a laser registration form, available at <http://www.ehs.columbia.edu/LaserRegistrationForm.doc>. *Purchasing will not process your Purchase Order (PO) unless the form, approved by EH&S, is submitted along with the PO.* The user must provide specific information about the laser (wavelength, power, pulsed or continuous wave, nominal hazard zone, etc.) and its maintenance, most of which can be obtained directly from the manufacturer for commercial lasers. Registrants must also indicate the proposed location and identify those who will be using the laser.

Laser Safety Training End-users must list the personnel who will use the laser and note the applications of the particular device. All users must attend [Laser Safety Training](#) conducted by EH&S on first Tuesday of each month at the Morningside campus. Training covers hazard recognition and control, and an overview of the CU laser policy. It is best for laser users to attend in-person training before use. Refresher training is available through RASCAL (www.rascal.columbia.edu). PIs, senior lab staff, and/or representatives from the laser manufacturer must provide instructions in use of the specific laser purchased.

Laser Inspections Laser safety inspections, conducted by EH&S, are also an important part of Safety Program at CU. A primary goal of the inspections is to gather information about the types of lasers present on campus, how they are used in research settings, and to ensure laser controls are in place. Information gathered is used to enhance training and other elements of the Laser Safety Program. To schedule an inspection, please contact EH&S at 212-854-8749 (@MS) and 212-305.6780 (@CUMC).

Why You May Not Need a Respirator by Muhammad Akram

Engineering controls (fume hoods, biological safety cabinets) and safe work practices are the best protection from respiratory hazards. The use of respirators, like other items of personnel protective equipment is a 'last line of defense'; their use is only allowed when other control methods are not effective or feasible.

Any institution that issues respirators to its employees must develop a Respiratory Protection Plan: hazard assessment, medical clearance, respirator selection criteria, training and fit testing. Most airborne hazards in laboratories and other settings can safely be managed through engineering controls and other safe work practices; if you believe that this is not the case for your work, contact EH&S; **do not** take it upon yourself to select and use a respirator.



Relocatable Power Taps by Harry J. Oster

'STICKS' AS THE RESULT OF RECAPPING HYPODERMIC NEEDLES INTENDED FOR DISPOSAL ARE AMONG THE MOST PREVENTABLE INJURIES IN CLINICAL AND RESEARCH SETTINGS. THEY ARE ALSO 'ILLEGAL' - OSHA'S BLOODBORNE PATHOGENS STANDARD (APPLICABLE WHEN EXPOSURE POTENTIAL TO HUMAN BLOOD, BODY FLUIDS, ETC. EXISTS) PROHIBITS NEEDLE RECAPPING UNLESS SUCH ACTION IS MEDICALLY NECESSARY OR CAN BE SAFELY ACCOMPLISHED USING ONLY ONE HAND TECHNIQUE. THIS PROHIBITION EXTENDS, AS PER UNIVERSITY POLICY, TO ALL OTHER USES OF HYPODERMICS. TO FACILITATE NEEDLE DISPOSAL WITHOUT THE PERCEIVED NEED TO RECAP, ENSURE THAT A 'SHARP' CONTAINER IS AVAILABLE AS CLOSE AS POSSIBLE TO NEEDLE USE SO THAT THEY CAN BE DISCARDED IMMEDIATELY AFTER USE.

Commonly referred to as a "power strips", these devices, when properly used and listed by Underwriters Laboratories (UL), can safely accommodate several low wattage electrical appliances. Appropriate uses include computers, certain laboratory equipment and home workshop tools and appliances. Power strips are only intended to be directly connected to a permanently installed electrical outlet. They must be polarized or grounded and equipped with over-current protection. *Power strips are NOT to be:*

- ◆ Interconnected (daisy chained) with another strip or extension cord (see photo).
- ◆ Used on construction sites and similar locations.
- ◆ Permanently secured to any part of a building or stationary object.
- ◆ Substituted for permanent wiring.
- ◆ Installed through walls, windows, ceilings, floors.
- ◆ Subjected to environmental or physical damage.
- ◆ Used on high-power loads such space heaters, microwave ovens or refrigerators.

The improper use of power strips has been cited by the Fire Department of New York (FDNY) during their weekly laboratory inspections. If you have been using extension cords or power strips, please contact EH&S for an assessment of your lab's wiring set-up.



Photo shows prohibited "Daisy Chaining" - one power strip connected into another.

FDNY Annual Familiarization Drill by John LaPerche

The Tenth Annual Familiarization Drill with the FDNY and hosted by EH&S, was held at CUMC/NYPH campus on Saturday April 24th. Local Washington Heights and upper Manhattan fire units including Engine 67, Engine 84, Ladder 45, Ladder 34, Battalion 13, and Division 3 along with specialty units, including Haz-Mat, Rescue 1 and Squad 41, were on site and focused on the tunnel systems under the buildings at the Medical Center. Also present were Facilities Operations, Public Safety, CU EH&S including Fire Safety and administrators from both NYPH and CUMC. The session began with all groups assembled in Alumni Auditorium for a PowerPoint presentation to introduce routine hazards that emergency responders might encounter throughout the campus.



Following the presentation, the groups were led on a tour through the tunnels, stopping at the NYPH boiler plant, hazardous waste storage areas, high voltage areas and other areas of concern to the FDNY. Many of the FDNY attendees were also responders to the 2009 fire in the basement of the Eye Institute, and stated that having prior knowledge of the layout of the tunnel system from previous drills was beneficial in finding the fire and extinguishing it safely without injury. Following the walk through, a "Lessons Learned" lunch session was held.

For Lab Fire Safety Prevention tips, check out: FDN(wh)Y Me @ <http://ehs.columbia.edu/FDNYMe.html>

“Smoke Alarms: A Sound You Can Live With!” by Harry J. Oster

This is the National Fire Protection Association’s (NFPA) official theme for this year’s Fire Prevention Week, which kicks-off on Sunday, October 3rd. The 2010 campaign is designed to educate people about the importance of smoke alarms and encourages everyone to take the necessary steps to update and maintain their home’s smoke alarm protection.

According to the NFPA, smoke alarms can mean the difference between life and death in a fire. Their statistics show that smoke alarms reduce the chance of dying in a fire by half. But, they must be working properly to do so. The association’s data show that many homes have smoke alarms that aren’t working or maintained properly, usually because of missing, disconnected or dead batteries. Roughly two-thirds of all home fire deaths occur in homes where smoke alarms are absent or non-functional.

Columbia University EH&S and the NFPA suggest the following to ensure that your smoke alarms are maintained and working properly:

- ◆ Test smoke alarms at least once a month using the test button, and make sure everyone in your home knows the sound emitted from the smoke alarm.
- ◆ If a smoke alarm “chirps,” the battery is low - replace the battery right away.
- ◆ Replace all smoke alarms, including alarms that use 10-year batteries, when they are 10 years old, or immediately if they do not respond properly when tested.
- ◆ Never remove or disable a smoke alarm battery or the smoke alarm itself.

Remember: fire is fast, dark and deadly. A fire can happen at any moment. Practice fire safety 365 days a year. For additional fire safety information, please visit the NFPA’s Web site at www.firepreventionweek.org.



Welcome new EH&S Team Members! by Lauren Kelly

It is with great pleasure that we welcome two new EH&S team members. Rebecca Lonergan joined us as the Sr. Hazardous Materials Officer on May 17th. She will oversee all hazardous waste operations at all Columbia University campuses. Rebecca has a Bachelor’s of Science degree in Chemistry from the SUNY College of Environmental Science & Forestry and is currently working on completing her Master’s of Science at Hunter College.

On June 1st, Keith Bottum joined our team as a Hazardous Materials Officer at CUMC. He will oversee hazardous waste daily operations at the Medical Center campus. He has a Bachelor’s of Science degree from the University of North Carolina. Rebecca and Keith will be a great asset to our already successful Environmental team in leading the hazardous waste program at all of our campuses. Please join me in congratulating and welcoming them to our team.

Incompatible Chemicals: What We Have Learned by Lauren Kelly & Kevin McGhee

Be honest...at some point we have all made that innocent mistake of accidentally mixing two incompatible materials in a waste container. Sometimes mixing two chemicals results in nothing more than a more hazardous, but manageable solution such as a corrosive, toxic solution. However, sometimes we may not be so lucky and may have accidentally created a potentially dangerous solution. The best thing to do is call EH&S for guidance. The two recent incidents illustrate the potential hazards of mixing incompatible chemicals.

In the first incident, methanol and nitric acid, a mixture which under certain conditions forms explosive methyl nitrate, were combined in the same hazardous waste container. An alert laboratory worker, realizing the mistake, contacted University safety personnel. Due to the potential danger of the mixture, the University's chemical emergency response vendor was called in the early morning hours to assist. The response team, dressed in full ballistics suits for protection, stabilized the container by adding methanol and water, diluting the mixture to a safe concentration, and ultimately disposed of the solution safely off-site. At the conclusion of the incident investigation, it was learned that although the container was labeled as hazardous waste and included all of the chemicals in the waste, the concentrations listed on the waste label were not accurate and that the waste stream could have - and should have - been separated into two containers. This minor error in handling and labeling the waste container prompted a building evacuation, but thankfully there were no injuries.

In another recent incident involving the mismanagement of hazardous waste, an inexperienced student dumped a small amount of acetone waste into a waste container labeled for sulfuric acid. The resulting exothermic reaction caused the plastic waste container to partially melt, spilling much of its highly corrosive contents. Thankfully, the student had the awareness to report the incident to EH&S. A team of EH&S trained spill responders spent several hours cleaning up the spill.

Both of these incidents underpin several critical points:

- ◆ Inexperienced lab personnel must be trained in [all relevant safety topics](#) before they begin handling hazardous materials or equipment and receive hands-on instruction in all procedures from their supervisors or mentors, and should be closely supervised until they can demonstrate that they are able to carry out all necessary tasks safely.
- ◆ Laboratories must properly segregate chemical waste in terms of chemical compatibility and reactivity to avoid adverse reactions. EH&S can assist in making these determinations if assistance is needed.
- ◆ The concentrations and chemical components of all chemical waste streams must be clearly identified on hazardous waste labels. This ensures that hazardous wastes are properly managed and handled safely.

If you are unsure as to the compatibility of different chemicals that you plan to combine in one container, contact EH&S in advance for guidance.

Oil Bath Déjà vu by Juliette Ogonnaya

The incidents that occur on Columbia campuses, the lessons learned from them and subsequent recommendations made are often reported in the EH&S Safety Matters newsletter. The goal is to prevent recurrence, but unfortunately an incident that was reported in the [Spring 2010 Newsletter](#) recurred a month later.

Once again, a fire occurred in a fume hood when an oil bath was heated beyond its flashpoint. Most importantly, as in the prior incident, no one was injured; however both incidents could have been prevented if the basic principles stated in the original article were applied. Safety Matters offers useful safety information and should be shared with all people that may benefit from it. It should be posted in visible locations (e.g. bulletin boards) and distributed to all staff. Additionally, articles specific to your operation can also serve as useful teaching points during staff meetings, which should always include a few minutes for safety-related discussion.

For questions regarding the safe handling of oil baths, email labsafety@columbia.edu or contact your Laboratory Safety Officer. Previous editions of Safety Matters are archived at <http://www.ehs.columbia.edu/News.html>.

“Almost event”: Computer Overheat Incident, by Harry J. Oster

A computer fire was recently avoided by a quick thinking employee and thorough investigation by staff. Upon entering the work area, the employee detected an unknown burning odor and immediately called Public Safety, who in turned called EH&S Fire Safety and Facilities to investigate the odor. The investigation traced the odor back to a desktop computer tower that was emitting excessive heat. Just then, the unit starting smoking, at which time the unit was unplugged. Once unplugged, the smoke and heat dissipated. It was determined that the tower had in the past been left “on” for an unknown periods of time and not regularly shut down at the end of the work day.

Recommendations:

- ◆ If you notice any brown colored heat marks or dust build-up on the rear of your tower, immediately unplug it and call your campus IT office.
- ◆ Keep the immediate area around and above the tower and monitor free of combustibile materials (paper, dust etc.).
- ◆ Maintain ample air space on all sides and on top of all computer equipment.
- ◆ For safety and energy efficiency, consider replacing a computer that Is out of warranty (typically after 3-5 years).
- ◆ Know the location of, and how to use the closest fire extinguisher;
- ◆ Upon smelling any burning odor, immediately call Public Safety.
- ◆ Back up files to a server or portable memory device frequently to help prevent loss of data, should an incident like this occur.
- ◆ Take time to read the manufacturer’s installation and safety guide included with each computer.
- ◆ If using a laptop, insure to use on a flat hard surface to allow proper airflow under the unit.



Brown colored” heat mark (lower left) and build up of dust (top center)

Biological Toxins-Regulations/Exemptions by Paul Rubock

Possession of some commonly used toxins in excess of specific quantity limits requires FBI security clearance, finger printing and [CDC](#) or [USDA](#) registration. Regulated toxins and their exemption maximums are: T-2 or diacetoxys cirpenol-1,000 mg; abrin, conotoxin, ricin, saxitoxin, shiga-like ribosome inactivating proteins, tetrodotoxin, *C. pefringens* epsilon toxin, or shigatoxin-100 mg; Staphylococcal enterotoxins-5 mg; and botulinum neurotoxins-0.5 mg. Diligent inventory management should, in most cases, allow laboratories to work within these limits without going through the registration process. If your laboratory will approach or exceed these quantity limits, contact EH&S to initiate registration. Labels and Material Safety Data Sheets (MSDS’s) should be used as risk assessment.

Remember to get your Flu Shot – available in October
from Workforce Health & Safety OR Student Health Services

Hazardous Materials in Transit – Program Update by Christopher Pitoscia

Each day thousands of shipments of hazardous materials criss-cross the country's transportation system via road, rail, air and sea and, often in the cargo compartments of passenger transport vehicles. Most of these "hazmats" are mundane consumer products like perfume, which is flammable, or dry ice-cooled perishable foods; however, each are highly regulated to protect the health and safety of the handlers and carriers who transport them and the passengers who ride along with them on their journeys. The conduct of laboratory research and healthcare also often requires transport of hazardous materials, including flammable, corrosive or toxic reagents, radioactive materials, potentially infectious materials and microorganisms, and human-derived samples.

Personnel who perform any function associated with shipping hazmats require training, which includes general familiarization with the regulations, security awareness and hazardous materials safety. EH&S is actively developing and improving training and resources within the University to address these requirements so that personnel can prepare hazmat packages safely and in compliance with all applicable regulations. Please visit the EH&S website frequently for updates and contact your Laboratory Safety Officer for further information.

Please note - If you or someone in your laboratory did not attend one of April's "Transportation of Dangerous Goods" training sessions, you must contact EH&S for assistance prior to shipping any hazardous materials.

Radiation Dose Limits For Individual Members of the Public by George Hamawy

We all are exposed to radiation in our daily life, some natural and some man-made. The mRem is the unit of measurement for radiation exposure; the average normal annual exposure in the United States is 320mRem. The exposure from a chest x-ray is approximately 10 mRem. The overall exposure to an individual in the general public should not exceed 100 mRem per year beyond background. Such additional exposures sources can include licensed activities conducted by our facility- such as the use of X-ray producing machines or radioactive materials.

What does that mean? It is not as simple as it seems. Who is considered the public? Where is the exposure coming from? And what is the Radiation Safety Office's response if someone potentially is going to exceeds this limit?

For patient visitors' areas where radiation exposure may occur over a short period, the annual limit of 100 mRem of additional exposure applies unless the Radiation Safety Officer justifies an increase to 500 mRem/year for the visitors. If it is determined that an employee not working with radiation will still receive more than an additional 100mRem annually, perhaps as a result of proximity to where radioactive materials are used or for frequent visit to a laboratory using radiation sources, the Radiation Safety Officer can give this employee a "radiation worker" status. The person must then attend a radiation safety training, and as a result of this status the exposure should not exceed 500 mRem/year. If a worker's exposure has the potential to exceed the 500 mRem/year (5000 mRem is the annual occupational exposure limit), a dosimeter such as a film badge should be issued.

Remember – Please return your Radiation Film Badge in a timely manner !



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Do you have a suggestion for a future *Safety Matters* article? Do you have a comment on something you just read? Please share it with us at , newsfeedback@columbia.edu