SAFETYMATTERS

Volume 19 Issue 2 | COLUMBIA UNIVERSITY EH&S | Spring 2025

Inside this Issue

Environmental Health & Safety

Website
http://ehs.columbia.edu

Irving Medical Center
Phone: (212) 305-6780

Morningside and Manhattanville
(212)-854-8749

Radiation Safety
Phone: (212) 305-0303

Instagram

@columbiaehs

Safe Passage: Shipping Hazardous Materials for Laboratory Research

By Christopher Pitoscia, Director, EH&S

Collaboration is a hallmark of scientific research, and in an increasingly globalized society, can take place between partners both near and far. Often, collaboration among researchers involves the sharing of resources, samples, specimens, and even equipment. Moving these materials down the hall or across campus is easy enough, but when research materials are shared across longer distances - between campuses, between cities, or beyond – the process becomes more complex and requires special attention to ensure the safety of the sender, the recipient, and everyone who handles the materials in transit.

It is easy to take for granted that with a few clicks of a mouse, a package of almost anything can simply arrive at the doorstep. That package's journey, however, can involve travel by air, land and sea, and by the time the package has reached its destination, it will likely have passed through the hands of as many as 10 to 20 people! In many cases, the journey will even involve travel aboard a passenger aircraft. If that package is a t-shirt or a pair of shoes, it is unlikely to cause any problems along the way. If it is a bottle of hydrochloric acid, a shipment of batteries, or a sample of blood from a sick patient, however, it is imperative that it be packaged correctly and accompanied by accurate paperwork and other identifying information so that it can be handled and arrive safely.

At Columbia University, training is available for researchers whose activities require sending certain potentially hazardous research materials in transit. These training modules address the shipment of "Category B" biological materials, excepted quantities of some chemicals, and dry ice when used as a refrigerant in packaging. The courses contain information on all aspects of the shipment process, including:

- Packaging – Not any package will suffice when transporting hazardous materials. Shippers must be trained in how to select and prepare the correct packaging, which often includes the use of tested and rated boxes and additional components to prevent leakage and damage to contents.
- Labeling – The exterior of packages containing hazardous materials are often required to bear labels, markings and other information that communicates the hazards of their contents. The proper selection and application of these is covered by the training courses.
- Paperwork – Formal documents, including a Shipper's Declaration of Dangerous Goods, packing list, Safety Data Sheet and other information are attached to packages of hazardous materials in transit. These documents must be filled out according to strict standards, with every "i" correctly dotted, and every "t" correctly crossed.
- Competency – Practice makes perfect, and as of 2023, shippers of hazardous materials must demonstrate their understanding of training and their competency before participating in any aspect of hazardous material transport. EH&S is qualified to assess the competency of trainees to help set researchers up for success.

The regulations and requirements around the shipping and transport of hazardous materials are complex, but for good reason. The safety of shippers, handlers and even other travelers depends on them. Furthermore, compared to other safety requirements, it is uniquely easy for a regulator or inspector to identify wrongdoing or compliance mistakes, as packages readily identify the name and address of the person who sent them! So, get the help you need. Utilize EH&S' training modules, and contact an EH&S team member at hazshipping@columbia.edu if shipping any materials that are not covered by the courses.

Wildfire Readiness: Staying Protected During Emergencies

By Hadler da Silva, Senior Safety Advisor

Current wildfire outbreaks in California as well as those that occurred in New York and New Jersey during the fall of 2024 have once again brought wildfire safety concerns into the public discourse both nationally and locally. Wildfire smoke poses significant health risks. Wildfire smoke contains a mixture of gases and fine particulate matter such as PM2.5 (Environmental Protection Agency, 2024b). These particles can penetrate deep into the lungs and even enter the bloodstream, leading to a variety of adverse health effects (2024b).

Understanding these risks and taking steps to reduce exposure is crucial for protecting individual and community health.

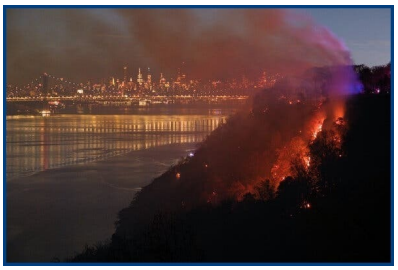


Figure 1: Brush fire in the palisades in Englewood Cliffs, NJ (Colon, 2024)

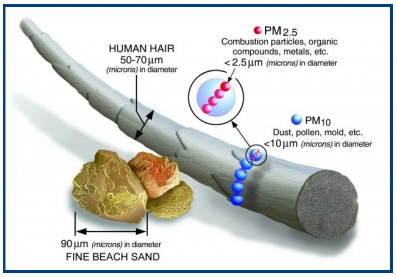


Figure 2: Because of their size, PM2.5 are able to penetrate deep into the lungs and enter the bloodstream (Environmental Protection Agency, 2024b)

Health Effects of Wildfire Smoke

Inhalation of wildfire smoke can have both short-term and long-term health consequences. Short-term exposure is commonly associated with irritation of the eyes, nose, and throat, as well as coughing and difficulty breathing. (Centers for Disease Control and Prevention, 2024). Individuals with increased risk including those with preexisting respiratory conditions such as asthma or chronic obstructive pulmonary disease can have their symptoms exacerbated by wildfire smoke potentially leading to the need for emergency medical interventions (2024). Long-term exposure to wildfire smoke, even at lower concentrations, has also been linked to severe health outcomes. These include an increased risk of cardiovascular diseases and a higher likelihood of developing respiratory conditions, including chronic bronchitis (Grant & Runkle, 2022).

In addition to those with preexisting respiratory conditions, certain populations are particularly vulnerable to the effects of wildfire smoke. These include older adults, children, and pregnant individuals(Centers for Disease Control and Prevention, 2024). Communities with limited access to healthcare or resources for mitigating exposure are also at heightened risk.

Strategies to Reduce Exposure

There are several strategies to reduce exposure to wildfire smoke (Environmental Protection Agency, 2018). These strategies are particularly important during active wildfire events or periods of poor air quality.

1. **Monitor Air Quality Index (AQI):** The Air Quality Index (AQI) provides real-time information on air pollution levels. Individuals should check local AQI readings regularly through reliable sources, such as the Environmental Protection Agency (EPA) website or mobile applications. When AQI levels indicate unhealthy air, individuals should limit outdoor activities.
2. **Improve Indoor Air Quality:** Keeping indoor air clean is essential during wildfire events. Windows and doors should be kept closed, and gaps should be sealed to prevent smoke infiltration. Using high-efficiency particulate air (HEPA) filters in air purifiers can significantly reduce indoor concentrations of PM2.5. Central air systems equipped with HEPA or similar filters should also be utilized if available.
3. **Use Personal Protective Equipment (PPE):** While cloth or surgical masks provide limited protection against particulate matter, respirators such as N95 masks can effectively filter out PM2.5 when properly fitted. It is important to note that respirators may not be suitable for everyone, including young children and individuals with certain medical conditions.
4. **Create a Clean Air Space:** Designating a room in the home as a "clean air space" can provide an escape from smoke. This room should be equipped with a portable HEPA filter and should be sealed as tightly as possible to minimize smoke infiltration.
5. **Follow Public Health Guidance:** During severe wildfire events, local authorities may issue advisories or recommend evacuation. Individuals should follow these guidelines closely to ensure their safety.

The health effects of wildfire smoke are significant and far-reaching, necessitating proactive measures to reduce exposure. By understanding the risks and using strategies to mitigate exposure, individuals can better protect themselves during wildfire events. Many government websites offer resources to address questions about wildfires and smoke exposure. A great example is the EPA's Smoke-Ready Toolbox for wildfires (Environmental Protection Agency, 2024a). This is a comprehensive resource designed to educate the public about the risks of wildfire smoke and actions they can take to protect their health. It includes fact sheets, infographics, and guidance for creating clean air spaces at home.

EH&S Biosafety Team Supports Cystic Fibrosis Gene Therapy Trial

EH&S was proud to support a Columbia clinical research team, led by Drs. Claire Keating and Emily Dimango, conducting a "first in humans" gene therapy trial aimed at correcting the genetic defect that causes cystic fibrosis, a debilitating lung disease. A viral vector was used to deliver this novel gene therapy. https://www.columbiadoctors.org/news/enids-story-cystic-fibrosis-clinical-trial-offers-hope

EH&S biosafety officers assessed risk and provided practical guidance on engineering controls and personal protective equipment. As described in the aerobiology cover story in SafetyMatters, Summer 2023, nebulized gene therapy products may pose a chronic exposure risk to personnel administering the therapy where the treatment room is the primary containment envelope. The treatment room was equipped with air scrubbers that quickly clear aerosols. Personal protective equipment that offers respiratory protection also became a more primary line of defense.

CUIMC Relay Marathon

Representing EH&S at the event to be held at the Armory on April 24, 2025 are from left to right: Pam Shively, Lauren Kelly, Kyle Marquez, Sarah Aloe, Peter Caracappa, and Kathleen Crowley.

Spring and PPE

Warmer weather is on the way, but stay safe in the lab with proper PPE!

Long pants or the equivalent, closed shoes, a laboratory coat, gloves, and protective eye wear.
No shorts or sandals!

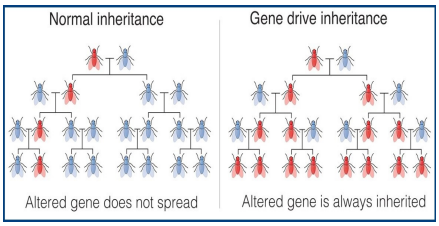
Genetically Modified and Compliant Fruit Flies

By Dr. Christopher Aston, Director, Biological Safety/Chief BSO

With their short life span, being compliant with US government regulations is probably the last thing a fruit fly thinks about, but it is something that their researcher owners should be mindful of! The NIH guidelines and export control regulations present particular compliance requirements for researchers who employ fruit flies as a model organism.

Recombinant DNA research that generates mutations in fruit flies (aka Drosophila melanogaster), or other insects, is not typically subject to the NIH guidelines. Fruit fly researchers are consequently less accustomed to submitting their research for Institutional Biosafety Committee (IBC) review.

The first notable exception, subject to the NIH guidelines, is the creation of gene-drive modified organisms. A gene drive uses CRISPR/Cas9 gene editing technology to propagate an altered gene throughout a population such that it is always inherited by offspring, instead of by the 50% probability predicted by Mendelian genetics (see figure).



Gene drives could one day be used to alter disease-transmitting insects such as mosquitoes which could be made resistant to malaria, therefore reducing the likelihood of the disease being transmitted to humans by breaking the life cycle of the protozoan parasite. Gene drives could even be used to eliminate entire mosquito species.

Currently, such powerful technology is confined to research laboratories because the consequence of a gene drive spreading across a mosquito or fruit fly species is unknown. What would happen, for instance, if some of the engineered fruit flies got out and began spreading their mutation in the wild?

The latest (April 2024) edition of the NIH guidelines details institutional expectations for Gene Drive Modified Organism (GDMO) experiments. All such research must be reviewed by the IBC prior to commencement. When researchers conduct experiments involving GDMO, the institution must ensure that the IBC has adequate expertise, using ad hoc consultants, if necessary, who assess the impact on ecosystems. Determination of whether a gene drive modified organism has a potential for serious detrimental impact on managed or natural ecosystems should be made by the Principal Investigator and the IBC, in consultation with scientists knowledgeable with gene drive technology, and of the environment and ecosystems in the geographic area of the research. The containment level for the experiments must be BSL-2 or higher.

A second type of recombinant DNA research that introduces foreign genes into fruit flies also requires IBC review. Experiments introducing genes coding for toxin molecules with an LD50 of <100 micrograms per kilograms body weight require IBC approval before the work commences. Such fruit fly lines cannot be shared freely across the research community. A cautionary tale to highlight is that of Indiana University who recently ran afoul of export control regulations, admitting to multiple violations related to the unlicensed export to research locations in 16 countries of fruit flies containing a gene for a controlled toxin sequence encoding ricin A (https://research.columbia.edu/recent-developments-export-controls).

Fruit fly researchers should ensure that EH&S is aware of their plans to work with genome editing tools or gene drives by ensuring that the applicable question is answered on their Laboratory Assessment Tool and Chemical Hygiene Plan (LATCH). Submission of a standalone Appendix A in Rascal is the vehicle for registering gene drive research or cloning of toxin genes with the IBC. The Director for Export Controls & International Engagement in Columbia's Office of Research Compliance and Training (212-851-9822) can provide guidance and support regarding export of fruit flies expressing toxin genes.

Meet the EH&S Staff

Calista Bryant

Safety Advisor II

With a vibrant personality and a passion for making a difference, Calista Bryant, Safety Advisor II, has been a part of the Columbia community for a year and a half, bringing her unique flair to the role. Calista's journey began in the Bronx, but her roots stretch back to Putnam County, a place steeped in history. Interestingly, it was here that Benedict Arnold's treachery was unveiled, setting the stage for his infamous capture. Calista's first job at the ZARA by Union Square taught her the importance of building relationships. The best piece of professional advice she's ever received echoes this sentiment: "Focus on building strong relationships." This philosophy has guided her throughout her career, helping her cultivate genuine connections that enrich her professional journey.

When it comes to personality traits, Calista identifies most with otters. Known for their playful nature and intelligence, otters embody the spirit of fun and cleverness that Calista brings to her work. With a quick wit and a sense of humor that can brighten anyone's day, she navigates the complexities of safety protocols with a smile. Calista draws inspiration from the words of Eleanor Roosevelt: "The future belongs to those who believe in the beauty of their dreams." This quote resonates deeply with her, fueling her motivation to create a positive impact, no matter how small. It's this belief that drives her to excel in her role at Columbia.

While sports may not be her forte—though she does cheer for the Yankees—Calista finds joy in baking, particularly cookies. There's nothing quite like the aroma of freshly baked treats to wind down after a long day. When she's not whipping up delicious confections, you can find her dreaming of living in London. The city's iconic architecture, vibrant shopping scene, and diverse food offerings make it a top choice for her ideal home. In her downtime, Calista enjoys listening to music and catching up with friends. However, she wishes to delve deeper into music theory, hoping to understand the intricacies behind the melodies she loves. Currently, she's working on an updated version of the Personal Protective Equipment (PPE) Policy, a significant project that will impact researchers across the University. While it may seem daunting, Calista is excited about the opportunity to make a meaningful contribution.

As Calista continues her journey with EH&S, her commitment to safety and her spirited personality make her a valuable asset to the community. With dreams of London, a love for baking, and a passion for making a difference, Calista Bryant is not just a Safety Advisor II; she's a beacon of positivity and inspiration for all around her.

EH&S HAZWOPER, RCRA, Class 7 Training Spring 2025

If you did not receive training information for courses at Columbia University and need HAZWOPER (Hazardous Waste Operations and Emergency Response Training), RCRA (EPA Hazardous Waste Training), or Class 7 Training (Shipping Radioactive Materials), please contact Pam Shively at pss2154@cumc.columbia.edu.

Carolina Paredes Nova

Radiation Safety Program Coordinator

In the Radiation Safety Office, one individual stands out not just for her expertise but for her serene demeanor and palpable enthusiasm. Meet Carolina, the Radiation Safety Program Coordinator, who has been a vital part of the Columbia community for a year and four months as of September 25, 2023. Before her role at Columbia, Carolina began her career as an analyst at an insurance broker. This experience laid the groundwork for her current position, where she continues to inspire others with her dedication and commitment to safety. Carolina hails from the stunning coast of the Dominican Republic. If given the chance to live anywhere, Carolina would choose Sarasota, Florida. With its gorgeous beaches and Caribbean vibe, it feels like home to her.

If you were to ask Carolina which animal best represents her personality, she would undoubtedly say the koala. Known for their calm and peaceful nature, koalas embody the resilience and affection that Carolina brings to her work and life. One of Carolina's most admirable traits is her ability to remain calm and patient, even in stressful situations. This characteristic not only helps her navigate challenges effectively but also allows her to focus on finding solutions rather than getting overwhelmed.

Carolina lives by a personal mantra: "Not all the beauty in life needs to be loud and grand; sometimes, the most meaningful moments come in the quiet and peaceful stillness." This philosophy resonates deeply with her, guiding her through both her professional and personal life. Carolina's vision for a better world includes offering more support to those in need and fostering kindness and empathy in everyday interactions. She is motivated by the little victories and the knowledge that she can make a positive difference around her.

When it comes to sports, Carolina proudly carries on her father's legacy as a devoted New York Mets fan—because someone's got to keep the faith! In her free time, Carolina loves to don her chef's hat, experimenting with new recipes she discovers on YouTube. Cooking is not just a hobby for her; it's a creative outlet where she adds her personal touch to every dish. Additionally, she enjoys exploring historic places, with Dubrovnik's Old City in Croatia currently topping her list of favorites.

After a long day at work, Carolina loves to unwind by taking long walks with her best friend. These moments of connection and conversation are essential for her, providing a perfect balance to her busy life. When she's not working, Carolina finds joy in exploring the beautiful landscapes of upstate New York, especially during the summer. Carolina has a keen interest in learning more about how technology can streamline administrative tasks. She believes that automating repetitive tasks and improving communication can significantly enhance efficiency, allowing more time for meaningful work.

The best piece of professional advice Carolina has ever received? "Don't hesitate—grab the opportunity when it comes your way." This wisdom has guided her career and continues to inspire her to embrace new challenges with open arms. In a world that often feels overwhelming, Carolina stands as a reminder of the beauty in simplicity, the power of patience, and the importance of kindness. With her calm koala spirit, she navigates the complexities of life and work, leaving a positive mark on everyone she encounters.

ISO 21482 - The Newest Radiation Safety Symbol

By Guillermo Michelena, Health Physicist

ISO 21482 - The newest radiation symbol has arrived! Its creation is thanks to the dangers that radioactive orphan sources have presented in recent history. Any sealed radioactive material or device that is discarded or abandoned with no clear identity of the owner is classified as a radioactive orphan source, and they can pose significant safety and environmental risks if not responsibly managed or disposed of.

Around the world, there have been instances in the past where construction workers exposed themselves to radiation by taking or handling misplaced radioactive orphan sources found in scrap yards or constructions sites. These incidents are examples of individuals unknowingly endangering themselves because they did not understand the warning from the conventional radiation safety symbol – the trefoil. This highlights the lack of familiarity across the globe with the concept of radiation and the risks that severe radiation exposure poses to any individual's health.

The radiation safety symbol, known for its widely recognized trefoil design, has served as a universal emblem to communicate the presence of radioactive materials or radiation hazards. However, as scientific understanding and safety protocols evolve, so too does the need for clearer, more effective communication in safety signage. In response to these shifts, a new radiation safety symbol has been introduced, aiming to improve upon its predecessor by enhancing visibility, recognition, and interpretation, especially in diverse global contexts.

The original radiation symbol, a three-bladed fan inside a circle, was created in 1946 by the U.S. Radiological Safety Section to provide a clear, recognizable indicator of radiation risks. Its simple, black-and-yellow design has been the standard for indicating radioactive materials, but over time, various shortcomings have emerged. These limitations include the symbol's lack of visibility in low-light environments, its abstract nature which may confuse those unfamiliar with radiation risks, and its inability to convey urgency or the specific type of radiation involved. To help reduce the deaths and injuries from accidental exposure to these radioactive orphan sources when the warning from the trefoil symbol failed, a new supplementary warning symbol was launched by the International Atomic Energy Agency (IAEA) and the International Organization for Standardization (ISO). The IAEA focused on creating a symbol that would be universally recognized and understood, regardless of cultural or language differences.

The sign consists of a red triangle with a black border containing black icons outlined in white. Across age, education, and cultural background, red was found to be more effective at conveying "danger" than the color yellow, which was viewed as the less serious "caution". The color scheme of the new symbol enhances its visibility and makes it stand out more effectively in various lighting and environmental conditions. The icons are a trefoil on the top of the triangle, five wavy lines emanating from the trefoil towards the bottom, a skull and crossbones, a running person, and an arrow pointing away from the skull. Together the icons are meant to convey one message to anyone across the globe regardless of background: run away from the radiation danger that can cause death.

The guidelines for ISO 21482 state that the symbol is to be placed in devices housing high-activity radioactive sources where exposure to the source could cause death or serious personal injury. The supplementary symbol would only be visible for anyone who attempts to dismantle these devices to warn them against tampering and to maintain distance. The symbol will not be posted on doors to restricted/controlled radioactive areas, transportation packages, or containers.

The new ISO 21482 radiation symbol is a key step forward in the ongoing effort to improve radiation safety communication. It addresses the limitations of the old symbol and ensures that radiation hazards are more clearly and effectively communicated, regardless of the setting or cultural context. The enhanced design not only increases the symbol's visibility but also provides more information about the specific risks involved, helping to prevent accidents and injuries related to radiation exposure. These qualities make the new symbol an invaluable tool for improving safety in environments where radiation is present. By adopting this new symbol, organizations can ensure that they are following modern standards for radiation protection and contributing to a safer environment for workers and the public alike.

SAFETYMATTERS
COLUMBIA UNIVERSITY EH&S
Volume 19 Issue 2
Spring 2025

How Completing the LATCH Helps Environmental Health & Safety Help Laboratories

By David Raharijao, Data Analyst

The Laboratory Assessment Tool for Chemical Hygiene (LATCH) is a key resource for laboratory safety and compliance at Columbia University, supporting research and a culture of safety. Laboratory safety starts with having the right information at the right time. The LATCH bridges laboratories and Environmental Health & Safety (EH&S) through the data it gathers. This comprehensive resource paints a clear picture of each laboratory's unique needs and risks, allowing EH&S to provide targeted support, helping to ensure research can be done safely.

The LATCH is, at its core, a centralized document that contains essential information about a laboratory's structure, personnel, and potential hazards. It also offers customized safety guidance tailored to the specific hazards present in the space. Acting as a dynamic guide, it adapts to changes in laboratory activities and ensures that safety protocols and compliance measures stay current and effective. To maintain its dynamic quality, the LATCH is best renewed annually or whenever new hazards are introduced in the laboratory. Required by OSHA and University policy, LATCH supplements the Columbia University Chemical Hygiene Plan (CHP) to ensure compliance. It is additionally conveniently accessible via the LION system.

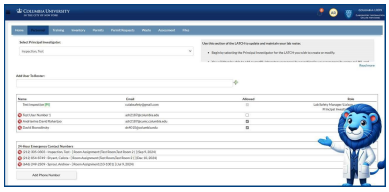
Laboratories are often balancing experiments, data analysis, and other critical tasks, so dedicating time to the LATCH may seem daunting. However, completing it is a cornerstone for ensuring safety and compliance while enabling EH&S to offer enhanced support. The time investment is worthwhile, as the data captured in the LATCH can deliver key benefits such as:

- **Emergency Preparedness:** Providing EH&S with the ability to quickly contact the right personnel during incidents, ensuring a rapid and informed response, especially after-hours.
- **Regulatory Updates:** Identifies laboratories affected by new regulations, allowing EH&S to deliver timely and relevant updates.
- **Training Compliance:** Tracks certifications and training status for personnel, ensuring safety standards are consistently met.
- **Hazard Documentation:** Maintains detailed records of hazards, enabling tailored safety guidance and support.
- **Permit Management:** Streamlines the process for obtaining and managing approvals like C-14 permits, saving valuable time.

For instance, during a hypothetical after-hours laboratory fire, the LATCH proves critical. With access to up-to-date information, EH&S could quickly contact the appropriate laboratory personnel and provide first responders with important hazard details. This rapid response minimizes risks and can prevent further damage.

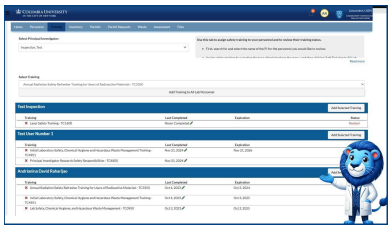
Filling out the LATCH is designed to be simple. For laboratories that have completed it in the past, the "previous assessment" feature in LION allows quick duplication of prior data, requiring less than 10 minutes to update. For first-time users, the process involves gathering basic information, such as lab personnel, occupied spaces, emergency contacts, and hazards. Even from scratch, it typically takes less than an hour. Upon completion, EH&S will review submissions promptly and provide feedback or approval as needed.

While completing the LATCH ensures immediate compliance, it also offers significant long-term benefits. Accurate data captured in the LATCH can streamline safety inspections in laboratories, ensuring that potential safety issues are identified and promptly addressed to maintain a secure research environment. The LATCH is also a useful on-boarding tool to orient personnel to the laboratory's hazards, and must be read and understood by new members upon joining a research group. Additionally, accurate and up-to-date LATCH data fosters a stronger partnership between EH&S and laboratories, promoting a safer and more collaborative research environment. This thorough documentation allows EH&S to provide targeted support, keeping laboratories safe, compliant, and operational.



The Personnel tab on LION's LATCH page lets laboratories view their team roster, assign roles, and list emergency contacts for their spaces, keeping critical information organized and accessible.

The Training tab on LION's LATCH page provides a comprehensive overview of users' training status, highlights expired certifications, and allows laboratories to assign required training courses directly to team members.



For additional support, laboratories are encouraged to complete the LATCH training on Rascal (TC6550), which provides step-by-step guidance on accessing and using the tool. However, EH&S is always ready to provide guidance that is needed to access the tool, complete sections, or clarify requirements, the team is ready to help at labsafety@columbia.edu.

EH&S New Team Members

Cindy Ma-Safety Advisor
Kyle Marquez - Associate Health Physicist

EH&S Fun Facts

EH&S has three team members named Chris (Pettinato, Aston, and Pitoscia) while the Data Team is all David (Skorodinsky and Raharijao).

EH&S Work Anniversaries

Yvette Acevedo - 35 years

Editorial Staff: Kathleen Crowley, Marianne McCartney, Chris Pitoscia, Pam Shively
Please share questions or comments with us at newsfeedback@columbia.edu