SAFETYMATTERS

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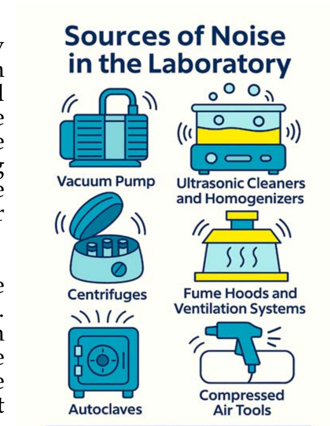
Is Your Lab Louder Than You Think?

By Chara Proud, Health and Safety Specialist

One of the most commonly overlooked hazards in many academic research laboratories is noise. Unlike other hazards, excessive noise often blends into the background of daily laboratory work, making it easy to underestimate its impacts on safety, productivity, and health.



The Occupational Safety and Health Administration (OSHA) has consistently identified noise-induced hearing loss as a major occupational health concern (OSHA, 2011). In 2024, the National Institute for Occupational Safety and Health (NIOSH) estimated that 22 million workers in the United States are exposed to hazardous noise levels every year (NIOSH, 2024). While academic laboratory environments may not have the same noise generating equipment as other industries, many laboratories contain equipment capable of generating significant noise, especially when combined with other equipment and activity.

OSHA's Noise Standard (29 CFR 1910.95) establishes a permissible exposure limit (PEL) of 90 decibels (dBA) averaged over an eight-hour workday. Additionally, OSHA requires the implementation of a hearing conservation program when workers are exposed to an 8-hour time-weighted average (TWA) of 85 dBA or greater. Most laboratory activities do not exceed these regulatory thresholds; however, research shows that noise can still affect health and performance even at lower levels.

Studies have demonstrated that combined or continuous sources of moderate noise can increase stress, fatigue, and irritation, impacting efficiency, concentration, and overall quality of work (Froehlich, 2013). In one study, approximately 35-40% of office workers reported that noise levels between 55 and 60 dBA were irritating, further demonstrating that noise levels do not need to reach regulatory limits to have a negative impact. Additionally, studies looking at the connection between noise exposure and hypertension have found that participants exposed to greater levels of noise had higher blood pressures and were more likely to have treatment-resistant hypertension (Kershaw & Giang, 2021).

Reducing Noise in the Laboratory

Proactively managing noise in the laboratory can improve comfort, communication, and safety. Consider the following strategies:

- Choose quieter equipment when purchasing new instruments or equipment. Some equipment, like ultrasonic cleaners or vacuum pumps, list noise levels in the manufacturer's specifications. Use this information to compare options.
- Isolate noisy equipment by placing it away from workstations or in designated equipment rooms whenever feasible.
- Ensure that equipment is frequently serviced, especially if equipment starts to generate noise that it previously had not.
- Use hearing protection when tasks or equipment generate noise levels at or above 85 dBA, particularly for repeated or extended exposures.

How Loud is Your Lab? A Simple Check

If you are unsure whether noise levels in your laboratory may be elevated, simple observations can provide helpful clues. If you cannot hear yourself snapping your fingers at arm's length, or if you need to raise your voice to communicate with someone nearby, noise levels may be approaching or exceeding 85 dBA. These indicators do not replace a formal noise assessment but can signal when further evaluation may be needed.

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Current Affairs: Navigating Electrical Safety in the Laboratory

By Christopher Pitoscia, Director, EH&S

Laboratories are home to many hazards, from potential chemical and radiological exposure, to contact with infectious microorganisms, or the physical dangers of slips, trips and falls. Depending on the nature of a lab's research focus, they also often contain a variety of electric-powered instruments and may also include active work with electrical systems. These research tools and activities can themselves pose a hazard to laboratory workers ranging from minor, barely perceptible shocks, to burns, fire, and fatal electrocution if manufacturers' instructions are not followed and best safety practices are not observed.

A worst-case scenario example illustrating these hazards occurred in late December 2022 at the SLAC National Accelerator Laboratory — a research facility operated by Stanford University under U.S. Department of Energy (DOE) oversight — when an experienced electrical worker was seriously injured by a shock/arc flash while performing energized electrical work. Investigators found that the employee received a high-voltage electrical shock that resulted in significant injury, and a formal investigation was launched by a DOE Accident Investigation Board.

As a first step toward preventing such incidents, a basic comprehension of the physics of electricity is helpful in understanding how to work safely with electrical tools and instruments and around sources of electric power. A water hose analogy can be used to illustrate several important concepts of electrical energy. If a hose carrying running water represents an electrical wire carrying electricity, water pressure is the equivalent of voltage (measured in Volts, V), the volume of the water's flow is akin to electric current (measured in Amps, A), and a kink or narrow section of hose represents resistance (measured in ohms, Ω).

https://app.jove.com/v/10364/electrical-safety-avoiding-electric-shock-fire-or-explosion

Each of these factors plays a part in the hazards of working with or around electricity. For example, while a shock from static electricity may carry thousands of Volts, it is harmless due to its extremely low amperage (~5μA) and short duration, while a shock from a household (or laboratory) outlet may deliver "only" 120V, it carries far greater current (15-20A), enough to cause a fatal arrythmia under the wrong conditions. Importantly, those conditions include resistance, which is why it is crucial to ensure that when working with electrical appliances or around electricity, the working environment is safe. Dry skin or surfaces, for example, are far more resistive to electricity than wet.

Many modern appliances and laboratory instruments are built with electrical safeguards in place, such as emergency shutdown triggers. Similarly, domestic and industrial wiring must be built in accordance with applicable codes to prevent accidents. These include circuit breakers and ground fault circuit interrupters (GFCI) in outlets near wet environments like bathrooms or near laboratory sinks. Both circuit breakers and GFCIs work to instantly cut power to a circuit if excess electrical energy is present or the flow of electricity travels in an unintended path to ground (such as into a person who comes into contact with the power source) instead of through its wiring.

Certain laboratory equipment, like gel electrophoresis systems, power supplies, amplifiers and LASERs pose elevated electrical hazards and require special care and training. All laboratories, however, should adhere to the following basic practices to limit the risk of electrical shock, burns, other injuries, or fire:

- Use modern appliances and instruments in good working order
- Follow manufacturers' instructions for proper operation; ensure plug-in appliances are connected to an appropriate power source.
- Limit the use of extension cords and power strips to short term temporary use only; plug high voltage/current devices directly into a wall receptacle, do not use power strips.
- Inspect plugs and cords for signs of excess wear, including fraying, cracking or damage to insulation, bent or missing prongs; never use a damaged cord and never remove a grounding pin from a three-pronged plug.
- Always ensure work areas are clean and dry when working with or near electrical appliances. Remove rings, watches and other jewelry from the hands and arms when working with or near electrical systems.
- Never attempt to perform service or maintenance on an appliance or instrument while it is plugged in or powered on; never reset a circuit breaker more than once. If a breaker or other shutoff device trips multiple times, contact an electrician for further investigation.

EH&S has developed several new resources, including a training module, guidance documents, and emergency procedures to provide information and recommendations to laboratory researchers. Please see the page here essential safety topics - https://research.columbia.edu/electrical-safety

https://ehs.ucla.edu/inspections/lab-safety/general

Reminder that **all researchers** in a wet laboratory must be current with Laboratory Safety Training!

If you are taking it for the first time , please take TC4951: Lab Safety, Chemical Hygiene, Hazardous Waste Management, and Fire Safety Initial Training. The refresher course is TC0950.

Also, remember to take courses which are specific to your laboratory activities (use the Training Finder to learn more). These could be on RASCAL or provided by your PI or senior lab personnel.

Principal Investigators need to complete TC4951 or TC0950 **once** and then complete TC6800 (PI Responsibilities) **once** to remain current unless the refresher course is assigned by EH&S.

Sunday March 8, 2026

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!

From Curiosity to Global Impact: The Lifelong Quest of Stephen S. Morse

By Samira Joussef Pina, Biosafety Officer II

For more than four decades, Stephen S. Morse has been at the crossroads of infectious disease research, public health preparedness, and the evolving challenges of a world constantly reshaped by microbes. Now approaching retirement, Dr. Morse reflects not only on the arc of his career but also on the mentors, institutions, and lessons that have shaped his vision of science and society. When he considers his decades-long career in public health, he speaks as both a scientist and a storyteller, weaving together lessons from research, mentorship, and global experience.

A native of New York City, Morse developed intellectually at the University of Wisconsin–Madison, where he encountered inspiring figures such as Drs. Robert Hanson, Steve Kornguth, and Nobel laureate Howard Temin, shaping his deep understanding of microbiology. Motivated by their academic discipline and curiosity, Morse developed a lifelong commitment to translating scientific insight into practical public health strategies as he says he is drawn to difficult problems. Dr. Temin, who would go on to win the Nobel Prize for his work on reverse transcriptase and retroviruses, was known for both his exacting intellect and personal engagement with students that would resonate in Morse's own philosophy, underscoring the importance he places on mentorship.

After completing his graduate work, he pursued postdoctoral training in immunology at the Medical College of Virginia, now called The Virginia Commonwealth University School of Medicine. After a brief period at Rutgers University, he joined Rockefeller University during the presidency of Nobel laureate Joshua Lederberg. There, Morse realized public health would be the field where he could make the greatest impact, despite never initially planning to enter it. Collaborations with Nobel laureate Shimon Sakaguchi and other leading scientists reinforced his belief that scientific progress is rarely the work of one person but a continuum of partnership and discovery.

At Rockefeller, Morse honed his vision for infectious disease surveillance, contributing to the 1989 NIAID/NIH Conference on Emerging Viruses and authoring the seminal book Emerging Viruses, which remains foundational in the study of novel pathogens. This work highlighted the interplay between pathogens, human behavior, and society, emphasizing early detection and proactive response. In 1996, he joined the Defense Advanced Research Projects Agency (DARPA), co-directing the pathogen countermeasures program and later directing the advanced diagnostics program. Then in 2000, Morse joined Columbia University, drawn to its collaborative environment and commitment to public health. There, he created and led the course Emerging Infectious Diseases, examining the biology, epidemiology, and societal implications of pathogens. At Columbia, his teaching has shaped countless public health professionals, instilling curiosity, critical thinking, and appreciation for the interface of science and society. "If I had one legacy, it's the students and others I hope I've influenced positively," he reflects.

Morse's impact extends beyond academia. He played a key role in developing ProMED, the Program for Monitoring Emerging Diseases, which revolutionized real-time global disease reporting. Collaborations with the Center for Infectious Disease Epidemiologic Research and the National Center for Disaster Preparedness exemplify his dedication to translating scientific knowledge into practical preparedness.

Across decades, Morse has witnessed the evolution of public health, from the eradication of smallpox to the challenges of COVID-19, and from early immunology experiments to the growing role of RNA-based therapies. Yet he remains cautious about the pace of technology. Dual-use dilemmas, vaccine hesitancy, and the inability of social systems to keep up with scientific advances are recurring concerns. "We haven't really got a sufficient understanding of [human behavior]," he observes. "Part of the problem is our own human frailties, which we have to admit we're working with." Even approaching retirement, he plans to continue teaching, formally and informally, guiding new generations of scientists and public health leaders to navigate the complex intersection of emerging diseases, societal behavior, and policy.

Stephen Morse's legacy is one of curiosity, mentorship, and practical impact. His contributions to infectious disease surveillance, public health preparedness, and education have shaped how society responds to emerging threats. More than any single discovery, his enduring influence lies in the scientists and public health leaders he has trained, those who will carry forward his insight and commitment, to the betterment of global health. As Morse puts it, "There is a great world still to be discovered…always room for people with curiosity and good questions."

Meet the EH&S Staff

Cindy Ma

Safety Advisor

Cindy Ma is a Safety Advisor with Environmental Health & Safety (EH&S), bringing a thoughtful, detail-oriented approach to her role. She has been part of the Columbia University community for five years, with the past year dedicated specifically to EH&S. Prior to joining the department, Cindy worked in a laboratory at the Irving Medical Center, giving her firsthand experience with lab environments and safety needs.

A New York City native, Cindy enjoys sharing that her hometown boasts America's first pizzeria—Lombardi's, which opened in 1905. She describes her personality as most similar to a cat: calm, curious, and meticulous, qualities that strongly influence how she approaches her work and collaborates with others.

Cindy draws inspiration from the quote, "Do what you can, with what you have, where you are." The message serves as a reminder to stay resourceful and take action, even when circumstances aren't perfect. She is motivated by making a difference—whether through solving problems, supporting others, or improving safety processes that make daily work easier and safer.

Outside of work, Cindy enjoys traveling, exploring new restaurants and cuisines, and cheering on the Dodgers. She finds balance after busy days by watching shows or taking walks to unwind and recharge. If given the opportunity to live anywhere in the world, she would choose London, a city she recently visited and admired for its neighborhoods, museums, and vibrant food scene.

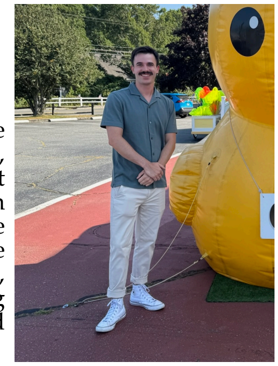
Cindy values organization as one of her strongest personal traits, noting that having a plan helps her stay on track and meet deadlines without feeling overwhelmed. Professionally, she is especially excited about her current work on inspection readiness and lab safety improvements, collaborating with teams to create safer workspaces.

Looking ahead, Cindy hopes to expand her knowledge of computer science, intrigued by how technology, coding, and data analysis can be applied to real-world problem solving. One of the best pieces of professional advice she's received—and continues to follow—is to always ask for feedback, a practice she credits with helping her grow and improve continuously.

Through her dedication, curiosity, and collaborative spirit, Cindy Ma plays an important role in advancing safety and preparedness across the University community.

Kyle Marquez

Associate Health Physicist



When you talk to Kyle Marquez, Associate Health Physicist, one thing becomes clear almost immediately: he brings both commitment and purpose to the work he does every day. Kyle joined Columbia just a year ago, but he's already made a strong impression within EH&S and across our community.

Kyle grew up in Bellingham, Massachusetts—a small town with a surprising historical claim to fame, it is the place where Deborah Sampson, the Revolutionary War hero who disguised herself as a man to enlist in the Continental Army, began her journey. Kyle loves sharing stories like that, and it is easy to see why: he has a natural curiosity about the world and a deep appreciation for people who show courage and perseverance.

Ask him what animal reflects his personality, and he'll say a bald eagle—a choice that fits his calm confidence and quiet determination. Those qualities show up not only in his work ethic but also in the way he interacts with colleagues and patients. Kyle says the coolest part of his job is helping cancer patients and their families feel reassured about radiation safety. Providing that peace of mind, he says, is meaningful every single day.

Kyle credits much of who he is to his grandmother, the most inspirational person in his life. She taught him to be kind, help others, and chase his dreams—advice he carries with him at home and at work. That commitment to self-improvement shows up in how he stays motivated: Kyle is constantly pushing himself to grow, learn, and "do better than last time."

Outside the office, you're likely to find Kyle lifting weights, watching movies, or creating art. Painting and drawing are his favorite ways to unwind, and he loves getting lost in new projects. And when it comes to sports? He's a proud New England Patriots fan through and through.

Although he's made a home in New York, Kyle's heart still has a strong pull toward Houston, Texas, where he was born. With family roots and cultural ties there, he says moving back someday would be a dream come true.

Kyle's career began in a seafood restaurant kitchen—an experience that taught him early lessons about hard work. One piece of advice has stuck with him ever since: "Hard work beats talent when talent doesn't work hard." It's a motto he lives by and one that continues to shape his professional journey.

EH&S HAZWOPER, RCRA, IATA, IATA 6.2 Training Spring 2026

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.

Spring CUIMC AED/CPR Training Series

Free to all faculty and staff. All in-person classes will begin promptly at 9:00 AM (2 hours) and will take place in the Alpha Conference Room, Georgian Building (617 West 168th Street). Registration required, links below.

February 20, 2026 March 24, 2026 April 17, 2026 May 1, 2026

Environmental Health & Safety in Space Exploration

By Hadeline Hanonik, Safety Advisor II

As space exploration rapidly expands beyond government-led missions to include commercial spaceflight, private space stations, and long-duration planetary exploration, Environmental Health & Safety (EH&S) has emerged as a foundational element of mission success. Space is an extreme occupational environment where traditional safety margins are narrow; rescue is often impossible, and environmental exposures can have immediate and long-term health consequences. Applying EH&S principles to space exploration is therefore essential to protecting human health, ensuring operational safety, and promoting sustainable use of the space environment.

EH&S in space adapts core terrestrial concepts like industrial hygiene, occupational health, toxicology, and safety engineering, to the unique hazards of spaceflight. NASA defines environmental health as the anticipation, recognition, evaluation, and control of environmental factors that may adversely affect human health, a framework that translates directly to spacecraft and space habitats (NASA, Office of the Chief Health and Medical Officer). In space, these factors include recycled air and water systems, radiation exposure, confined living conditions, and exposure to chemical contaminants from onboard materials and equipment.

One of the most critical EH&S disciplines in space is space toxicology, which addresses chemical hazards in closed-loop environments. Unlike Earth-based workplaces, spacecraft lack the ability to dilute contaminants through ventilation to the outside environment. Off-gassing from materials, combustion byproducts, propellant residues, and by-products of life support systems can accumulate over time. To manage these risks, NASA and its partners establish Spacecraft Maximum Allowable Concentrations (SMACs) and Spacecraft Water Exposure Guidelines (SWEGs), which define safe exposure limits for astronauts during both short- and long-duration missions (NASA Toxicology and Environmental Chemistry Program; James et al., 2009). While similar to the familiar occupational limits that governmental agencies have established on earth, such as OSHA's Permissible Exposure Limits (PELs) or NIOSH's Recommended Exposure Limits (RELs) these limits account for altered human physiology in microgravity and the cumulative nature of space-based exposures.

Continuous environmental monitoring is another cornerstone of EH&S in space exploration. Air quality, water quality, microbial contamination, and radiation levels are constantly monitored aboard the International Space Station (ISS) and other spacecraft to ensure environmental conditions remain within safe limits (NASA Human Health and Performance Directorate). This monitoring mirrors industrial hygiene practices on Earth but is significantly more complex due to the reliance on sensor-based systems, delayed sample return, and limited opportunities for corrective action. Environmental data are integrated with operational decision-making to prevent hazardous exposures before they can impact crew health.

EH&S also plays a vital role in occupational health and medical surveillance for astronauts. Spaceflight introduces unique health stressors, including microgravity-induced bone loss, immune system dysregulation, vision changes, and psychological stress from isolation and confinement. NASA's Crew Health and Safety program integrates medical monitoring with environmental exposure data to inform crew selection, mission planning, and vehicle design (NASA Crew Health and Safety). This proactive approach emphasizes prevention and early intervention, recognizing that medical emergencies in space are difficult to manage and may have mission-ending consequences.

In addition to chemical and biological hazards, human factors and ergonomics are central to EH&S in space. Spacecraft and habitats must be designed to minimize physical strain, reduce the likelihood of human error, and support cognitive performance under high-stress conditions. Human factors engineering addresses workstation layout, tool usability, workload management, and behavioral health risks, all of which contribute to overall mission safety (NASA Johnson Space Center Human Factors Program). These considerations are increasingly important as missions grow longer, and crews become more autonomous.

Finally, EH&S principles extend beyond crew health to encompass environmental sustainability in space. Orbital debris, habitat contamination, and planetary protection are emerging environmental concerns that parallel terrestrial environmental protection efforts. Scholars have argued that applying environmental risk reduction and sustainability frameworks to space activities is essential to preserving orbital environments and preventing irreversible harm to celestial bodies (Rao et al., 2022). As space becomes more accessible, EH&S will play a key role in balancing exploration with responsible stewardship.

In conclusion, Environmental Health & Safety is integral to modern space exploration. By applying Earth-based EH&S principles to the unique hazards of space, professionals help protect astronaut health, prevent catastrophic failures, and support the long-term sustainability of human activities beyond Earth. As space exploration enters a new era, EH&S will remain a critical driver of safe and responsible progress.

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Laser Cutter Safety Program

By Konstantinos Georgiou, Associate Director & Radiation Safety Officer, Clinical Radiation Safety Program

Laser cutters are versatile machines used to cut, etch, or engrave a wide range of materials using high-power lasers. Most systems are enclosed and utilize a powerful carbon dioxide (CO_2) laser that produces an invisible beam at a wavelength of 10,600 nm, though some systems may incorporate additional laser types. Capabilities vary depending on machine size, laser power, and material compatibility. While highly effective tools, laser cutters present several potential hazards, including fire risk, electrical hazards, optical hazards, exposure to hazardous fumes, and particulates.

Environmental Health & Safety (EH&S) is pleased to announce the establishment of a Laser Cutter Safety Program, introduced in 2025 as part of Columbia University's broader Laser Safety Program. This new initiative reflects the growing use of laser cutter systems across the University and the need to proactively address the complex hazards associated with their operation. Proper oversight, training, and engineering controls are essential to ensure safe operation.

Program Goals

- Ensure all laser cutters are registered and approved for use
- Standardize training and operational requirements
- Address fire, fume, particulate, and laser hazards
- Promote safe laser cutter use across all University spacesShape

General Safety Guidance

1. ALWAYS refer to the manufacturer's instructions for safe equipment use.
2. Use Approved Materials Only - All materials used in a laser cutter prior to cutting, etching, or engraving MUST BE APPROVED by a lab or shop supervisor with knowledge of the laser cutter. Some materials can be extremely toxic and / or damaging to these machines. Reflective materials should never be cut, as they can cause the laser beam to escape the laser enclosure. A list must be posted of approved material for cutting and / or engraving, near the laser cutter. All materials used must be compatible with the equipment per manufacturer's specifications and recommendations. CONSULT with the shop supervisor to discern which material and settings are best for the specific project.
3. NEVER open a laser cutter while a job is actively running.
4. NEVER leave a laser cutter unattended while cutting, marking, or engraving is in progress. The laser may cause ignition of combustible materials which can lead to a fire.
5. A properly installed, maintained, and operational particulate and fume exhaust system is mandatory when operating the laser system (e.g., BOFA filter). A filter change-out schedule must be established to ensure filters are replaced before they become oversaturated.

Training

BEFORE using a laser cutter, ensure that all users complete the shop specific training, and RASCAL – TC7202 Laser Cutter Safety Training. In addition to these modules, a system-specific training is required in the lab/shop for the specific needs of the cutting project from the lab/shop supervisor.

Registration & Oversight

- All laser cutters must be registered with EH&S upon purchase
- EH&S will conduct annual audits of laser cutter spaces to verify compliance and address unsafe practices or conditions

Register or ask questions: lasersafety@columbia.edu

Need Help or More Information?

EH&S is available to support your lab or shop.

- labsafety@columbia.edu
- CUIMC: (212) 305-6780
- Manhattanville / Morningside: (212) 854-8749

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Noise Assessments and Support from EH&S

Any laboratory that has concerns about noise levels can contact Environmental Health & Safety (EH&S) to conduct a formal noise assessment. This may include the use of a noise dosimeter to measure sound levels over time or monitoring of specific equipment or locations within the laboratory. Personal exposure monitoring allows EH&S to calculate an individual's time-weighted average noise exposure, which can then be compared to OSHA criteria.

Based on the findings, EH&S will provide recommendations related to equipment setup, engineering controls, administrative controls, and personal protective equipment to reduce noise exposure. Early evaluation and simple adjustments can help to protect hearing and improve the laboratory environment for all.

Resources

Froehlich, P. (2013). Noise pollution in the laboratory (White paper). Parker Hannifin Corporation. https://www.parker.com/content/dam/Parker-com/Literature/IGFG/PDF-Files/Noise-Pollution-in-the-Laboratory-White-Paper.pdf

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