



SAFETY MATTERS

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COLUMBIA UNIVERSITY EH&S

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Environmental Health & Safety

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<http://ehs.columbia.edu>

Irving Medical Center

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ehs-safety@columbia.edu

Morningside & Manhattanville

Phone: (212) 854-8749
ehrs@columbia.edu

Radiation Safety

Phone: (212) 305-0303
rsocumc@columbia.edu



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JEANNETTE M. WING APPOINTED EXECUTIVE VICE PRESIDENT FOR RESEARCH AT COLUMBIA UNIVERSITY

AS A PIONEER IN COMPUTER SCIENCE RESEARCH DR. WING
BRINGS A FRESH MANDATE TO THE EVPR OFFICE.

Jeannette M. Wing, Ph.D., is a Professor of Computer Science and former Avaneassians Director of the Data Science Institute, and as of September 1, 2021, the newly appointed Executive Vice President for Research (EVPR) at Columbia University. In her role as EVPR, Dr. Wing has overall responsibility for the University's research enterprise, including oversight of its health and safety programs. *SafetyMatters* had the pleasure of meeting with Dr. Wing to discuss her early impressions of the EVPR's office, her goals for Columbia's research enterprise, her appreciation for safety, and some fun facts about herself!

Through the early weeks in her position, Dr. Wing has quickly grown to understand and appreciate the enormity of the EVPR's responsibility. First and foremost, that the EVPR's office – and all of its units, including Environmental Health & Safety (EH&S) – is intended to serve the University, with a mandate to create the safest, healthiest, and best possible environment for its researchers, so that they can perform state-of-the-art research. She sees EH&S as a natural part of the EVPR's portfolio, noting that the alignment recognizes safety as an integral component of research.

As she grows into her role, Dr. Wing intends to operate the EVPR's office under a philosophy summarized by a slogan that she created, "Power in Partnerships, Power in Diversity, Power for Impact." Within Columbia, she plans to maximize and facilitate multi-disciplinary collaboration between schools and expand the University's relationships with industry, government, non-profit organizations, the surrounding community, and other academic institutions. Further, her goal is to accomplish all of this in a way that reaches beyond Columbia's typical partners to engage larger state and public schools, historically black colleges and universities, and others with whom long-term

relationships can be established. She sees these partnerships as being even stronger when they are diverse on a multi-dimensional level, across race, gender, geography, and discipline – noting that the social sciences, arts, and humanities are crucial partners of science and engineering for humanity to address the world's most pressing needs.

**"POWER IN PARTNERSHIPS,
POWER IN DIVERSITY,
POWER FOR IMPACT."**

- JEANNETTE M. WING, EVPR



Jeannette M. Wing: Executive Vice President for Research
(Photo Credit: Robert Giordano)

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According to Dr. Wing, the Office of the EVPR is uniquely suited to serve Columbia in these ways, as it transcends silos that may pose challenges elsewhere. Referring to the National Science Foundation's (NSF) recent selection of Columbia to lead a climate modeling center called Learning the Earth with Artificial Intelligence and Physics (LEAP), she believes that the award represents the first step. In her vision for the future of Columbia research, it is an opportunity to set a high bar of excellence and an example of the University standing ready to anticipate and respond to significant funding opportunities in the future.

Where does her passion for leading the University's research enterprise come from? Dr. Wing is genuinely a Columbian through and through, even with a decorated and well-traveled academic and professional background that has taken her from MIT – where she earned her bachelor's, master's, and doctoral degrees in computer science – to the University of Southern California, to Carnegie Mellon University, and later to Microsoft Research and NSF. As a young girl growing up in Morningside Heights, she played on the steps of Low Library in the shadow of her new office! Her father earned his Ph.D. and served on the faculty at Columbia; both her brother and nephew were Columbia students, her sister-in-law is an alumna of Barnard College, and even her mother took classes at Columbia! And while she didn't attend Columbia herself, she holds New York City close to her heart, and throughout her time away, she always recognized that there is no place like it.

Finally, while her love of karate and ballet are well known, Dr. Wing also followed in her brother's footsteps as a collegiate fencer, which she describes as a "combination of ballet and karate." It seems likely that the skills of grace, agility and strength learned on the fencing strip will serve her well as EVPR!

Please join EH&S in welcoming Dr. Jeannette Wing to her new role as we look forward to working with her in support of Columbia research!

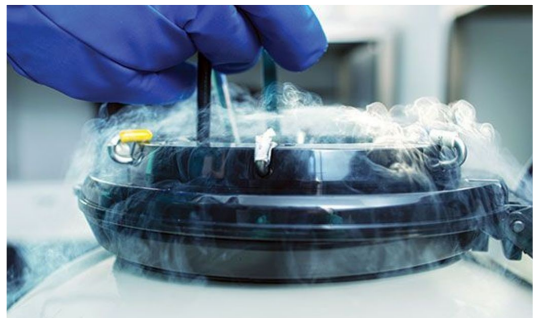
By: Christopher Pitoscia, Associate Director

THE LEIDENFROST EFFECT

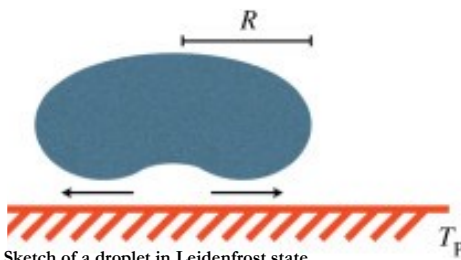
By Ryan El Nagggar, Safety Advisor

Liquid nitrogen, as its name implies, is nitrogen that exists in its liquid state, produced by the fractional distillation of cryogenic liquid air. Liquid nitrogen has a boiling point of -196 degrees Celsius. Its ability to maintain extremely low temperatures, well below that of water, enables it to have many uses in the laboratory. However, with all the incredible applications of Liquid Nitrogen, there are unfortunately dangers associated with its use. In addition to its potential to create an oxygen-deficient atmosphere, the super low temperature of liquid nitrogen can cause frostbite or cryogenic burns if in contact with skin. The skin damage can be severe enough to require surgery or even amputation.

A common misconception regarding skin contact with liquid nitrogen is that it will be severe from ANY exposure. The Leidenfrost Effect is a phenomenon that occurs when a liquid comes into contact with a solid that is at a temperature well above the liquid's boiling point. A vapor layer approximately 0.2 millimeters thick is formed between the solid and liquid when this occurs, creating a barrier. In this particular instance, liquid nitrogen is the liquid, and YOU are solid. Therefore, accidental exposure to droplets of Liquid Nitrogen on the skin will most often not cause harm, let alone a medical emergency. The Leidenfrost effect causes the drops to touch the skin for less than a second. The severe dangers tend to come from extended contact with the liquid nitrogen, such as accidentally dipping one's hand into a liquid nitrogen container or being exposed via a splash.



Always handle Liquid Nitrogen slowly to minimize boiling and splashing. Remember to use tongs to withdraw objects immersed in a cryogenic liquid.



Sketch of a droplet in Leidenfrost state.

(Photo Credit: Droplet Wetting & Evaporation, 2015)

The Leidenfrost Effect, while a fascinating phenomenon, should never be depended on for safety when dealing with Liquid Nitrogen. It can be helpful to know about it and potentially alleviate panic for rare small skin exposures. However, skin exposures should not happen in the first place. Bare skin should not be exposed to liquid nitrogen at any point when using it. Significant Liquid Nitrogen burns are an emergency. Researchers should always wear Cryogloves, lab coats, face shields, and goggles when handling liquid nitrogen in any amount, and safety should always remain paramount.

COLUMBIA UNIVERSITY

ENVIRONMENTAL
HEALTH & SAFETY

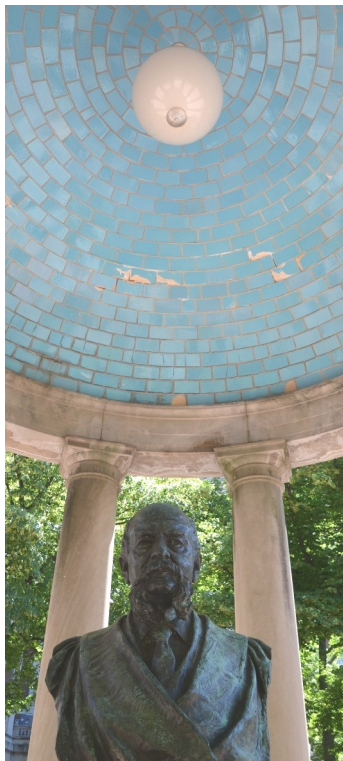
EXPERT GUIDANCE

TIMELY SERVICE

COMMITMENT TO
HEALTH AND SAFETY

BEST PRACTICES

COLLABORATION

SUBMIT A RADIOACTIVE
WASTE PICK-UP

Pick-Up requests for Radioactive Waste can be submitted through your Laboratories [LATCH profile](#). Simply navigate to the 'Aggregated Waste' Tab and select "Pick-Up" for the specific container you wish to dispose.

REQUEST A RADIATION
CLEARANCE

To request EH&S clearance of contaminated spaces or equipment that are being vacated/renovated, disposed of, relocated, or handled by non-laboratory personnel, please review and submit a completed [Clearance Request Form](#) to EH&S prior to movement.

'CRADLE TO GRAVE' TRACKING:
RADIO-CHEMICAL USE IN RESEARCH AT COLUMBIABy *Samuel Dindayal, Health Physicist*

The use of radioactive materials (RAM) at Columbia University is subject to significant regulatory oversight. The types, quantities, and uses of RAM on campus are restricted by the conditions of the RAM licenses issued to the University. Radiation Safety tracks the approval, receipt, usage, and disposal of RAM to ensure requirements are met every step along the way, and refers to this as "Cradle to Grave" tracking, which includes:

Procurement: Researchers should make all purchases of radioactive materials using the ARC gateway, where the RSO approves the requisition. Further, researchers **MAY NOT** use Credit cards or P-cards to purchase radioactive materials. Step-by-step instructions on placing RAM requisitions in ARC can be found on the [EH&S website](#).

In instances where using the ARC system is not appropriate (such as material that is not purchased but is gifted or transferred from another institution), the researcher should forward the request to the RSO at rso-ehrs@columbia.edu. Even laboratories purchasing Uranyl compounds are subject to these restrictions, and a requisition should be created in ARC.

Usage: Once obtained, RAM must always be secured, and staff must document any waste disposal. Further, the use and waste of radioactive materials should be tracked in the Laboratory Information Online Network (LION). Remember that the usage documented in LION must match the disposal amount written on the RAM waste label.

Material Transfers: Radiation Safety must approve BOTH internal (between labs) and external (to other institutions) RAM transfers before transfer via the [RAM Transfer Form](#).

Waste Management: RAM waste containers must be labeled to include lab contact information, type(s) of waste, radioisotope(s), and estimated quantity. Don't forget to describe the contents, such as chemical constituents present in the waste on the label! Feel free to refer to the [RAM Waste Labeling Guide](#).

Finally, Radiation Safety program staff are available to assist with any radiation safety concerns or issues and can be reached by email at rso-ehrs@columbia.edu.





THE LOGISTICS AND TRACKING OF A HAZARDOUS WASTE CONTAINER

By Flavia Villegas Landivar, Research Safety Coordinator

Have you ever wondered how much hazardous chemical waste Columbia University generates or what happens after a waste container is picked up from a laboratory?

Every year, an average of approximately 145,000 lbs. of chemical hazardous waste is generated across Columbia University. That is equivalent to the weight of 23 Elephants!

The EH&S Hazmat team manages the collection, storage, shipment, and disposal of laboratory waste generated across all five campuses and two satellite locations of the University, a total of twenty-eight waste generator accounts. The team also coordinates the communication with and scheduling of services provided by the University's vendor for this service. Each step must follow regulations set by the United States Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (DEC). In addition, the EH&S Hazmat team arranges all of the logistics needed to safely, successfully, and efficiently dispose of chemical waste. This coordinated

effort starts the moment that a waste pick-up request is received. Over 2,700 Chemical/Hazardous waste pick-up requests are received each year from approximately 700 laboratories covering 1,687 rooms.

So what exactly happens after a Chemical/Hazardous waste pick-up request is received? For requests from the **Morningside**, **Manhattanville**, or **Irving Medical Center Campuses**, the Hazmat team adds the service request to a fixed pick-up schedule (see below) and coordinates with the onsite technician. Other university campuses have **quarterly** pick-ups and shipments. During these pick-ups, the onsite contractor collects the waste from the laboratory and ensures the container is labeled correctly. Subsequently, the waste container is over-packed, segregated if necessary, and stored inside a designated chemical waste storage room, known as a Central Accumulation Area (CAA), which meets all the requirements established by the EPA.

Once a week, a comprehensive chemical waste inventory is sent to the contractor, and a shipment is scheduled. EH&S ships waste one day each week from Morningside and the Irving Medical Center. The EPA tracks the movement of any hazardous waste generated from the moment a container leaves its point of generation until it arrives at a designated facility for treatment, storage, or disposal (TSDF). Every time a shipment occurs, the contractor must generate a Hazardous Waste Manifest confirming the type and amount of waste, specific handling and management method codes, and more, in compliance with the regulations. Each of these manifests must then be scanned, filed, mailed to the DEC, and stored for three years per regulation. Additionally, the manifests are used for accounting and assessments such as quarterly tax payments fee programs and an annual hazardous waste report that the Hazmat team files to the DEC. Once the container has arrived at a licensed and permitted TSDF, a return manifest is mailed back to EH&S Hazmat, confirming the container has been received and appropriately managed. Finally, the waste is disposed of by an approved method, such as incineration, landfill, or recycling.

Many moving parts and regulations govern the disposal of chemical hazardous waste, but the process remains ever-interesting! The careful management of the logistics behind each waste container helps EH&S to keep Columbia University **Safe and Compliant**.

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WASTE PICK-UP SCHEDULE

MEDICAL CENTER: MONDAYS & THURSDAYS
MORNINGSIDE: TUESDAYS & FRIDAYS
MANHATTANVILLE: WEDNESDAYS
LAMONT & NEVIS: QUARTERLY

WASTE PICK-UP REQUEST

PLEASE COMPLETE A [CHEMICAL WASTE PICKUP FORM](#) WHEN THE CONTAINER IS 90% FULL

MEET THE ENVIRONMENTAL HEALTH & SAFETY STAFF



ANGELA MENG, *M.S., C.H.P.*

Deputy Radiation Safety Officer, Associate Director

Angela Meng grew up in Beijing and witnessed how the city transformed from a leisurely capital to a hustle-bustle megalopolis. She felt like the pace of life doubled or tripled in a short decade with a colossal shift marked by significant technological and economic advances. Angela loves New York City, as it has one of the most diverse populations on Earth. She states, "Many world cultures are represented and celebrated here – their languages, history, arts, food, music, etc. It is fortunate to be embraced by these wonders of life and to be able to enjoy them without having to travel the distance. I have lived here for 12 years but still can't seem to get enough of the experience."

Her current position at EH&S is Deputy Radiation Safety Officer/Associate Director. She has been at Columbia University for 12 years, beginning with postgrad study in the Department of Applied Physics and Applied Mathematics at Morningside. During her undergraduate studies, she was an intern at a Magnetic Resonance Imaging (MRI) research facility in the beautiful city of Vancouver, where her research project was to derive quantitative data from a myriad of MRI images to diagnose cancer. She had the opportunity to present the research at the annual meeting of the International Society of Magnetic Resonance in Medicine in Honolulu and hit the beaches of Hawaii with a team of colleagues after the meeting!

As evidenced by the COVID-19 pandemic, public health policies and infrastructure play crucial roles in ensuring the general public's well-being. Angela admires the work done by the public health experts at Columbia, which shape policies locally and influence actions globally, based on solid science and good conscience. She looks for every opportunity to learn and enjoys reading reports, listening to podcasts from the Center on Global Energy Policy at Columbia, and watching the World Leaders Forum webinars on her subway rides.

Angela appreciates cats - no offense to dog lovers out there - because of their independence and curiosity. She strives to keep her mind in a calm and creative place at work and home. She is among those who have included "travel to every part of the world" on their to-do list for life to experience different cultures. Like many travelers, Angela looks forward to the days following the full reopening of international borders, when one can once more cross the great seas of this Earth with ease. The best professional advice she has ever received is, "There is never a dull

day at Columbia." At this ever-evolving academic institution, there are always new problems to solve, partners, to collaborate with, and programs to build to meet challenges and opportunities that are on the horizon.

GABRIELA CARDOSO, *MPH, A.S.P.*

Occupational Health and Safety Specialist II

Gabriela "Gaby" Cardoso grew up in New Rochelle, New York, which is also the former home of Thomas Paine, Father of the American Revolution. Though Gabriela loves New York, she would also enjoy living in the wine country region of



New South Wales, Australia, where she would have the opportunity to do more scuba diving, a favorite hobby when she is not working. To relax, she likes to enjoy a glass of wine while reading a book, listening to a podcast, or watching an episode of her favorite show. Like many of us, she has been drawn to "Only Murders in the Building," where her favorite quote is from Mabel Mora (Selena Gomez), "Women who knock rarely make history." Gaby's family compares her to a feline; her husband sees her as having the soul of an old house cat, while her mother sees her like a lion when it comes to protecting her kin. Gaby is motivated by her family and taking vacations. Her determination and similar background help her identify with Alexandria Ocasio-Cortez, her role model.

As a New Yorker, Gaby cheers for the Yankees and Giants and is a fan of the FC Barcelona soccer club. Gaby demonstrates her creative personality through her drawing and sketching. She would like to learn more about economics and investment and their impact on people everywhere. Her wish for changing the world is for people to be more patient with one another and understand each other's backgrounds.

Gaby has been with Columbia University for over three years, where she currently holds the role of a Health and Safety Specialist. Among her many other responsibilities as a member of EH&S's Occupational Safety team, Gaby is presently developing more awareness of the health effects of waste anesthetic gases within the research community. The best professional advice Gaby has ever received in her short career is to "establish open lines of communication and never be afraid of asking for what you want or need because the worse that can happen is being told 'No.'"

APPENDIX A: PLANNING YOUR SUBMISSION FOR IBC REVIEW

By: Samira Joussef Pina, Biosafety Officer

To ensure compliance with the National Institutes of Health Guidelines, which are federal requirements governing rDNA research, it is the responsibility of Principal Investigators (PIs) to submit an Appendix A to register their research with the Columbia Institutional Biosafety Committees (IBC). The IBC also reviews research with hazardous biological agents and other potentially infectious materials used in vitro for experimental animal work and Human Gene Transfer research (Appendix M).

Leonard Bernstein is quoted as saying that two things are needed to achieve great things; a plan and not quite enough time. The Columbia IBC prides itself on being able to provide expedient institutional review through just-in-time planning.

The IBC frequently convenes, no less than monthly. The countdown to the meeting starts two weeks before that with a deadline for Appendix submission. To assist investigators with planning their proposal, [EH&S publishes these dates on our website](#).

In the first of these two weeks, the Biosafety Office (BSO) works with the PI or submitter to ensure the Appendix has the appropriate and complete information to be presentable to the IBC for review. The Appendix includes a general description of the research that can be meaningful without reference to the associated IACUC (animal) or IRB (human use) protocol. Other important information includes laboratory locations, completed training requirements for personnel, and the appropriate biocontainment level for the work. The BSO can assist investigators in making this determination (email biosafety@columbia.edu). Note also that a critical responsibility of the PI is to report to the NIH any significant research-related accidents resulting in exposure to rDNA. PIs should acknowledge their personnel's responsibility in being evaluated by their respective campus healthcare provider in this event. The PI is also responsible for identifying the availability of vaccines to personnel working with infectious agents with vaccine-preventable illnesses, including the COVID-19 vaccination, when there is a risk of occupational exposure. In the second week, the IBC members review the appendices to prepare for discussion at the meeting.

Appendices submitted with significant unmet requirements such as expired personnel training or submitted without adequate time for review by the BSO and the IBC run the risk of being returned to the PI for additional information or reaching their expiration date. Protocols that expire are a problem for all concerned. For example, any associated animal research must be paused, and the animals must be placed on an ICM holding protocol. A good IBC submission is like a road map; it shows the final destination and usually the best way to get there.

Investigators can expect to see protocols that have been approved by the IBC receive approval in RASCAL the following business day, paving the way for vital research to progress.



(Photo Credit: Piotr A Redlinski)

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& Manhattanville CAMPUSES**

**Call 854-5555 for Columbia University
Emergency Medical Services (CUEMS)**

For 24/7, fast, free NYS-Certified Volunteer Emergency Care



The Columbia University EMS Team
(Photo Credit: CUEMS)

Editorial Staff: Kathleen Crowley, Chris Pitoscia, Pam Shively, Robert Giordano

Please share questions or comments with us at newsfeedback@columbia.edu