YOUR HEALTH & THE ENVIRONMENT

NEWS FROM THE UNIVERSITY OF ROCHESTER ENVIRONMENTAL HEALTH SCIENCES CENTER



IHHE and EHSC Host Air Pollution and Health Research Symposium

On November 21st, 2024, the Environmental Health Sciences Center (EHSC) and the University of Rochester Institute for Human Health and the Environment (IHHE) co-hosted an Air Pollution and Health Research Symposium. The event brought together 90 faculty, staff, trainees, and community partners to discuss research on air pollution and health. The event provided attendees the opportunity to learn about current research in the field through

posters and research presentations and to interact with community groups interested in air pollution and health. Over lunch, the New York State Department of Environmental Conservation (NYS DEC) presented the results of the 2022-23 Community Air Monitoring Initiative and future opportunities for research, engagement, and problem-solving based on this initiative.

The symposium featured two keynote speakers:



Air Pollution and Health Research Symposium (continued)

Matthew Campen, PhD, MSPH (University of New Mexico), delivered a talk titled "When Smoke Causes Fire: Delineating the Dynamic Neuroinflammatory Response to Wildfire Smoke" and Marianthi-Anna Kioumourtzoglou, ScD (Columbia University), gave a talk titled "Air Pollution and Neurodegeneration: Evidence from Epidemiologic Studies of Administrative Datasets." The event also included presentations by several EHSC members, including **Alison Elder**, PhD, **Deborah Cory-Slechta**, PhD, **Matt McGraw**, MD, **Marissa Sobolewski Terry**, PhD, **Phil Hopke**, PhD, **Dan Croft**, MD, MPH, **Dave Rich**, PhD, and **Elaine Hill**, PhD. William Hadley, an undergraduate student at the University of Rochester, received the inaugural Utell-Frampton-Oberdorster prize for the best poster for his research conducted in EHSC member Dr. **Matt McGraw's** lab.



Understanding Air Pollution in Rochester

The NYS DEC Community Air Monitoring Initiative collected air quality data from ten communities with high air pollution burdens across the state, including Rochester. The project involved a partnership with the mobile air monitoring company Aclima to collect street-by-street data in the target areas. The data collected will help identify sources and develop strategies to reduce air pollution in these communities.

Story Maps of the data were released for each community. Check out Rochester's Story Map.

Efforts to share the results with communities are ongoing; the IHHE is partnering with the NYS DEC to co-convene community meetings in Rochester to discuss the results and address questions and concerns from local residents about air quality.

At a recent Community Advisory Board meeting, Center member **Dave Rich**, PhD, presented on "Gestational Air Pollution Exposure and Associations with Placental, Fetal, and Maternal Outcomes." He asked for feedback on additional factors that may be important to consider in his analysis.



Identifying Community Environmental Health Priorities

This past year, the engagement team worked with the Community Advisory Board to identify community environmental health priorities in the City of Rochester and the Finger Lakes Region. They surveyed Community Advisory Board members to create a list of the environmental health issues most important to the City of Rochester and the Finger Lakes Region. Using survey responses and with additional iterative feedback from advisory board members, the team refined the list of priorities to nine for the City of Rochester and eight for the Finger Lakes region. Finally, they asked the Community Advisory Board to rank those priorities for the present day (2024) as well as for 10 years in the future (in 2034). The team also asked EHSC members to rank the same priorities.

They found that housing quality and environmental exposures, difficulty accessing resources due to the built environment, and inequities in exposures and resource access were the top current community environmental health priorities for the City of Rochester (see the full list of priorities in the graphic below). Community Advisory Board members and EHSC members agreed about the top priorities. Both groups also agreed that air quality and heat are expected to become higher priority concerns in the next 10 years.



Community Environmental Health Priorities -City of Rochester

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Community Environmental Health Priorities (continued)

This process also identified three cross-cutting issues and overarching themes: climate change, social determinants of health (such as safe neighborhoods, access to healthcare, education, violence, poverty), and environmental justice. Participants noted that these issues impacted many environmental health priorities and should be considered as strategies are developed to study and address these issues.

Many of the environmental health priorities for the City of Rochester were also identified as important for the Finger Lakes Region, including housing, the built environment, and air quality, but some were different. For example, pollution from agriculture and landfills and occupation health of agricultural workers were noted as key environmental health issues in rural areas of the Finger Lakes Region. The engagement team plans to expand regional partnerships over the next several years to more fully assess the community environmental health priorities in the Finger Lakes Region.

Read more and download the report.

"A Green Heart for Healthy Communities" Seminar

The EnLIGHT Seminar Series hosted University of Louisville Assistant Professor Dr. Natasha DeJarnett on March 27, 2025. Over 75 people attended her talk, "A Green Heart for Healthy Communities." Dr. DeJarnett also met with faculty, trainees, and community partners including the City of Rochester forestry department staff to discuss the city's recently updated Urban Forestry Master Plan. This event was co-sponsored by the EHSC, IHHE, and Center for Community Health & Prevention.

Dr. DeJarnett met with City of Rochester forestry department staff, council member, and Tree Ambassadors.



2024 Capacity Building Project – Understanding Environmental Health in Greater Rochester

The 2024 EHSC Capacity Building Project was awarded to Rochester Ecology Partners. Rochester Ecology Partners provides opportunities to the Greater Rochester community to learn about nature and connect with their community through programs that lead to improved individual, community, and environmental health. Their goal with the Capacity Building Project was to expand their understanding of environmental health issues facing communities in and around Rochester. The project, engaging with a broad network of community partners and local residents, complemented the Community Advisory Board's environmental health priority identification process described above.

Rochester Ecology Partners staff held meetings and conducted surveys with their network of community members and partners to gather information about environmental health concerns and priorities in Monroe County. They found that the community's top priorities are pollution, housing quality and environmental exposures, and drinking water quality. Respondents emphasized the effects of environmental degradation on physical and mental well-being. The engagement team and Rochester Ecology Partners worked closely together on these complementary efforts to assess the community's environmental health priorities.

The Capacity Building Project helped expand Rochester Ecology Partners' <u>Greater Rochester</u> <u>Environmental Community Hub</u>, an initiative that seeks to understand and connect the work of organizations dedicated to community and environmental well-being. The Hub includes a directory of organizations, a blog, news and events, and relevant resources.

The project enhanced Rochester Ecology Partners' capacity to facilitate network-building, model collaborative leadership, and become a trusted source of education and information.

Future plans include additional work to understand specific community concerns about the identified priorities of pollution, housing, and drinking water, continued development of the Environmental Community Hub, and fostering partnerships and incorporating environmental health into future programming. Rochester Ecology Partners has already applied for grants to support this new direction and plans additional work in this area in the future.



Chris Widmaier (Rochester Ecology Partners) presenting at a Community Advisory Board meeting

Learn more about the project.

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Welcome New Center Members

Olga Astapova, MD, PhD

Olga Astapova, MD, PhD, is an assistant professor in the Department of Medicine, Division of Endocrinology. She received her MD and PhD from Wayne State University in Detroit, before training in Internal Medicine and Endocrinology at the University of Rochester Medical Center. Dr. Astapova is now a physician-scientist who specializes in sex hormone disorders, including polycystic ovary syndrome (PCOS) and hypogonadism. She runs a basic research lab using a mouse model of PCOS to study how androgens, a type of sex hormone, act in the ovary. This can be affected by environmental exposures to endocrine-disrupting compounds that mimic hormones and may either stimulate or inhibit their

activity. One current area of her research is how systemic



Olga Astapova, MD, PhD

insulin resistance, common in PCOS, affects ovarian function, and how diet may play a role through metabolic products called glycotoxins. Dr. Astapova is excited about joining the EHSC because of the potential for networking and collaboration. She is committed to education and mentoring of fellows, residents, medical students and graduate students.



Jessica Stern, MD, MS

Jessica Stern, MD, MS

Jessica Stern, MD, is an associate professor in the Divisions of Pediatric Allergy and Immunology and of Allergy, Immunology, and Rheumatology in the Departments of Medicine and Pediatrics. She graduated from Bowdoin College and received her medical degree from the University of Rochester School of Medicine and Dentistry, where she stayed to complete her combined Internal Medicine and Pediatrics residency training, Allergy and Immunology Fellowship, and a master's degree in clinical investigation. Her research interests include the intersection of public health and allergic disease, specifically the use of implementation science to improve equity in allergic disease. Her career goals are to reduce health care disparities in asthma and allergic disease by integrating systems that address comorbid allergic conditions, environmental triggers, and social determinants of health.

New "One Health" Activities for Community Settings

Center members **Becca Lauzon**, PhD, and **Dina Markowitz**, PhD, have developed a suite of nine new activities for community settings focused on the concept of "One Health." One Health is an approach that recognizes the close link between human, animal, and environment health.

<u>Available on the Life Sciences Learning Center website</u>, the new activities are designed to be engaging for a variety of types of learners, highly adaptable for different educational settings, and easy for facilitators to implement.

The suite of nine activities includes two "Activity Tools" that are designed to be used with any environmental or health themed activity and apply a One Health lens to deepen participant understanding. The other seven activities, which focus on pollinators and mosquitoes, cover topics ranging from vector-borne disease and pesticide safety to food security. All activities include connections to human, animal, and environment health.

Using a One Health framework for the activities supports participants to build personal relevance to the topic, increase awareness of the impacts of their actions, and empowers them to work towards protecting and improving the health of all living beings.

These One Health community-based activities were developed with support from an NIH Science Education Partnership Award (R25GM132758). They represent the second phase of a multi-year "One Health Education" project with the goal of increasing understanding of the concept of One Health. The first phase of the project supported working with teachers to develop seven hands-on activities for high school students. The nine new One Health activities will be disseminated online to communitybased and informal educators throughout the US and will also be used in local and regional workshops.



Activity participants balance a cup of beans on a plate using three strings, representing the balance between human, animal, and environment health.

What Can Frogs Teach Us About Human Health?

Center member **Jacques Robert**, PhD, is the director of the Xenopus Research Resource for Immunobiology, the world's most comprehensive facility specializing in the use of Xenopus *laevis* for immunological research. Dr. Robert's team studies the development of the immune system and immune responses to viruses and bacteria, using the amphibian Xenopus as an

animal model relevant to human health. His lab is also interested in long-term effects of water pollutants such as microplastics on the development of the immune system and antiviral immunity across the lifespan.

The Robert lab's work on microplastics is supported in part by the <u>Lake Ontario MicroPlastics (LOMP)</u> Center, which is jointly funded by NIEHS and NSF as part of the Centers for Oceans and Human Health program. Read more about LOMP in the Summer 2024 newsletter article, "<u>Rochester Home to New Microplastics</u> <u>Research Hub</u>".



Jacques Robert, PhD

Microplastics and the Immune System

Studies have found microplastics, small pieces of plastic less than 5 mm in diameter, throughout the environment as well as in animals and in peoples' bodies. In a recent study, the Robert lab asked the question "How do microplastics accumulate in *Xenopus laevis* tadpoles and affect their developing immune system?"

Some microplastics come from the breakdown of larger plastics. Others are created, like plastic pellets called nurdles. The kind of plastic used in this study, polyethylene terephthalate (PET), is often found in plastic packaging and bottles. PET is a common component of environmental plastic pollution.

Studies have found that microplastics have negative health effects on animal species. One area of research is the effect of microplastics accumulation on the body's ability to fight infection. Because the immune system of *Xenopus laevis* tadpoles shares many similarities with that of humans, this research may shed light on whether and how microplastics affect human health.

The study compared two groups of tadpoles. One group (experiment) was placed in a water bath containing small amounts of PET microplastics. Another group (control) was placed in clean water. After one month, both groups of tadpoles were transferred into clean water free of microplastics. They were then exposed to ranavirus Frog Virus 3, a well-known amphibian

Microplastics and the Immune System (continued)

pathogen. Six days later, tadpole organs were assessed for microplastic accumulation and viral loads.

Tadpoles exposed to microplastics were more susceptible to viral infection than those raised in microplastic-free water. The researchers found that the tadpoles ingested microplastics, which then traveled through the intestinal lining into the liver and kidneys. Infected organs where microplastics accumulated showed only moderate inflammation and uninfected organs showed no inflammation. This suggests that the reduced resistance to the virus came from disruption of the immune cells, not from inflammation. More research is needed to understand how exposure to PET microplastics disrupted immune cells and weakened the tadpoles' immune response.

Ingestion of large amounts of plastic particles is known to cause inflammation and tissue damage. This study reveals the potential of exposure even to lower amounts of microplastics to directly impair the immune system. Microplastics particles also contain many chemical additives. Future experiments will determine the respective impact of these chemicals and of microplastic particles on immune function. Because Xenopus laevis and mammalian immune systems are similar, these findings strongly suggest that exposure to microplastics could also affect the human immune system and impact the body's ability to fight infectious diseases.



Xenopus laevis tadpole

Learn more about how and why scientists use Xenopus laevis frogs to learn about immune system development and how studying microplastics pollution and immune system development can help us protect the health of both humans and frogs in a new infographic, created by the LOMP community engagement team.

Listen to Dr. Robert talk about his work studying the impact of environmental stressors (including pollution and pathogens) on amphibian health and amphibian immune systems, including what frogs can teach us about human health, on WXXI's **Environmental Connections.**



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Radon Outreach at the University of Rochester

Over the past year, the IHHE engagement team, Katrina Korfmacher, PhD (Professor of Environmental Medicine) and Madeline Holodnik, MPH (Engagement Coordinator), and the Wilmot Cancer Institute's Community Outreach and Education team, Charles Kamen, PhD, MPH (Associate Professor, Departments of Surgery and Psychiatry), Sarah Merritt (Regional Outreach Manager, Senior Public Health Project Specialist), and Emily Hayes (Program Manager, Community Outreach and Engagement), collaborated with Center member Lee Murray, PhD (Associate Professor of Earth and Environmental Sciences), on a pilot project aimed at refining the radon risk map for New York State. This initiative also focuses on increasing awareness about radon exposure in Western New York and the Southern Tier. Modeled after a similar study conducted at the University of Kentucky, the project seeks to improve the awareness of radon risk data in the region.

To create a more detailed radon risk map, the project gathered home test data from radon testing



Learn more and view the infographic

companies. As part of the project's outreach efforts, they engaged with the community by setting up informational tables at various events, raising awareness about the risks of radon exposure. Additionally, they created an infographic to help people understand the simplicity of radon testing, as many were unaware of how easy it is to test their homes. This infographic



Top left to right: Katrina Korfmacher, Madeline Holodnik, and Lee Murray. Bottom left to right: Charles Kamen, Sarah Merritt

provides a step-by-step guide for individuals interested in testing for radon in their own homes.

The EHSC, IHHE and Wilmot Cancer Institute also co-hosted Dr. Stacy Stanifer (University of Kentucky). Her talk, "Making Space for Radon in Lung Cancer Prevention Efforts," highlighted her research at the University of Kentucky and explored how radon exposure factors into lung cancer prevention strategies.

Center Member News and Honors

Fish, Mercury, and the Developing Brain

For over three decades, the Seychelles Child Development Study has been a vital component in understanding the effects of mercury exposure from fish consumption on child development. Mercury is known to be neurotoxic at high levels. In Seychelles, where fish is eaten daily, the longitudinal study has found no evidence linking typical mercury exposure through fish to neurodevelopmental harm. Instead, researchers suggest that omega-3 fatty acids and other nutrients in fish may counteract potential negative effects. The research, currently led by Center member **Edwin van Wijngaarden**, PhD, highlights the complexity of mercury's impact on the developing brain and questions the global public health recommendations for pregnant women.

Over the years, the research has been supported with funding from NIH, the Republic of Seychelles, and the European Union. The University of Rochester Environmental Health Sciences Center, now in its 50th year of continuous NIH funding, originally emerged from Clarkson's research in Iraq and has supported the study since. <u>Read the full article</u>, originally published in NeURoscience Volume 24, to learn more. Center members **Gary Myers**, MD, **Sally Thurston**, PhD, **Matt Rand**, PhD, and **Gene Watson**, DDS, PhD, are also part of the research team.



Gene Watson, DDS, PhD (left), looks through hair samples from participants in the Seychelles Child Development Study with Gary Myers, MD (center), and Edwin van Wijngaarden, PhD.

Olga Astapova, MD, PhD, assistant professor of Endocrinology, Diabetes and Metabolism won the inaugural Molecular Human Reproduction (MHR) <u>Early</u> <u>Career Innovator Award</u> for "research that exemplifies the innovation, dedication, and rigor that propel the field of reproductive sciences forward." The honor recognizes young researchers who publish original research articles as part of the Early Career Innovator Series.





Elaine Hill, PhD, has been appointed to the Dean's Professorship in Public Health Sciences. She holds joint appointments in the Departments of Economics and Obstetrics and Gynecology.

Center Member News and Honors (continued)

Ehsan Hoque, PhD, professor of Computer Science, received the <u>Presidential Early Career Award for Scientists and Engineers</u>.





John Onukwufor, PhD, was featured in a <u>Q&A</u> on the University of Rochester Medical Center LinkedIn page. He shares about his journey as a scientist and his work exploring the role of metals in neurodegeneration and how organisms adapt to stress.

Jeff Wyatt, DVM, MPH, University veterinarian and professor of Comparative Medicine and of Environmental Medicine, was featured on an episode of The Next Step podcast. Wyatt, the first veterinarian to complete the University of Rochester School of Medicine and Dentistry's Master's of Public Health in 1995, recounts how this unique path allowed him to weave human, animal, and environmental health into a cohesive practice. Hear firsthand how his global research endeavors brought crucial perspectives to Rochester's public health efforts and what career advice he has for those seeking to carve out their own unique path in medicine.



Faculty and Students Honored at the Office for Graduate Education and Postdoctoral Affairs Awards Ceremony



Tom O'Connor, PhD, won the Graduate Student Society Mentoring Award



Steve Georas, MD (left), and **Michael O'Reilly**, PhD (right), won the Outstanding T32 Program Director Award



Toxicology T32 Trainee **Rachel Lombardo** won the Robert L. and Mary L. Sproull University Fellowship



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For Questions or Comments, Please Contact:

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