SUMMER 2020

YOUR HEALTH & THE ENVIRONMENT

NEWS FROM THE UNIVERSITY OF ROCHESTER ENVIRONMENTAL HEALTH SCIENCES CENTER

IN THIS ISSUE

NOTE FROM THE DIRECTOR

B. Paige Lawrence, PhD

The last several months have been challenging for everyone navigating the impacts of the COVID-19 pandemic on their personal and professional lives. The University of Rochester shut down non-essential labs in March and began ramping them up again with social distancing and other protections in place in early June. Our researchers, students, and staff have demonstrated exceptional creativity, resilience, and flexibility in responding to these unprecedented circumstances.

Meanwhile, the pandemic has generated urgent new research questions, including many related to our Center's research expertise. In this newsletter, we highlight several of our researchers' ongoing work that relates to the interactions between infectious and environmental disease and to the indirect effects of the pandemic, including reduced air pollution on environmental health. As well, several of our Toxicology graduate students have shared reflections on how they have navigated this period and the challenges it has posed.

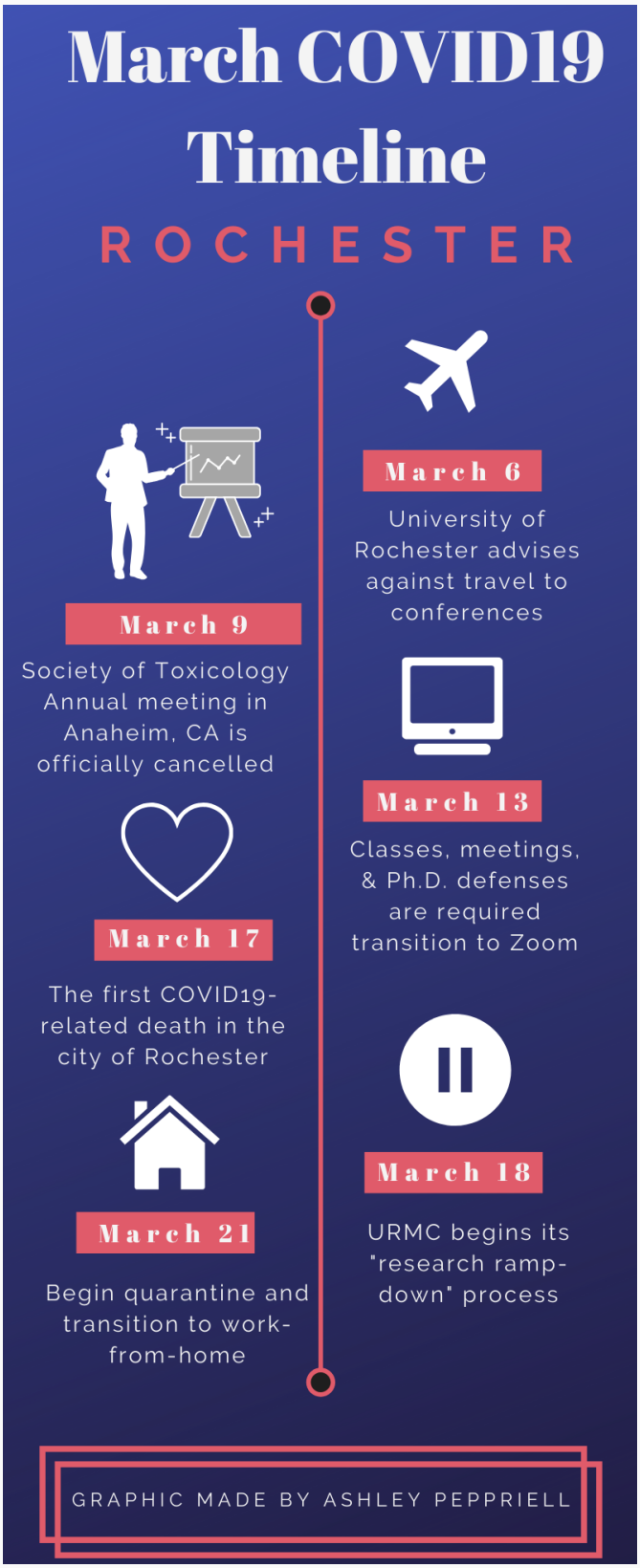
Just as labs were ramping up again, our nation and community were rocked as the death of George Floyd rekindled awareness of the impacts of racism in our society. I have appointed a diversity and inclusion work group to propose steps our departmental community can take address these issues in all aspects of our work. We welcome input from our alumni and larger community.

ADAPTING IN A PANDEMIC: STORIES FROM TOXICOLOGY GRADUATE STUDENTS

Ashley Peppriell
Year 4- PhD Candidate
Lab: Matt Rand, PhD

In March, we saw increasingly aggressive measures to limit the spread of SARS-CoV-2, or "COVID-19" and started working from home. I felt more efficient at home than at my desk at the UR Medical Center. Following the ramp-down, I responded to the COVID-19-related changes in several ways. I helped transition two courses to online platforms, navigated the postponement of our Toxicology Program retreat (which I co-chair), and wrote my first paper. Because I finished my work faster at home, I found more free time in the day. The newfound time was filled with more activities that ease my mind and bring me joy. After finishing work for the day, I baked bread, ran, painted rocks, or worked on posts for my personal blog, PhDistance. I found these activities immensely therapeutic.

Nevertheless, my experience wasn't without challenges. In the background, I found that my feelings of stress, contentment, and fear oscillated over the course the two months. I became frustrated with the reality that some personal goals were now unattainable or delayed. Academic conferences were cancelled or moved to online platforms, committee meetings and talks were rescheduled, and experiments were postponed or eliminated. Despite all that, I found refuge in the fact that this was done to protect public health, which is of utmost importance.



Ashley Fields
Year 5- PhD Candidate
Lab: Martha Susiarjo, PhD

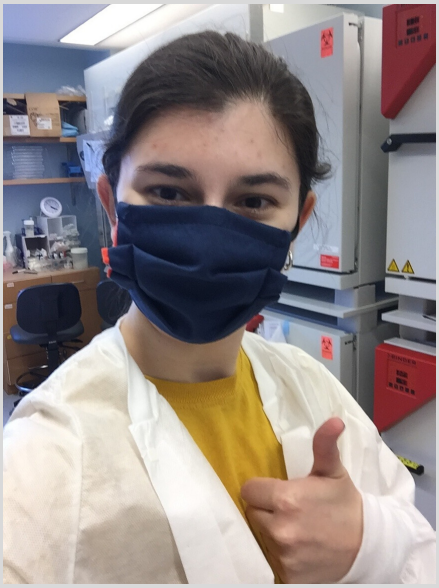
As a rising 5th year graduate student in the Toxicology Graduate Program, I have put countless hours into my research. Starting out in the lab of Martha Susiarjo, PhD, I created a novel vitamin B6 mouse model to investigate the underlying mechanisms of gestational diabetes mellitus, which is a form of diabetes that occurs during pregnancy.

Although these past couple of months have been stressful with the ramp down of scientific experiments and the stay-at-home order due to COVID-19, I have still remained productive. I submitted my first first-author manuscript for publication and I am currently writing the introductory chapters of my thesis. Even though I am not being 100% productive in the lab, I am using the time to get a head start on my dissertation and to generate a well thought-out research strategy for when I return back to the lab. I cannot wait to get back to the lab and finish up the last part of my thesis work!

In addition to my thesis research, I have been conducting informal career interviews with a handful of our Toxicology PhD alumni about different career paths in industry. I have had the chance to speak with Stephen Dertinger (PhD 2000), Daniel Nazarenko (PhD 2001, DABT), Amy Lavin Williams (PhD 1998, DABT), Jennifer Ingram-Ross (PhD 1999), and Melissa Badding (PhD 2012, DABT). I appreciate how the Toxicology PhD alumni are so kind and willing to talk about their experiences after graduation and their current careers. After having these insightful conversations, I definitely know that I would like to enter a career in industry as a toxicology consultant.

Emily Quarato
Year 2- PhD Student
Lab: Laura Calvi, MD

My work within the Calvi lab focuses on mesenchymal stem cells (MSCs), a component of the bone marrow microenvironment that regulates hematopoietic stem cell function and supports bone maintenance following radiation injury. In particular, I have been working on characterizing the phagocytic capacity within MSCs and determining if this activity is altered upon radiation exposure.



Since the beginning of the pandemic the lab scene has changed, but that does not mean that I have stopped working on answering questions that I posed for my research. For the first few weeks of the ramp down I found myself solely at home. During this time, I decided to work on building up my knowledge of the current literature and work on my writing skills, from learning how to conduct a formal peer review, to beginning to draft a manuscript, and finally working on my proposal document. Upon the news that lab activity would slowly ramp up again, our lab set up a new system to minimize potential exposure to COVID-19 while maximizing activity. Since this new system limited time in the lab I have had to rearrange some of my plans to work on projects that required less time and equipment.

Although COVID-19 was unexpected it allowed me to better analyze the data I currently have and begin to create my story for publication. Thus, moving forward, I plan to streamline my work in and out of the lab towards collecting the data necessary to complete my story.

Sarah Morgan
Year 1- PhD Student
Lab: Lisa DeLouise, PhD

As a first-year graduate student in the Toxicology training program, I recently finished my laboratory rotations and joined the DeLouise lab. Research in the DeLouise lab focuses on developing biomedical devices for drug discovery using bio nanomaterials and investigating the impacts of environmental exposure to micro- and nanomaterials. My project investigates the health impacts of microplastics and the chemicals adsorbed to their surfaces.

Since I started my project right before the ramp down due to COVID-19, my research has been slow going so far. I have used the time working from home to develop a deep understanding of the current literature and assess what knowledge gaps the field has. This has been extremely useful for composing my Toxicology seminar presentation and first experiments. Although the ramp down was frustrating because of the delay it caused, the timing of when it happened early in my graduate career minimized the impact on my projects.

Adjusting to working from home took some time. When my classes switched to being online, I had to modify how I was learning and studying. Due to this and the increased time it took to listen to an online lecture, I had to rethink how I was using my time in order to get a similar amount of work done. I have become more organized and have changed the way I accomplish some tasks. Hopefully, these changes will allow me to be more efficient as I transition back into lab.

Ian Krout
Year 3- PhD Student
Lab: Matt Rand, PhD

With the recent shut down of research activities at URMC, I looked for ways to keep myself engaged and involved with my community. I received an email from CEC director Katrina Korfmacher, PhD which highlighted local volunteer opportunities and I was able to sign up as a medical reserve volunteer working with the Monroe County Department of Public Health. I started off volunteering for the help line and I was trained to answer any questions from members of the community. As the COVID-19 situation progressed, I began to be involved with contact tracing. I learned the best way to contact and discuss exposure risk with those in our community as well as how to make sure they had the resources to get essential needs and keep themselves and their families healthy. It felt great to be able to work in preventing the spread of COVID-19 in my own community.

Aside from the work with the county medical reserves, I also volunteered with Lifespan of Rochester. With Lifespan, I was assigned to keep in touch with an older individual in the Rochester community who was living alone during the quarantine. We were tasked with making sure our "buddy" had everything they needed such as food, clothes, etc. We also had the important job of just having conversations and building a relationship to keep our buddy in good spirits and provide some company. It was very rewarding to be able to participate in both opportunities and I hope to keep volunteering even as I make my way back into research once again!

Healthy Environment and Endocrine Disruptor Strategies (HEEDS) Webinar Series

Alyssa Merrill
Year 2- PhD Student
Lab: Debbie Cory-Slechta, PhD
and Marissa Sobolewski, PhD

I am a second year student researching the long-term maternal health effects of a pregnancy exposure to a complex mixture of endocrine disrupting chemicals (EDCs). I learned about the Healthy Environment and Endocrine Disruptor Strategies (HEEDS) through a colleague who is actively involved in the organization. HEEDS, a coalition of scientists dedicated to improving communication, coordination, and collaboration in the EDC field, is a wonderful resource for individuals in the EDC field or those who want to learn more about the field to connect with scientists outside the University of Rochester.

HEEDS has recently begun a new webinar series the Young EDC Scientists Series (YESS) sponsored by the HEEDS Mentoring Working Group and the Collaborative on Health and the Environment (CHE). The focus of these webinars is to feature early-career EDC scientists (graduate students and post-docs, as well as other early-career researchers who study EDCs), discussing their research projects and findings. YESS recently hosted a webinar titled “Exposure to Phthalates and Aging,” highlighting the work of two graduate students exploring different implications of phthalate exposures on aging.

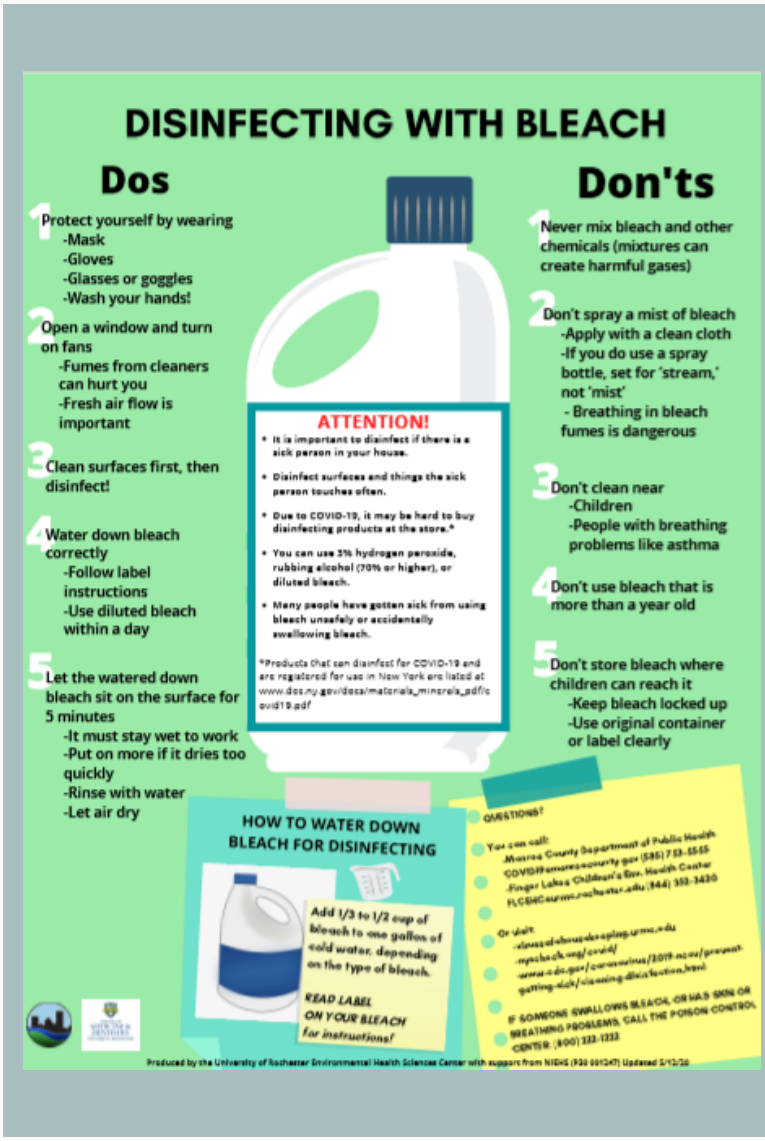
If you are interested in viewing this webinar it is available on the Collaborative on Health and the Environment’s YouTube channel. To find out about future seminars and other emerging EDC news, sign up for the HEEDS newsletter at heeds.org. For those interested in partaking in the YESS webinar series or who would like to recommend a speaker contact info@heeds.org.

THE NEW LOOK OF COMMUNITY ENGAGEMENT

COVID-19 has posed numerous challenges to community engagement programs. However, using technology and working with community partners, the Community Engagement Core has provided resources to help community members make informed decisions and continue important environmental health programs.

During the COVID-19 pandemic the EHSC CEC has focused their efforts on projects including:

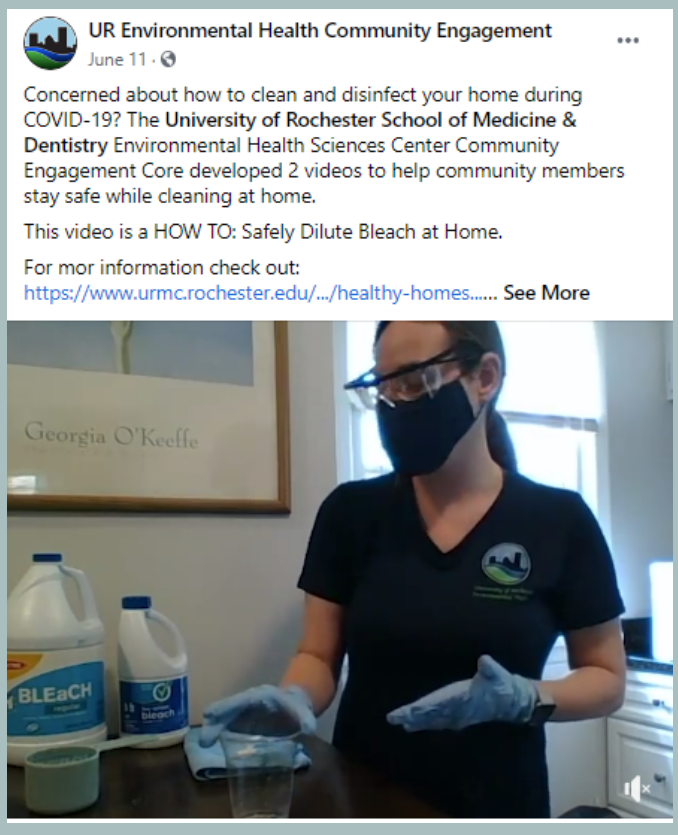
Virus Safe Housekeeping Website
The CEC adapted its longstanding Healthy Homes work to address new needs associated with the COVID-19 pandemic. The CEC team created a new website, "virussafehousekeeping.urmc.edu" as a way to provide resources from government and academic partners. This website provides information on topics including Healthy Housekeeping: Cleaning & COVID-19, Home Visits & COVID-19, Masks & COVID-19, Vaping & COVID-19, General Local Resources Related to COVID-19, and General Resources from National Government and Academic Partners.



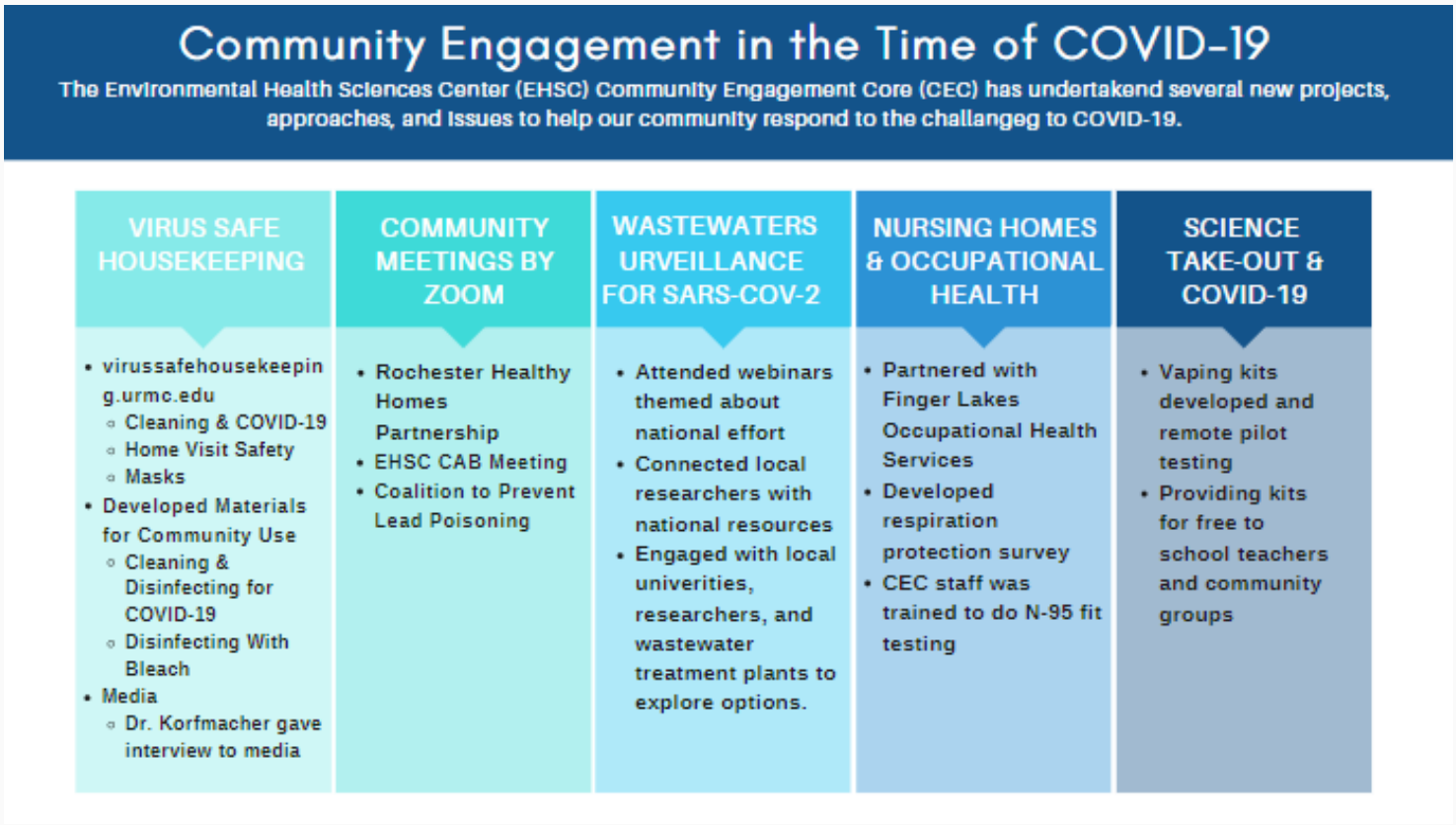
Along with providing resources from other organizations, the CEC has also developed Healthy Homes and COVID-19 resources with the help of community partners. The CEC developed two documents to provide information on using cleaning chemicals safely and appropriately: a 2-page document on cleaning and disinfecting (meant to be printed out in black and white by community groups with limited resources) and a low-literacy infographic that focuses on how to safely disinfect with bleach. These materials have been disseminated locally and nationally and have been adopted by local organizations such as the City of Rochester, Monroe County Department of Public Health, and Foodlink.

THE NEW LOOK OF COMMUNITY ENGAGEMENT

On Wednesday, June 9th, the Director of the Community Engagement Core, Katrina Korfmacher, PhD, spoke with local media about the importance of cleaning and disinfecting along with how to properly use chemicals, such as bleach, at home.



CEC Program Manager, Cait Fallone, MA, developed informational videos on how to safely and properly mix bleach at home to use as a disinfectant. These videos were shared with local media sources, local and national partners, and on the Virus Safe Housekeeping Website.



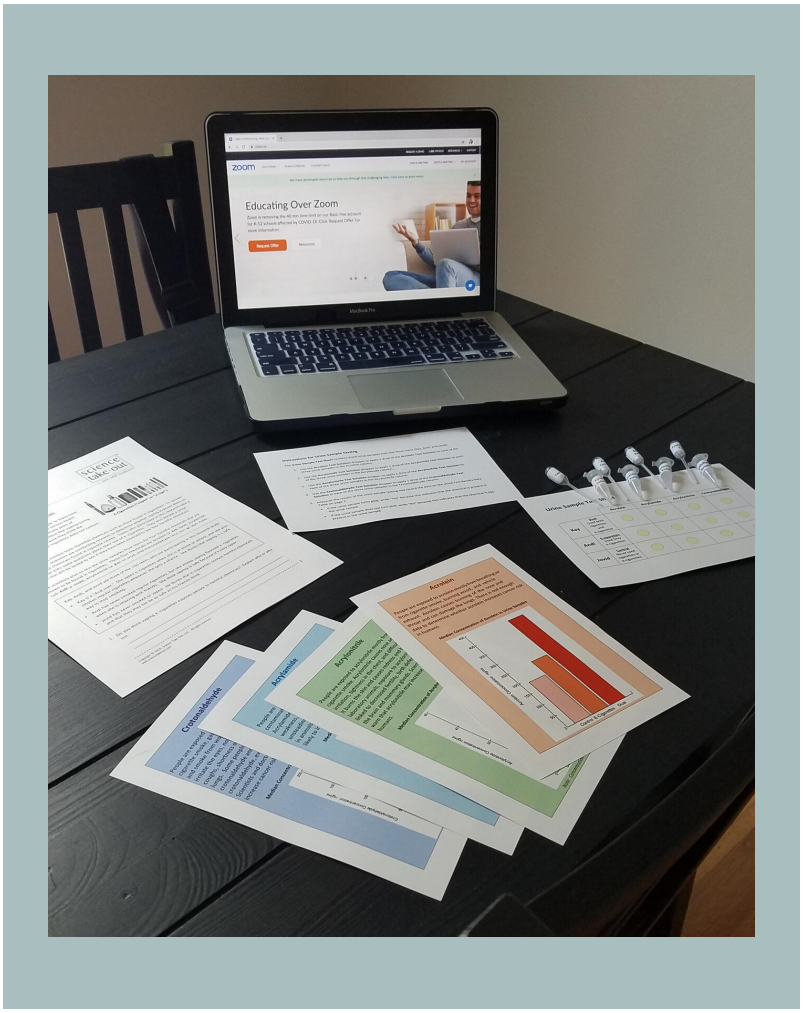
Continuing Convening Meetings (RHHP & CAB)
Many local organizations have been impacted by COVID-19, making it difficult to engage with community members to provide support for their needs. For organizations that require in-person interventions such as home visitors, clients still need resources and providers need up-to-date information and support. The CEC adapted to these changes by transitioning monthly Rochester Healthy Homes Partnership (RHHP) meetings to a virtual format. Partners gathered via Zoom to discuss current and evolving COVID-19 information relevant to housing and also shared general advice on how to continue supporting community members during this time.

The Bi-Annual EHSC Community Advisory Board meeting was also transitioned to Zoom format. Jim McGrath, PhD, Professor in Biomedical Engineering, presented on his work developing silicon filters to identify microplastic in drinking water and solicited CAB members' feedback on how to share his findings about local drinking water with the larger community. **(See article on page 18)**

Nursing Homes & Respiratory Protection
The CEC partnered with the Finger Lakes Occupational Health Services to assist in COVID-19 related occupational health initiatives including developing and overseeing a survey of over 60 local nursing homes about their respiratory protection programs and needs. The CEC also connected local and state health departments to coordinate needs around training and personal protective equipment.

SCIENCE TAKE-OUT AND COVID-19

With the abrupt closure of schools in March, teachers had to rapidly transform their curricula into online formats. Many science teachers still wanted to provide their students with opportunities for hands-on learning. The CEC has been working with our partners at Science Take-Out to help science teachers and their students during the COVID-19 pandemic.



- Science Take-Out posted free files of kit documents and photos of kit experiment results to their website for teachers to use for online instruction for numerous topics. Teachers can download the kit files and photos to their school's online learning portal. Their students can then do the online version of the activity, without needing any lab materials. You can view the free Science Take-Out kit files at: https://www.sciencetakeout.com/news-blog/

- Teachers are using Science Take-Out kits to provide their students with hands-on science learning at home. The kits are individually packaged with all materials included, making them perfect for home use since they do not require any lab equipment, glassware, microscopes, etc. Science Take-Out has shipped kits to schools throughout the US to distribute to their students, and they have also shipped kits directly to students' homes to use in remote education.

- Prior to the COVID-19 pandemic, the CEC had been collaborating with Science Take-Out to develop vaping education kits. Our initial plan to pilot test the kits in middle and high school classrooms has been put on hold until schools reopen. Even though schools are closed, teen vaping is still very much a problem, and educators are eager to use the vaping kits for online and home-based learning. We are currently working with community-based organizations to lead online (Zoom) sessions with groups of teens for remote pilot testing of these kits.

- Science Take-Out developed an "Influenza Pandemic" kit that was being pilot tested in schools prior to COVID-19. We are exploring the possibility of using the kit to teach concepts relevant to COVID-19. Science Take-Out also recently applied for a grant to create new COVID-19 education kits for use in schools and community-based education programs.

ENVIRONMENTAL EXPOSURES AND INFECTIOUS AGENTS: FROM MEASLES TO COVID-19

Todd Jusko, PhD

B. Paige Lawrence, PhD

Sally Thurston, PhD

One of the Environmental Health Sciences Center's (EHSC) key research areas is the effects of environmental exposures on the immune system. As the media, public health officials, and general public try to understand why some people and populations have been more affected than others by COVID-19, environmental exposures are one factor being explored. Past research has demonstrated multiple environment-immune system interactions. A recent example of this research theme is reported in a recent publication, "Blood Lead Concentrations and Antibody Levels to Measles, Mumps and Rubella among U.S. Children," whose authors include EHSC members Todd Jusko, PhD, B. Paige Lawrence, PhD, and Sally Thurston, PhD. This paper reports on a study that explored the impacts of low levels of lead on children's immune systems.

Based on an analysis of 1999–2004 National Health and Nutrition Examination Survey (NHANES) data, children who had received the measles, mumps and rubella vaccine and had blood lead level (BLL) concentrations between 1 and 5 µg/dL, "had an 11% lower anti-measles and a 6% lower anti-mumps antibody level compared to children with blood lead concentrations <1 µg/dL." Although it is well known that lead contributes to immunosuppression at higher levels, a 2012 National Toxicology Program report noted "limited evidence" for this effect at blood lead concentrations <10 µg/dL. This study's finding that lead affects immune response at blood lead concentrations <5 µg/dL adds to evidence that lead has harmful effects, even at levels that until recently were considered "safe."

The study also found that children who had blood lead levels between 1-5 µg/dL were 1.5 to 2 times more likely to have seronegative anti-measles antibodies as children with BLL <1 µg/dL. This means that although they had received vaccinations, they were not protected as expected from these infectious diseases. This study could not determine if the lead exposure caused or contributed to this reduced vaccine effectiveness. However, if this is the case, it would mean that immunized children with even slightly elevated blood levels could be at higher risk of contracting these diseases, especially if they live in places where herd immunity is low (for example, due to low population-wide vaccination rates).

ENVIRONMENTAL EXPOSURES AND
INFECTIOUS DISEASE: FROM MEASLES TO COVID-19 continued

Lead's contribution to immunosuppression is just one example of interactions between environmental exposure and infectious disease. In the wake of the global COVID-19 pandemic, researchers may begin to explore whether past or current environmental exposures contributed to the severity or prevalence of the disease among different populations.

PAIGE LAWRENCE NAMED DEPUTY EDITOR AT ENVIRONMENTAL HEALTH PERSPECTIVES

Center Director B. Paige Lawrence, PhD, along with two others, has been appointed as a Deputy Editor for Environmental Health Perspectives (EHP). Editor-in-Chief (EIC) Joel Kaufman, MD, MPH, introduced the new Deputy Editor role and named the appointees in a recent webinar with the Board of Associate Editors.

As recognized leaders in their respective disciplines of exposure science, environmental epidemiology, and experimental toxicology, the Deputy Editors will act as ambassadors to colleagues in their scientific communities to ensure that EHP continues to publish the most influential environmental health research. With a wealth of leadership, editorial, and peer review experience at EHP and other journals, the new Deputy Editors are expected to complement existing editorial workflows.

Working closely with the EIC and EHP Science Editors, they will evaluate new and revised manuscripts, participate in triage and interim editorial decisions, and collaborate with Associate Editors to oversee peer review. The Deputy Editors will also provide leadership for the consideration of submissions in their areas of expertise.

CAN LUNG IRRADIATION LEAD TO WORSE OUTCOMES FROM COVID-19?

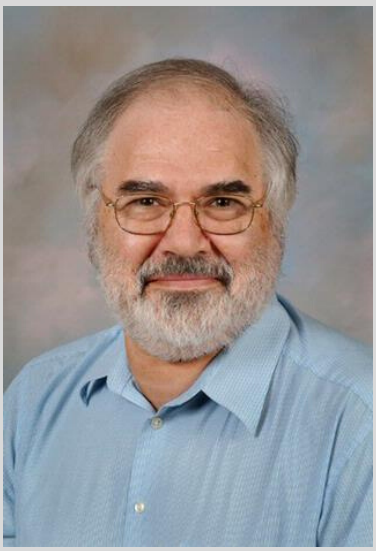
Researchers have extensively studied the mechanisms by which radiation therapy damages tissues in the body. This research is particularly relevant to lung cancer patients who receive radiation therapy. Recent results have shown that the response of the lung to radiation can lead to tissue damage, inflammation, and potential fibrosis. This is similar to the response of the lung to respiratory pathogens, including viruses. What does this imply about the combined risk of these two factors?

Center members Jacob Finkelstein, PhD and Jacqueline Williams, PhD, along with Professor of Radiation Oncology Brian Marples, PhD and Research Assistant Professor of Radiation Oncology (and former T-32 Toxicology Training Program post-doctoral trainee) Angela Groves, PhD are investigating a hypothesis that tissue injury from pulmonary irradiation may exacerbate the severity of COVID-19 infection. They (1) and others (2), (3) have shown in animal studies that influenza A viral infection after pulmonary irradiation increased morbidity and mortality, even if the infection occurred long after the initial radiation exposure. (4), (5)

These experimental radiation biology data are relevant because lung cancer patients are considered especially susceptible to COVID-19 based on age, co-morbidities, and treatment-related factors such as immunosuppression. With about 50-60% of all cancer patients receiving radiation therapy as part of their management, (6) these patients could be at greater risk from COVID-19 infection and complications due to inability of their damaged lung tissues to completely recover after infection. (7)

This research team is now exploring whether COVID-19-infected lung tissue is more likely to be damaged by radiation, and conversely whether radiation-damaged lungs are more susceptible to COVID-19. Defining these questions is of clinical importance because infection and recovery from COVID-19 might alter lung radiosensitivity to high-dose radiation therapy for present (or future) cancer patients. As well, prior lung radiation therapy might increase susceptibility to COVID-19 infectivity. They are also investigating whether the time interval between exposures to radiation and viral infection is significant.

The research team (Drs. Marples, Finkelstein, Williams and Groves) has previously collaborated on models of combined injury (radiation + viral infection). The experimental models they previously developed are now being used to explore the potential for enhanced risk from COVID-19 for lung cancer patients and to inform possible therapies. This research may inform cancer patients' and health care providers' decisions related to COVID-19.



Jacob Finkelstein, PhD

Jacqueline Williams, PhD

(1) Beach TA, Groves AM, Williams JP, Finkelstein JN. Modeling radiation-induced lung injury: lessons learned from whole thorax irradiation. Int J Radiat Biol 2020;96:129-44.

(2) Marks LB, Bentzen SM, Deasy JO, et al. Radiation dose-volume effects in the lung. Int J Radiat Oncol Biol Phys 2010;76:S70-6.

(3) Rodrigues G, Lock M, D'Souza D, Yu E, Van Dyk J. Prediction of radiation pneumonitis by dose - volume histogram parameters in lung cancer--a systematic review. Radiother Oncol 2004;71:127-38.

(4) Manning CM, Johnston CJ, Hernady E, et al. Exacerbation of lung radiation injury by viral infection: the role of Clara cells and Clara cell secretory protein. Radiat Res 2013;179:617-29.

(5) Manning CM, Johnston CJ, Reed CK, Lawrence BP, Williams JP, Finkelstein JN. Lung irradiation increases mortality after influenza A virus challenge occurring late after exposure. Int J Radiat Oncol Biol Phys 2013;86:128-35.

(6) Yap ML, Zubizarreta E, Bray F, Ferlay J, Barton M. Global Access to Radiotherapy Services: Have We Made Progress During the Past Decade? J Glob Oncol 2016;2:207-15.

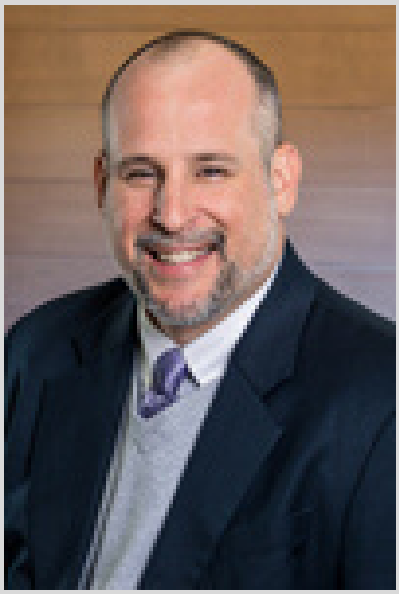
(7) Manning CM, Johnston CJ, Hernady E, et al. Exacerbation of lung radiation injury by viral infection: the role of Clara cells and Clara cell secretory protein. Radiation research 2013;179:617-29.

AIR POLLUTION AND HEALTH IN NEW YORK STATE: FEWER BUT MORE TOXIC POLLUTANTS?

The Environmental Health Sciences Center (EHSC) has a strong tradition of research on the health effects of inhaled particulate matter. Over the past 5 years, a multidisciplinary team of EHSC researchers has integrated its longstanding expertise in ambient air quality monitoring with analysis of population health outcomes. This work provides new insights into the health effects of implementing air quality protection policies.

David Rich, ScD and Phillip Hopke, PhD lead a team of researchers examining changes in exposures and related health impacts in New York. Rich is an environmental epidemiologist who studies the health effects of air pollution. He has worked on issues of air pollution and health in China since 2008, when quality improvement measures were instituted due to the Beijing Olympics, including limitations on car travel, industrial shutdowns, and emission reductions. Rich's team demonstrated significant improvements in healthy people's cardiovascular health and fetal growth as a result of the resulting pollution reductions. Since that time, he has investigated other health outcomes associated with "natural experiments" affecting air pollution. New York's air is much cleaner than China's, offering the opportunity to study the impacts of lower levels of pollution and different pollutant mixtures in the air. Rich has studied the health effect of variations in regional air quality over the past several years.

Hopke has worked on U.S. and global air pollution monitoring and exposure research for decades. Formerly based at Clarkson University, he has had a longstanding focus on trends in air quality in New York State. Hopke has been doing exposure assessments for almost 30 years, beginning with measuring radon decay products in occupied homes. He headed the exposure core of the University of Rochester's USEPA PM (Particulate Matter) and Health Center and has provided exposure assessments for a number of toxicological and epidemiological studies. Since moving to Rochester full time and joining the EHSC in 2018, Hopke has continued this work and partnered with additional researchers looking at health effects of changes in local air quality.



David Rich, ScD

Philip Hopke, PhD

AIR POLLUTION AND HEALTH IN NEW YORK STATE: FEWER BUT MORE TOXIC POLLUTANTS? continued

Rich and Hopke's research team, including EHSC members Daniel Croft, Sally Thurston, Mark Utell, and Edwin van Wijngaarden, has recently focused on the relationship between air pollution and respiratory infections. Looking at the time period from 2005-2016, they found that overall concentrations of fine particulate matter (PM2.5), sulfates, and other particulate and gaseous pollutants declined overall. Summertime ozone levels generally declined, but concentrations increased in the winter and spring in several areas.

During this same time period, the rate of hospital admissions for myocardial infarction (heart attacks) declined, but not as steeply as expected based on the significant decrease in PM2.5. In other words, there was less PM2.5 overall, but the composition of the PM2.5 appears to have been more toxic. Similarly, rates of hospitalization and emergency department (ED) visits for culture-negative pneumonia and ED visits for influenza per unit concentration of PM2.5 increased over time. The hospitalizations and ED visits for respiratory infections and cardiovascular disease were found to be related to the emissions from several sources including gasoline-powered light duty vehicles, diesel engines, wood smoke, road dust, and heavy oil combustion.

This work shows that while changes in policy, technology, and economic activity have reduced PM2.5, they have changed the composition of very small particles in the air, with significant consequences for health. For example, gasoline was reformulated between 2010 and 2014 to reduce the amount of benzene, a known liver carcinogen. However, the replacement chemicals tend to react with oxidants in the air, forming secondary oxidizing aerosols (SOA). When these chemicals are inhaled, they can lead to increased oxidative stress and more adverse outcomes per unit mass. Thus, although overall emissions of PM2.5 have declined, the chemical makeup of the particles resulting from the remaining emissions may be more toxic than was the composition of PM2.5 when these policies were put into effect. This may mean fewer health benefits than would have been expected based on predictions based on PM2.5 concentrations alone. This finding suggests that future air quality regulations should consider their impact on not only concentration but also the particle composition.

With COVID-19, air pollution has declined globally due to reduced industrial activity and transportation. This provides a "natural experiment" for investigating the health impacts of short-term improvements in air quality that future research may explore.

Recent publications from EHSC researchers related to air quality/exposure and health issues in New York State include:

Squizzato S, Masiol M, Rich DQ, Hopke PK. PM2.5 and gaseous pollutants in New York State during 2005-2016: spatial variability, temporal trends, and economic influences. Atmospheric Environment 2018;183:209-224.

Squizzato S, Masiol M, Rich DQ, Hopke PK. A long-term source apportionment of PM2.5 in New York State during 2005 to 2016. Atmospheric Environment 2018;192:35-47.

Squizzato S, Masiol M, Enami F, Chalupa DC, Utell MJ, Rich DQ, Hopke PK. Long-term changes of source apportioned particle number concentrations in a metropolitan area of the northeastern United States. Atmosphere 2019;10:27.

Zhang W, Lin S, Hopke PK, Thurston SW, van Wijngaarden E, Croft D, Squizzato S, Masiol M, Rich DQ. Triggering of cardiovascular hospital admissions by fine particle concentrations in New York State: before, during, and after implementation of multiple environmental policies and a recession. Environmental Pollution 2018;242(Pt B):1404-1416.

Croft D, Zhang W, Lin S, Hopke PK, Thurston S, van Wijngaarden E, Croft D, Squizzato S, Masiol M, Rich DQ. Triggering of respiratory infection by air pollution: impact of air quality policy & economic change. Annals of the American Thoracic Society 2019;16(3)321-330.

Rich DQ, Zhang W, Lin S, Squizzato S, Thurston SW, van Wijngaarden E, Croft D, Masiol M, Hopke PK. Triggering of cardiovascular hospital admissions by source specific fine particle concentrations in New York State. Environment International 2019;126:387-394.

Hopke PK, Zhang W, Croft D, Lin S, Squizzato S, Thurston SW, Masiol M, van Wijngaarden E, Utell MJ, Rich DQ. Changes in the acute response of respiratory diseases to PM2.5 in New York State from 2005 to 2016. Science of the Total Environment 2019;677:328-339.

Croft D, Zhang W, Lin S, Hopke PK, Thurston S, van Wijngaarden E, Croft D, Squizzato S, Masiol M, Rich DQ. Associations between source-specific particulate matter and respiratory infections in New York State adults. Environmental Science & Technology 2020;54(2):975-984.

Hopke PK, Croft D, Zhang W, Lin S, Masiol M, Squizzato S, Thurston SW, van Wijngaarden E, Utell MJ, Rich DQ. Changes in the Hospitalizations and Emergency Department Visits for Respiratory Diseases to Source-Specific PM2.5 in New York State from 2005 to 2016. Environmental Research 2020;181:108912.

NIEHS AWARDS ANOTHER FIVE YEARS OF FUNDING FOR DR. SALLY W. THURSTON'S T32 TRAINING GRANT

From left to right: Alexis Zavez (current PhD student), Omar Mbowe (former T32 postdoc 2016-2018), Sally Thurston, PI, and Yun Zhang (Statistics PhD, 2018)

The Department of Biostatistics and Computational Biology's T32 training grant "Training in Environmental Health Biostatistics" (T32ES007271) was awarded an additional five years of NIEHS funding starting in July 2020, following 25 years of prior NIEHS support. Center member Sally W. Thurston,PhD has been leading this grant for the past five years, following many years of leadership by David Oakes, PhD. Other EHSC trainers include Drs. Deborah Cory-Slechta, Tanzy Love, Matthew McCall, David Rich, and Edwin van Wijngaarden. The funding supports one postdoctoral fellow and three Biosatistics doctoral students.

For more information please see https://www.urmc.rochester.edu/biostat/training-grant.aspx

COPD
outlook

Irfan Rahman exposes cells to smoke as part of research into exosomes and COPD.

Care packages

Vesicles released in response to cigarette smoke might trigger COPD, but engineered versions offer possible therapy. By Jyoti Madhusoodanan

RAHMAN'S LAB HIGHLIGHTED IN NATURE FOR COPD WORK

Irfan Rahman, PhD, Professor in the Departments of Environmental Medicine, Public Health Sciences, Dentistry, and Medicine, has been highlighted in Nature journal for the work he and his lab has done on the discovery of exosomes in COPD.

To read this article, please follow the link https://www.nature.com/articles/d41586-020-01375-9

McGrath Speaks on Microplastics at June 2020 Community Advisory Board Meeting

Jim McGrath, PhD, Professor of Biomedical Engineering at the University of Rochester, was the guest presenter for the EHSC Community Advisory Board Meeting held remotely on June 10, 2020.

Dr. McGrath spoke about "The Rapid Assessment of Microplastics in Drinking Water: Analysis of Microplastics in Drinking Water: From Hemlock Lake to Georgen Hall (University of Rochester)." He and his team have developed silicon filters that are able to filter nano-sized particles from a variety of media. They partnered with the City of Rochester Water Bureau and used these filters to assess the presence of microplastics in local drinking water as it makes its way from its source to the tap.

McGrath presented his initial results to the CAB to get input on how to share these findings with the larger community prior to publication. Although there is limited evidence about the human health implications of microplastics, many people are concerned about their presence in drinking water. The researchers responded to CAB members' questions and suggestions about how best to communicate the findings in light of this uncertainty.

The team plans to continue developing these filters as a potential citizen science tool and other applications to facilitate the measurement of microplastics in a wide range of settings. They have also partnered with several EHSC members to explore potential health impacts of microplastics in both aquatic animals and humans.

2020 Toxicology Student and Postdoctoral Awardees

Although our annual Retreat and Awards Banquet were postponed due to the COVID-19 pandemic, we would still like to acknowledge the excellent work of our trainees. Please congratulate this year's recipients of the Toxicology Training Program awards:

Weiss Toxicology Scholar awards: Timothy Anderson (pre-doctoral); Thivanka Muthumalage, PhD (post-doctoral)

Tim is a student in Dr. Deborah Cory-Slechta's laboratory. He is studying the toxicokinetics of paraquat that is delivered via inhalation exposure and its associated neurobehavioral effects. This work has important implications for commonly-used agricultural pesticides. Thivanka is mentored by Dr. Irfan Rahman and studies cellular stress responses and lung injury following exposures to e-cigarette aerosols or specific components that are used in vaping. Both of these individuals are engaged, highly productive young scientists and exhibit strong leadership inside and outside of their respective laboratories.

Robert N. Infurna award for best scientific publication: Christina Post (pre-doctoral); Qixin Wang, PhD (post-doctoral)

Post CM, Boule LA, Burke CG, O'Dell CT, Winans B, Lawrence BP. The ancestral environment shapes antiviral CD8+ T cell responses across generations. iScience. 20:168-183, 2019.

This paper describes transgenerational impacts of an environmental toxicant, TCDD, on innate and adaptive immunity. This work was a complex, large undertaking and has significant implications for the way that we think about who is impacted by environmental exposures.

Wang Q, Khan NA, Muthumalage T, Lawyer GR, McDonough SR, Chuang TD, Gong M, Sundar IK, Rehan VK, Rahman I. Dysregulated repair and inflammatory responses by E-cigarette-derived inhaled nicotine and humectant propylene glycol in a sex-dependent manner in mouse lung. FASEB Bioadv 1(10): 609-623, 2019.

This paper combines in vivo and in vitro approaches to characterize the impact of e-cigarette vapors in the lungs upon acute inhalation exposure. In addition to demonstrating the pro-inflammatory effects of nicotine in lung, which is not new, it also demonstrates that the commonly-used solvent (humectant) has its own effects. This paper is comprehensive and timely.

Neuman award for exemplary scholarship and citizenship: Ashley Peppriell
Ashley is a mentored by Dr. Matt Rand and is studying the impacts on muscle development of methyl mercury exposure in a Drosophila model. In addition to working hard and making great strides in the laboratory, Ashley is a volunteer extraordinaire! She co-led the annual retreat planning team for two years, has served as a teaching assistant, is a peer mentor, and is a great ambassador for the Toxicology Training Program. She certainly exhibits the high level of scholarship and citizenship that defined the lives and careers of Drs. Margaret and William Neuman.

2020 Toxicology Student and Postdoctoral Awardees

Best Question awards: Janine Cubello and Ashley Fields
It was a tough call, so we decided to give out two awards this year! Janine is mentored by Dr. Margot Mayer-Pröschel and studies the effects of combined lead exposure and iron deficiency on the developing brain. Ashley's mentor is Dr. Martha Susiarjo and her project is focused on the impact of vitamin B6 deficiency on pregnancy outcomes in the context of diabetes mellitus.

2020 University of Rochester Elon Huntington Hooker Dissertation Fellowship: Kadijah Abston, MS
Kadijah is a fourth-year student working in Dr. Xin Li's laboratory. The award is given to support student researchers who are primarily focused on chemistry or biochemistry. In her graduate work, Kadijah is exploring the novel hypothesis that lead can impact brain development across multiple generations via epigenetic modulations that are manifest at the level of DNA methylation changes and/or changes in small non-coding RNAs that get transmitted via the male line. This work will provide foundational knowledge about paternal information that gets transmitted across the generations and has implications regarding the broad human health impact of a wide-spread environmental toxicant.

Please congratulate these trainees when you see them! Look for more details on the Program website.
https://www.urmc.rochester.edu/environmental-health-sciences/news.aspx

For questions or comments, please contact:

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