Environmental Science Newsletter - Fall 2021

The latest news, views, and announcements

Dr. Larry Lehr Retires after serving the Environmental Science Department for 30 years

Dr. Lehr's great friend, Doug Nesmith shared with us fond memories over the years, so we decided to post them in this newsletter.

Almost 11 years ago, Larry Lehr took me under his wing as a new employee in the Environmental Science Department. I started on the first day of fall classes and was totally lost. He saw how I was struggling in my little office in the Goebel Building down the hall from his office. He had a grad student teaching his watershed lab and he asked if I wanted to take a little tour of the sights, they planned on visiting during the semester so I could help the grad student out and give me a chance to get out of the building. He also took me to lunch that day and I noticed right away that he seemed to know everyone we ran into. During lunch he said, "Let me introduce you to the mayor". And he took me over and introduced me. I jokingly said, "You seem to know everybody, who else could you introduce me to?" He said, "Who would you like to meet?" I said, "Since I am an Aggie, could you introduce me to Governor Rick Perry?" He said sure and drove me down to Austin and the governor's mansion, knocked on the door and the staff welcomed him by name and led us in where he introduced me to the governor. When we left, he said, "Anyone else you would like to meet?" I said, "I am Catholic, I would love to meet him, but I bet you can't introduce me to the Pope." He said, "Sure I can, I can get you an audience with him." I knew I had him on this one. He made our flight arrangements so we could overnight in Rome, and he took me to Vatican City. We arrived at the Papal Palace and Larry knocked at the door. Again, the staff knew him by name, and they allowed him to enter but not me . He apologized and

INSIDE

said, "So sorry, but head over to St Peter's Square and I will meet you there when I am done here." While I was unhappily waiting at the square, all of a sudden, the crowd in the square looked up and began cheering. There on the distant balcony appeared to be Larry and the Pope. I found an older Italian gentleman who spoke English and asked, "Is that the Pope up there?" He replied, "I'm not sure about the guy in the white robe but the other guy is Larry Lehr!!!"

Seriously though… as Larry enters his last few weeks here at Baylor before his retirement, I am reminded of all those people I have met in the past 11 years who have told me that they knew Larry. Always with a smile on their face as they remember times spent with him. All of the students I have interacted with who don't know him as Dr. Lehr but as "Larry". I will always remember the lineup of students in the hall waiting to talk to Larry and get his help or advice. I will remember his effervescent, positive attitude and personality and will miss hearing him come down the hall. He always included me in his field trips to caverns, rivers, and wildlife refuges. We never took a trip where he didn't run into someone he knew or taught. More than once we ran into a couple with kids and he had taught them both. Larry and Cindie have been great friends to Suzanne and me, having us over to their house when we didn't know anyone. Former librarian Cindie even came out of retirement when she knew Suzanne was desperately needing help with the Learning Resource Center at the School of Ed. Larry and I just missed meeting about 45 years ago when he did his student teaching at my high school in the fall after I graduated.

Larry invited me to help on Jimmy Dorrell's Mission Waco/Urban REAP project and when it was funded, we spent weeks going through the startup procedure with the industrial composter adding microbe inoculated sawdust and food waste daily to get it operating.

All of us have a finite life and an infinite life. By definition, our finite life ends at some point, but our influence carries on in our infinite life. Larry's infinite life will be huge, extending to the thousands of students he has instructed, mentored, advised, and cared for. This department, Baylor University, the city of Waco and the state of Texas are better places thanks to the influence of Larry. Thanks for the memories Larry.


Dr. Christie Sayes

Lung-on-a-Chip: Analyzing Advanced Materials and Health

August 25, 2021in Baylor Research news

At the intersection of toxicology and materials science, a Baylor professor is working to keep servicemen and women healthy as advanced materials presented uncharted opportunities on airplanes, automobiles and more.

Christie Sayes, Ph.D., associate professor of environmental science at Baylor and faculty fellow in the U.S. Air Force, has developed a “lung-on-a-chip” to simulate the human lung and the ways it is impacted in real operational environments. The chip, like her broader research, bridges technology and health. As advanced materials such as carbon fibers become more common, Sayes examines the impact of aerosols from those materials that can be breathed in by military and civilian personnel.

“Engineered nanomaterials have so much potential to improve on many aspects of everyday life, but we don’t exactly know how they interact with humans and their environment,” Sayes says. “So, we study those interactions to protect the people around them.”

INTERACTING WITH NEW TECHNOLOGY

Sayes’ training in pulmonary toxicology hones her health focus on the lung. In her Baylor lab, she and her students’ further study emerging technology. These technologies can improve everyday life and are naturally of interest to a variety of industries and organizations, from the commercial aerospace industry to the Department of Defense. They present opportunities for products that are safer and more efficient. With each technological breakthrough, Sayes’ group asks a further question: how do they impact the people working on and around them?

Her work with the DoD began at a Society of Toxicology meeting, where she was introduced to Saber Hussain, Ph.D., Wright State University professor and Air Force Research Fellow. Their conversation spawned questions and, back in their labs, further collaborative research.

“The physical and chemical properties that are different in advanced materials as compared to conventional materials also translate into biological differences,” Sayes says. “We don’t know exactly how these engineered nanomaterials interact with humans and the environment around us. So, we ought to think about those interactions and evaluate the safety as they interface and interact with military personnel.”

Carbon fibers found in many airplanes provide a useful example of her work. At times, repairs will be necessary, and the materials will experience natural wear and tear. As they wear down, toxicants could be inhaled by the people working on them through the form of aerosol spray, as particles suspended in the air enter their breathing space.

Information on the impact of these aerosols can be utilized in a variety of ways: personal protective equipment could be developed or required when repairs are taking place, exposure limits and more. To accomplish this understanding, a realistic simulation is needed.

LUNG-ON-A-CHIP

Sayes' advancements model pulmonary models to study lungs under normal conditions, extreme operational conditions and more, gleaning information that is predictive of lung response to different aerosols. The data can yield insights into recovery time, resilience and more.

"The lung-on-a-chip technology simulates effects the human lung may see in a real operational environment," Sayes says. "We use the technology to screen for different aerosols that may or may not be in the operational environment to determine if there is an adverse health effect."

The chip replicates conditions of the human long in a micro-environment which consists of both epithelial cells, which line the airway of the lung, and immune cells, which dictate both sustained and short-term reactions to aerosols introduced into the airways. The technology provides baseline understanding of lung function, data which can be for further benefit—negative impacts aren't all she seeks to uncover. The technology further provides information to see if lung function can be improved. Repeated tests provide insight into short-term and long-term exposure to aerosols and provide the DoD with upstream approaches—to mitigate those effects and improve on pulmonary function and performance.

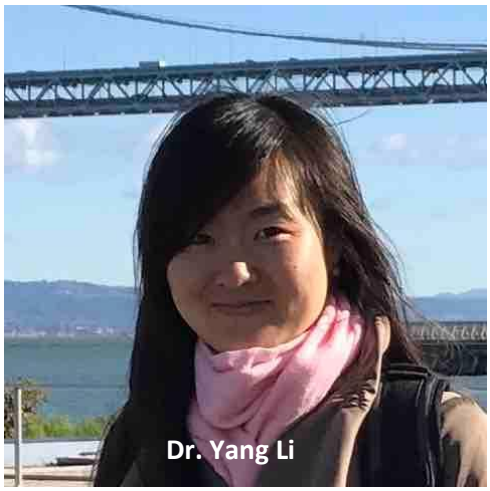
"It is beneficial to look for ways to improve upon the function of the lung in two ways. This makes military readiness more accessible, as well as helping us understand the ability of the lung to recover after exposure that might have caused an adverse reaction."

TECHNOLOGY AND HEALTH

As Baylor University blazes new trails in research, the challenges faculty seek to solve are interdisciplinary in nature. The University's strategic plan, Illuminate, features five signature academic initiatives—strategic areas in which Baylor researchers can build on university strengths to address problems in areas of national and global importance. Health and Materials Science are two of those initiatives—and they are right in Sayes' wheelhouse.

"I'm excited about this project," Sayes says. "We get to understand the benefits that advanced engineered materials offer to the military and other industries, and we also get to understand the safety and effects, both positive and negative, that engineered nanomaterials and emerging technologies provide."

Welcome Newest Faculty Member Dr. Yang Li


Dr. Yang Li

Dr. Li joined Baylor University as an Assistant Professor in the Department of Environmental Science in 2021. Prior to joining Baylor, she was a Postdoc Fellow at Harvard University, where she worked on MethaneSAT and MethaneAIR data analysis and science applications, with a focus on greenhouse gas flux inversion. Her other research projects at Harvard centered on using a coupled modeling framework to investigate the impacts of future changes in climate, vegetation, and land use practices on dust mobilization and wildfire activity. Dr. Li received her Ph.D. at the University of Michigan, where she applied and developed a large-eddy simulation model and regional chemical transport models to interpret the vertical distribution of biogenic volatile organic compounds. At Michigan, she also did a glacial project investigating the impact of aerosol deposition on snowmelt over the Greenland Ice Sheet. Dr. Li's research interests span from local atmospheric chemistry modeling of trace gases and aerosols to global interpretation of climate and air quality co-benefits.

Research

Dr. Li's research seeks to elucidate the chemical and physical processes of volatile organic compounds (VOC) in the boundary layer under a changing climate as well as their climate consequences. The importance of this work, which entails the development and application of sophisticated atmospheric models, is in advancing our understanding of changes in climate and key air pollutants, and to generate products relevant to assessment and policy decision support. Her research interests include:

- High-resolution modeling of urban air quality and fire smoke polluted boundary layer
- Trace gas-aerosol-cloud interactions
- Atmospheric chemistry-climate interactions
- Wildfire and dust under a changing climate
- Trends in greenhouse gas emissions and air quality co-benefits

Dr. Cobb to serve on EPA committee monitoring the effect of chemicals on the environment

- Randy Fielder July 6, 2021

Dr. George P. Cobb, chair and professor of environmental science in the Baylor University College of Arts & Sciences, has accepted an invitation to join an advisory committee which helps the U.S. Government monitor the effects of chemicals on environmental health.

Cobb has joined the Environmental Protection Agency's Toxic Substances Control Act Science Advisory Committee on Chemicals (TSCA SACC). During his time on the committee, Cobb will provide his "best independent judgment" on scientific studies supporting the EPA's mission to protect human health and the environment. His three-year term will expire on June 14, 2024. According to the EPA invitation, the SACC "provides independent scientific advice, information and recommendations to the EPA Office of Pollution Prevention and Toxics on the scientific basis for risk assessments, methodologies and pollution prevention measures or approaches. Its major objectives are to provide expert advice and recommendations to the EPA on risk assessments, models, tools, guidance documents, chemical category documents and other chemical assessment and pollution prevention products as deemed appropriate."

Cobb said that having a Baylor representative selected for this national committee "is a significant advancement for Baylor as an institution…and puts us more firmly on the map nationally and internationally for environmental topics."

In his role as a SACC member, Cobb said he and the other approximately 14 members will meet six times a year to assess risks that industrial chemicals may pose to human health and the broader environment.

"In the last two years, the committee has addressed chemicals such as dyes, solvents, flame retardants and asbestos," Cobb said. "My service on the committee helps fulfill its charter to provide expertise in chemical fate and exposure assessment within environmental systems."

Cobb's appointment comes after he served for the past two years as an ad hoc member of the committee, and also served in ad hoc roles for the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Science Advisory Panel, which evaluates pesticide registration and reregistration.

Cobb earned a PhD in chemistry from the University of South Florida and joined the Baylor faculty in August 2011. He has published more than 140 peer-reviewed papers and maintains strong national and international collaborations through leadership positions in The American Chemical Society and The Society of Environmental Toxicology and Chemistry.

Dr. Erica Bruce

Extending the “Golden Hour” for the Critically Injured

August 1, 2021, in Baylor Research News

War, and the way it is fought, is changing. Progressions in technology, ballistics, weaponry and even city growth present challenges to keeping injured service men and women alive until further medical care can be reached. In the field, there’s a time, known as the golden hour, that can be the difference between life and death. Previously, if injured individuals could be kept alive and transported to a fixed care facility within the first 60 minutes—the golden hour—their likelihood of survival was greatly increased. However, an hour often isn’t long enough. Erica Bruce, Ph.D., associate professor and graduate program director of environmental science at Baylor, has patented a resuscitative, oxygenating drug aimed at multiplying the golden hour to save lives impacted by traumatic injury.

“We began hearing this term, the golden hour, referring to the time a patient arrived at a fixed facility or traditional echelon of care. If they arrived within an hour, the chances of survival went up dramatically. When we think about combat theaters today and even in the future, combat theater is going to look a lot different,” Bruce said. “So, our goal is to try to create a drug that we can extend the golden hour to something on the order of 72 hours.”

Challenging Field Conditions

For service members injured in combat, hemorrhage, or bleeding out, is the most common cause of preventable deaths. When an individual experiences severe blood loss, even when the bleeding has been stopped, the body experiences hypoxic conditions as it lacks the necessary number of red blood cells needed to carry oxygen to vital organs. Hypoxia is a condition characterized by a lack of oxygen in the body or a region of the body. Bruce aims to fulfill a critical need in combat casualty care through her research on hypoxic conditions.

Combat medics in the field carry only what fits on their backs—often only a relatively small volume of IV fluid. Bruce’s team, supported by Hemotek, LLC (Plano, Texas), their industrial partner, recently developed and patented an oxygenating drug - Ox66™ - that alleviates hypoxia due to blood loss or hemorrhaging. This therapeutic delivers oxygen throughout the body, can be administered intravenously, is sterile in a light-weight powdered form, and does not have to be blood-typed and cross-matched— meaning a recipient can be any blood type.

“We needed something that can be easily deployed, something that field medics can take out and give immediately in the field, but they're not going to have a large volume of fluid to use. So, they need to get the best bang for the buck with that amount of volume,” Bruce says.

Bruce imitates field conditions in the lab through rodent studies, examining the effectiveness of the therapeutic even with only a small amount of blood available. With as little as 10 percent remaining, Bruce’s team has been successful in extending life, on average, for one to six hours, and as long as eight hours, thanks to the resuscitative drug. In the field, those additional hours make the difference for an injured service member who needs them in the hours between injury and transportation to centers where critical care is available.

The team's success has led to a $2 million pending proposal with the Department of Defense to extend their work to key parameters and potential problems, like coagulation and inflammation. Looking downstream is important to Bruce; the research isn't just about survival in the moment, but also quality of life down the road. By keeping oxygen circulating through the body, even in the midst of injury, future brain, heart, and overall organ function will benefit.
A Variety of Applications

While this particular research focuses on hypoxic conditions, Bruce's background in environmental science will further inform the research. Combat members are stressed, possibly dehydrated, and fatigued. They are exposed to bacteria and particulates, with drinking water containing different pathogens, and the fabrics of their uniforms often interlaced or coated with pesticides to protect them from disease-carrying pests.

How do those conditions affect the way a body heals, and do they impact the efficacy of the resuscitative drug? Bruce's next steps hope to address these lingering questions. Soon, Bruce's research will move from rodent studies to porcine models, whose biological systems bear strong resemblance to humans, in collaboration with the 59th Medical Wing of the Air Force.

The team's goal is to build a case for testing the resuscitative drug in larger animals. Her lab has multiple projects under their umbrella of hypoxia that look at the ways the drug could be used. Getting the drug across the blood-brain barrier is of significant concern for Bruce's lab, specifically with regard to traumatic brain injuries and Alzheimer's disease.

"There are some indications that if you've had a traumatic brain injury in a combat theater, it puts you at a higher risk for Alzheimer's later in life," said Bruce. "The Department of Defense is very interested in that work because most of the service members who see combat theater action will have a blast-induced traumatic brain injury and receive repeated mild concussions."

Bruce also sees the benefit of the resuscitative drug in civilian emergency care and medicine, referencing the close-to-home 2013 West Fertilizer Company explosion and other situations where individuals may have multiple injuries or significant blood loss. This oxygenating therapeutic could also have a variety of applications for conditions exacerbated by hypoxia. Chronic wounds, such as diabetic ulcers, often have trouble healing due to hypoxic conditions in the wound.

The resuscitative fluid developed by Bruce and her team could be integral to reducing loss of life due to war casualties in the future. It could also provide those who survive because of the drug a better quality of life after putting their lives on the line in service to their country.

Water Quality Researcher is Part of United Nations-endorsed Global Estuary Project


Dr. Bryan Brooks

- Kaitlyn Rieper August 18, 2021

Bryan Brooks, Ph.D., is a partner of the Global Estuaries Monitoring (GEM) Programme to study environmental pollutants in the estuaries of major cities across the globe

WACO, Texas (Aug. 18, 2021) – Baylor University's internationally recognized researcher in water quality, Bryan W. Brooks, Ph.D., is one of the collaborative partners of the Global Estuaries Monitoring (GEM) Programme, which was recently endorsed by the United Nations (UN).

The 10-year GEM Programme – proposed by the State Key Laboratory of Marine Pollution (SKLMP) at City University of Hong Kong (CityU) – will collect and study environmental pollutants, such as pharmaceutical residues, micro-plastics, pathogens, and emerging pollutants of concern, in the estuaries of major cities around the world to formulate a long-term policy of promoting clean estuaries.

Brooks is Distinguished Professor of Environmental Science and Biomedical Studies and also serves director of the Environmental Health Science Program at Baylor. Working internationally on issues involving water quality, environmental contaminants, and sustainability in rapidly urbanizing regions of the world, Brooks develops science-based approaches to define and manage complex environmental and health issues.

Brooks' research, and multiple collaborations with other initiatives such as the Global Horizon Scanning Project and the Centers for Disease Control and Prevention's groundbreaking UNCOVER-EH initiative, bolsters Baylor's focus on Health, specifically environmental determinants, one of the five signature academic initiatives of Illuminate, Baylor's strategic plan.

"Billions of people live on coastlines or immediately upstream from them, and this global trend is increasing with demographic transitions to cities and population growth," Brooks said. "We look forward to working with Professor Leung and our colleagues around the world to engage this timely and necessary initiative, which aligns with Baylor's unique mission and strategic efforts."

"As the population grows in coastal areas, global estuaries are facing unprecedented challenges associated with water pollution," said Kenneth Leung Mei-Yee, director of SKLMP and Chair Professor of Environmental Toxicology and Chemistry in the Department of Chemistry at CityU. "CityU will establish a global monitoring network with partners from all over the world to collect samples and conduct experiments to identify pollution hotspots and priority contaminants in order to recommend and promote the best strategies to create cleaner estuaries."

> At present, more than 100,000 chemical substances are being used in daily life and industries, and many of them will eventually be released into estuaries through different pathways. Nevertheless, there is a lack of information available around the globe concerning the occurrence and environmental risks of chemical contaminants in urbanized estuaries, especially those in Africa, South America, and in some coastal areas in Southeast Asia and Oceania.

The GEM Programme, led by Professor Leung, will develop standardized methods to establish a global monitoring network to collect seawater samples from urbanized estuaries worldwide, extract and quantify priority chemical contaminants, analyze and compare the differences of water quality among different estuaries and provide training opportunities to build capacity for pollution monitoring.

The first phase of the study will be launched in May 2022 in major urbanized estuaries in the southern hemisphere and extended to the northern hemisphere in November of the same year. It is expected that about 100 countries or regions will participate. The research team expects to publish the report after the completion of the first phase in 2023, revealing the pollution status of global estuaries, thus identifying the concerned estuaries and strategies for improvements at an earlier stage.

In addition to Brooks, collaborative partners of the GEM Programme include Professor Alistair Boxall from the University of York, UK, Professor Martina Doblin from the Sydney Institute of Marine Science (SIMS), Australia and Dr. Yuan Shen from the State Key Laboratory of Marine Environmental Science (MEL) in Xiamen University, China.

CityU has allocated HK$4 million to support the research. The team also will solicit support from the World Harbour Project with members from 27 coastal cities, the UNESCO Intergovernmental Oceanographic Commission Sub-Commission for the Western Pacific (IOC/WESTPAC), and the Society of Environmental Toxicology and Chemistry (SETAC), and will invite top researchers from all over the world to join and support the initiative.

Dr. Ryan McManamay

Sustainability Science Award

April 6, 2021, Lori Fogleman

Ryan A. McManamay, Ph.D., assistant professor of environmental science at Baylor University, is among the recipients of the Sustainability Science Award announced today by the Ecological Society of America (ESA).

The Sustainability Science Award is given to the authors of a scholarly work that makes the greatest contribution to the emerging science of ecosystem and regional sustainability through the integration of ecological and social sciences. One of the most pressing challenges facing humanity is the sustainability of important ecological, social, and cultural processes in the face of changes in the

In September 2017, while at the Urban Dynamics Institute at Oak Ridge National Laboratory in Tennessee, McManamay and his coauthors from Oak Ridge, Northern Arizona University and the University of Tennessee, Knoxville, published "US cities can manage national hydrology and biodiversity using local infrastructure policy" in PNAS (Proceedings of the National Academy of Science), one of the world's most-cited and comprehensive multidisciplinary scientific journals.

"I am truly honored for our work to be recognized by such a prestigious award, especially when I look back on the list of past recipients, many renowned scientists whose contributions have been instrumental in shaping my perspective of sustainability science," McManamay said.

McManamay and his interdisciplinary team used spatially referenced data from cities and surrounding rural areas to show how local and regional policy choices can affect hydrologic system integrity and biodiversity conservation. Their work highlights ways to make better choices about land use, water management and electricity production, and it promotes integrated planning and decision-making for greater sustainability of cities and the water- and energy-sheds that support them. Their research demonstrates a novel approach to integrating ecosystem and social sciences, embodying the mission of ESA's Sustainability Science Award.

"The award carries a lot of significance for me because it validates a long-term decision to pursue interdisciplinary sciences – which, at times, can be isolating if one's scientific identity is strongly tied to a disciplinary line of research or a community of collaborators. In other words, the award is a landmark and makes me feel that our research has a home and is valued," he said.

McManamay, who joined the Baylor environmental science faculty in 2019, is a spatial ecologist who studies human-environmental systems in order to balance ecosystem and societal needs, specifically large-scale impacts of humans on natural landscapes, such as energy development, on aquatic ecosystems. His formal training is in stream ecology and fisheries ecology, with emphasis on environmental flows and river restoration.

He was a research scientist at Oak Ridge National Laboratory from 2013 to 2019 and also served as a joint faculty member at the Bredesen Center at the University of Tennessee, Knoxville from 2016-2019, before continuing his academic career at Baylor.
"Maybe I chose Baylor, or perhaps we chose each other," McManamay said. "At an institutional level, Baylor has an unwavering mission along with high aspirations, such as working hard towards achieving R1 status – honestly, I wanted to be a part of that – and helping to grow a dimension of environmental science in that kind of atmosphere. But also, Baylor seemed like a land of opportunity backed by a supportive community of researchers at all levels of their careers. And through my interactions within the department and College of Arts & Sciences, I've found that to be true."
McManamay is a member of the American Geophysical Union, the American Fisheries Society, and an alumnus of the Emerging Leaders in Environmental and Energy Policy (ELEEP) group. He serves as an associate editor of Transactions of the American Fisheries Society. He earned his B.S. in biological sciences from Clemson University and his M.S. in biological sciences and Ph.D. in fish and wildlife conservation from Virginia Tech.
"Baylor University and the Department of Environmental Science are fortunate to have Ryan McManamay as a colleague," said George P. Cobb, Ph.D., professor and chair of environmental science. "It is gratifying to see the significant positive impacts that he is making to sustainability of ecological systems."
ESA will present its 2021 awards during a ceremony at the Society's upcoming Virtual Annual Meeting, which will take place Aug. 2-6.
"This year's award recipients have shown remarkable leadership and creativity," said Kathleen Weathers, ESA President. "On behalf of the Ecological Society of America, I congratulate the award winners and thank them for their significant contributions to building both ecological knowledge and the community of ecologists."


Dr. Melinda Coogan

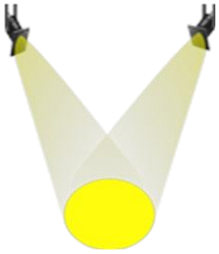
Environmental Science hires Dr. Melinda Coogan as newest Lecturer!

During summer, 2018, Dr. Coogan was hired by Baylor University as a Temporary Lecturer with the Department of Environmental Science after working as a Full Professor of Biology at a private university in NW Iowa. "In many ways, I felt like I was 'coming home to Texas'". Dr. Coogan has adult children who live in Texas, "My grown children had settled in Austin and Dallas, and I was able to become re-acquainted with colleagues and friends at UNT, where I received my PhD." Besides being closer to her children and college alum, Dr. Coogan shared why she loves working for Baylor, "I have thoroughly enjoyed working with the students, faculty, and staff at Baylor, where I've been able to offer a variety of lecture and field-based courses. I've also enjoyed working as a Thesis Mentor for a Baylor Honors student and with a McNair Scholar on design and implementation of a summer 2019 research project. During spring semesters 2020 and 2021 I participated in the Baylor Honors College program called Invitation to Excellence, where I've had the opportunity to meet many high-achieving seniors considering Baylor for their undergraduate education. Additionally, during fall semester, 2018, I worked with a group of Baylor science majors on the development and formation of the Baylor undergraduate student organization *Students for Environmental and Wildlife Protection* (SEWP), for which I continue to serve as Faculty Sponsor."

Environmental Science and Baylor knows how to pick only the most talented and worthy educators. During summer, 2021, after an extensive interview process, Dr. Coogan was invited to continue her career with Baylor as a Full Lecturer with the Department of Environmental Science. "I look forward to seeing where this next chapter in my life leads!" said Dr. Coogan.

Congratulations and we look forward to a continued and wonderful working relationship! Sic'Em Dr. Coogan!

Alumni Spotlight



– June 1, 2021, in Baylor Proud

Throughout COVID-19, those on the frontlines of healthcare have received well-deserved accolades. Doctors, nurses, first responders, researchers — all have stepped up to address COVID-19-related challenges. But that's not the only group on the frontlines; environmental and public health professionals are also out there working to protect the health of their neighbors — and much like the more commonly discussed medical fields, Baylor is well-represented in this group.

Part of the reason Baylor sends so many graduates into environmental health leadership is the strength of its environmental health science program — one of the oldest such programs in the nation, and one of only 30 programs nationally to have its bachelor of science program accredited by EHAC, which is recognized by the Center for Disease Control and Prevention (CDC) and the U.S. Public Health Service. Meet three Baylor environmental health science graduates serving on the frontlines of public health:

Kaitlyn Kelly (BS '18), air quality policy specialist, Washington State Department of Health

It's common to hear about wildfires on the West Coast in the news each summer, and Washington state is no stranger to their impact. Kaitlyn Kelly (pictured above left) is the state department of health's air quality specialist, focusing on wildfire smoke public health response. Kelly's work combines science, communications, and marketing, as she works to make information about wildfire smoke's impact on health understandable and actionable for Washington residents — a liaison, of sorts, to the public.

When COVID-19 became a public health issue last year, Kelly and her colleagues on the state's emergency response team had to combine responses to two public health crises at once: wildfires and a pandemic. Despite being younger than many colleagues, Kelly led the development of a statewide guidance for wildfires and a COVID-19 response with specific recommendations for residents. Additionally, her official blog posts provided much-needed public health information to a wide audience.

Matthew Reid (BS '14), senior environmental health officer, City of Austin Public Health Environment Health Services Division At restaurants, packaging plants, or any place that handles food, health inspectors are a regular sight, investigating food quality, safe handling and more. Matthew Reid (pictured above center) supervises food and swimming pool inspectors in Austin, a role that's required him to go from being an inspector himself to a boss and a coach. Reid was promoted to his current role shortly after the start of the pandemic last year, navigating the safety of his own team as they inspected for the safety of the public. Much of his work is in the spirit of "preventative measures," seeking to thwart food-borne illness and other challenges that could arise from improper handling. The pandemic required Reid's team to (successfully) increase its vigilance, watching for individuals who had been exposed to or were suffering from the virus. Additionally, Reid and his team also worked at vaccination distribution clinics on top of their daily roles.

Lt. Capri Woolridge (BS ’14), U.S. Public Health Service training officer, Division of Programmatic Training, U.S. Food & Drug Administration (FDA).
Lt. Capri Woolridge is an active-duty officer in the U.S. Public Health Service Commission — “America’s Health Responders.” That means she can be deployed at a moment’s notice for any disaster or challenge that has a public health aspect, from hurricanes to U.S. border issues to COVID-19. Last year, Woolridge (pictured above right) was deployed to the Bay Area when a quarantined cruise ship containing 300+ evacuees returned to land. She and her team provided medical care, personal protective equipment and supplies, and mental health resources to those on board. Woolridge has also served as a food investigator for the FDA, visiting large food warehouses and production facilities across the West Coast before being promoted to her current role of trainer. She created a new training program for her division, which serves the vital region of California, where much of the nation’s produce is grown.

No matter their role, Reid sums up what drew many of his fellow graduates to the field, and what motivates them still:
“We work in the shadows because we want to help people and help make a difference. We don’t need headlines; it’s a spirit of doing something for the greater good and to make the places we live better.” Sic ’em, Baylor environmental and public health graduates!

Faculty Service in American Chemical Society

Baylor’s Environmental Science department has a strong presence in the American Chemical Society. Faculty involvement includes:

Dr. George Cobb, Professor and Department Chair, serves as the councilor for the Toxic Substances Control Act Science Advisory Committee on Chemicals (TSCA SACC).

Dr. Bryan W. Brooks serves as the Editor-in-Chief for the American Chemical Society’s Environmental Science and Technology letters and Interim Editor in Chief of Environmental Science & Technology.

Dr. Christie Sayes is the 2021 American Chemical Society’s Chemical Research and Toxicology Young Investigator award winner. Additionally, she serves as the American Chemical society’s Senior Assistant Program Chair.

Additionally, recent graduates Connor Crow, Haley Davis, and Shelby Toles were sponsored to serve as UN accredited observers for the United Nations Framework Convention on Climate Change.

Ryan McManamay considers ecosystem footprint of climate mitigation energy pathways


Dr. Ryan McManamay

Baylor Press (July 13, 2021)

Climate change mitigation efforts have led to shifts from fossil-fuel dependence to large-scale renewable energy. However, renewable energy sources require significant land and could come at a cost to ecosystems. A new study led by Ryan McManamay, Ph.D., assistant professor of environmental science at Baylor University, evaluates potential conflicts between alternative energy strategies and biodiversity conservation.

The study, published in Biological Conservation, evaluates potential tradeoffs between climate benefits and energy costs, especially any negative impacts on biodiversity. While the environmental consequences of some renewable energy sources, like hydropower, have been widely studied, the large-scale impacts of other renewables, like solar, aren't well known.

"The study points to a need for the global community to understand the opposing endpoints of sustainability, which are scale-dependent," McManamay said. "At one endpoint, efforts to mitigate climate change at global scales via large-scale energy transitions may be completely incognizant of the consequences on local biodiversity. Likewise, local conservationists may not appreciate the magnitude of energy transitions required to shift global carbon emissions. Finally, I think there is a broad misconception among much of the community that if renewable energies are good for climate, they must also be good for the local ecosystem. Energies like solar have the potential to be deployed haphazardly with that mindset."

The challenges of climate mitigation in relation to different climate policy scenarios are projected in five Shared Socio-economic Pathways (SSPs) — qualitative descriptions of plausible alternative socio-economic development in the next century. The SSPs include alternative projections in deployment of electricity generations by technology. Considering scenarios under the SSPs, ecological foot-printing was used to evaluate the potential land and biodiversity tradeoffs of 10 different energy sources: solar photovoltaic, concentrated solar power, wind, hydropower, coal, conventional oil, conventional gas, unconventional oil, unconventional gas, and biomass.

"Ecological foot-printing took into account land-use efficiencies of each technology as well as estimates of the degree of habitat alteration arising from technology deployment," McManamay said. "This provides a standardized way to compare the biodiversity consequences of large-scale deployment of alternative energy technologies."

Researchers estimated a biodiversity footprint for each of the 10 energy sources by overlaying energy densities and habitat alteration probabilities with biodiversity patterns. They then used spatial modeling to examine regional variations in future energy deployment and potential biodiversity impacts at a high-resolution. Different biodiversity footprints were scored based on their impact and a cumulative biodiversity score was determined for each of the 10 energy sources.

The cumulative impact scores among the SSPs showed significant and consistent differences — the fossil-fueled development pathway (SSP 5) had the highest impacts while the regional rivalry scenario (SSP3) had the lowest. The sustainability-focused scenario (SSP1) represented a moderate impact score by comparison. Unexpectedly, the variation among SSPs didn't show a clear tradeoff between global climate mitigation and cumulative biodiversity impact.

"It was surprising to see the lack of a clear tradeoffs among sustainability endpoints," McManamay said. "This elicited us to take a deeper look into differences among the SSPs. Although SSP5 is termed 'fossil-fueled' development, the pathway includes significant technological advances in both advanced fossil and renewable technologies to meet highly consumptive, energy luxurious lifestyles. In other words, the biodiversity impacts are more related to total energy deployment than fossil versus renewable technologies. Although SSP1 is also characterized by significant renewable energy deployment, overall energy demand decreases due to increases in energy efficiencies. So, our work suggests that climate mitigation may not necessarily have to be at odds with biodiversity conservation."

Additionally, land constraints accounted for the most variation in biodiversity impact, particularly with regard to protected land use. Downscaled electricity generation scenarios were constrained by alternative land conservation and energy development policies.

The results offer an approximation of land and biodiversity impacts of future energy strategies outlined in the SSPs. While there were differences in the SSPs, the impact scores suggest that land protection measures and energy diversification could have greater implications for biodiversity challenges than the national-level global energy pathways outlined in the SSPs. Future planning and objectives for climate mitigation will require both broad and local consideration of biodiversity challenges.

Congratulations are in order for Dr. Christie Sayes for earning Tenure this year! What a great accomplishment.

Congratulations 2021 Graduates

Environmental Science (B.S.) May

Benjamin Oluwatamilore Adeeso
Rachel Ruth Alford
Fallon Louise Bain
Pablo A. Barahona
Joshua Grant Bell
Amjad Dabi
Haley Addison Davis
Leah Ruth Wen Eller
Emily Enas
Hailey Shea Farmer
Matthew Ryan Hackler
Ashleigh Ferrill Haddock
Telvin L. Haines
Zhengxin Huang
Benjamin Todd Lashley
Jordan Nicole Rita Livesay
Alexander McDonald
John Andrew McDonald, Jr.
Carley Summer McNutt
Coleman Paul Nickum
Katelyn Alise Reyes
Dane Bradley Rinehart
Zachary Carter Rundell
Lauren Savior
Bailey Anne Sharp
Tyler A. Varzeas
Thomas Scarborough Vinson
Grace Elizabeth Timmins Vollmers
Miranda Lynne Whaite
Regan Kressley White
Hayden Mark Williams

Congratulations 2021 Graduates (cont.)

Environmental Health Studies (B.S.) May

Lauren Elizabeth Buntin

Connor Crowe

Environmental Studies (B.A.) August

Evan Michael Armstrong

Chloe C. Bennett

Ruize Ji

Casey Howard Phillips

Environmental Science (B.S.) August

Griffin Joseph Drum

Congratulations 2021 Doctoral Graduates - May

Marina Rochelle Mulenos George: Dissertation, Environmental Science: *A Stepwise Approach to Understanding Nanomaterial Transformations Under Situationally Relevant Conditions*
Mentor: Dr. Christie Sayes

Henry Lujan, Jr.: Dissertation, Environmental Science: *Toxicological Response to Nanomaterial Exposure in In Vitro Lung Cells are Determined by Cell-Type*
Mentor: Dr. Christie M. Sayes

Subin Yoon: Dissertation, Environmental Science: *Detailed Molecular and Isotopic Characterization of Carbonaceous Aerosols to Access Air Quality Issues in Urban Areas: the San Francisco Bay Area and the Houston Metropolitan Area*
Mentor: Dr. Rebecca Sheesley

Environmental Science Welcomes Largest Graduate Assistant Class

This fall, Dr. Erica Bruce, the department Graduate Program Director, along with our other outstanding PIs, successfully recruited 18 new Graduate Assistants. Six are international, nine are women, and 16 are PhD students making this our largest PhD cohort as well. We are very proud of this group of graduate assistants (GAs) and are very happy they chose Baylor University and our department to further their studies.

During our recruiting event, it was all virtual, so we did not actually meet face to face. Not until the first day of classes was the department finally able to meet each of our new GAs.

All of this year's cohorts are excellent but there were six who were worthy of Graduate School Stipend Enhancements. Graduate Stipend Enhancements are awarded to a small percentage of applicants who demonstrate high GRE and GPA scores along with recommendations from department faculty. It is awarded in a single payment at the beginning of the GA's first semester.

Solomon Ayisire
Taiwo Ayorinde
Micah Bowman
Shannon Brown
Clancy Collom
Katherine Dunlap – Graduate School Fellowship Enhancement
Diana Ivey – Graduate School Fellowship Enhancement
James Liu – Presidential Fellowship Enhancement
Chaverle Noel
Precious Obiako
Casey Phillips - MS
Mia Ryon - MS
Lucas Senkbeil – Graduate School Fellowship Enhancement
Ruichen Song – Graduate School Fellowship Enhancement
Larissa Watkins
Adam Wronski
Kusy Zarzosa - MS
Qianyu Zhao – Presidential Fellowship Enhancement

Environmental Science Fall Seminar Schedule

Thursdays, BSB D.109 @ 4:00 - 5:00 PM

Date	Speaker	Area of Expertise	Affiliation
9/3/21	Tham Hoang	Environmental Toxicology	Auburn University
9/9/21	Rok Fink	Environmental Health	University of Ljubljana
9/16/21	Joshuah Perkin	Biological Conservation (Fish)	TAMU
9/23/21	Francesca Taraballi	Environmental Chemistry	Houston Methodist Institute
9/30/21	Purnendu Dasgupta	Environmental Chemistry	UT Arlington
10/7/21	Michal Bittner	Ecotoxicology	Masaryk University
10/14/21	Michi Tobler	Fish Evolution	Kansas State University
10/21/21	Carl Maxwell	Environmental Chemistry	American Chemical Society
10/28/21	Frauke Seeman	Aquatic Toxicology	TAMU-CC
11/4/21	Neel Aluru	Environmental Toxicology	Woods Hole Oceanographic Inst
11/11/21	Denielle Perry	Conservation (Rivers) & Geology	Northern Arizona Univ
12/2/21	Beatrice Opeolu	Environmental Toxicology	Cape Peninsula Univ of Tech

11/5/21 Megan Carr Strategic Resources Bureau of Ocean Energy Management
11:00 – 12:00 PM BSB, E.234
12:30 – 2:00 PM BSB A.108

The Department of Environmental Science was able to award scholarships of various amounts to the following students for 2020 -2021

Glasscock Energy Scholarship

Jonathan Norton, Senior - Environmental Science

Shelby Dye, Junior - Environmental Science

Hope Tucker, Freshman - Environmental Science

The Clara Wieland Scholarship

Maria Calcote, Sophomore - Environmental Science

The Frederick R Gehlbach Scholarship

Jonathan Norton, Senior - Environmental Science

The Elizabeth & Russell Hallberg Scholarship

Maria Calcote, Sophomore - Environmental Science

The Galen Green Scholarship

Jonathan Norton, Senior - Environmental Science

The Deidra & Ward Flora Scholarship

Maria Calcote, Sophomore - Environmental Science

The Tony & Donna Robert Scholarship

Zachary Wood, Junior - Environmental Science

The Doris Kayser Stark Graduate Scholarship:

Grace Aquino, PhD student in Environmental Science, Bruce Lab
Marco Franco, PhD student in Environmental Science, Lavado Lab
Lea Lovin, PhD student in Environmental Science, Brooks Lab
Farzaneh Mansouri, PhD student in Environmental Science, Usenko Lab
Jaylen Sims, PhD student in Environmental Science, Brooks Lab

Glasscock Gift Account Scholarship

Marco Franco – Lavado Lab
Kayla Garrett - McManamay Lab
Marina George - Sayes Lab
Meghan Guagenti - Usenko Lab
Abigail Henke - Brooks Lab
Lea Lovin – Brooks Lab
Chad Mansfield - Matson Lab'
Farzaneh Mansouri - Usenko Lab
Mckayla Miller - Usenko Lab
Claire Moffett - Sheesley Lab
Lydia Roush - McManamay Lab
Kendall Scarlett - Brooks Lab
Sujan Shrestha -Sheesley Lab
Megan Solan - Lavado Lab
Jillian Sturtevant - McManamay Lab
Sarah VerPloeg - Usenko Lab

Bryan Brooks, An Alternative COVID-19 Surveillance Approach to Support Public Health Decision Making. Health and Human Services Commission. DSHS-COVID19 Surveillance (2021), $400,000.00.

Bryan Brooks, Interactions of Climate Change on Oceans and Human Health (CAPICCOHH): Assessment of Effects on Ocean Health Related Illness and Disease and Development of Prevention Strategies to Better Protect Public Health – Year 4. USC-Climate Change (2021), $50,000.00.

Bryan Brooks, Collaborative Research: Treatment of Cyanotoxins by UV/Chlorine: Optimizing Removal While Developing Strategies to Minimize Disinfection Byproducts and Toxicity. NSF-Treatment of Cyanotoxins (2021), $119,983.00.

Erica Bruce (2020) $1.5M; Validating a Novel Oxygenating Therapeutic to Treat Acute Respiratory Distress Syndrome (ARDS) in COVID-19 Patients; Diana Davis Spencer Foundation.

Ramon Lavado, Development and establishment of fish cell lines from native and non-native fish species. DOI USGS-Fish Cell Lines (2021), $9,996.00.

Ryan McManamay, Dynamic land modeling for the Compass Project. PNNL-DOE-Compass (2021), $39,123.00.

McManamay, R.A., K. Mayes, D. Young. Geospatial analysis identifying environmental flow thresholds for fish species and communities in Texas. Texas Parks and Wildlife State Wildlife Grant. July 2021 to August 2023. $66,584

McManamay, R.A. Integrated Multisector, Multiscale Modeling (IM3) Science Focus Area, Phase 2, Pacific Northwest National Laboratory (PNNL). October 2020 – Sept 2024. $100K renewal

McManamay (Co-Investigator, PI – William Arnold, OceanSpace LLC) - Advancing Optical Imaging and Classification to Enhance Biodiversity Monitoring . Department of Energy, Office of Efficiency and Renewable Energy. Small Business Innovation Research. DE-FOA- 0002381. $1,119,242 ($330,000 to Baylor-McManamay).

Benjamin Ryan, Proposal to Address the Research Needs in Health Emergency and Disaster Risk Management. World Health Organization (2021), $41,200.00.

Benjamin Ryan (Principal Investigator, 100%), "Vulnerability to climate change and environmental degradation assessment in Vietnam," Sponsored by International Organization for Migration, Awarded. (June 26, 2020 - November 20, 2020). (/) - Award Letter Amount: $12,500.

Benjamin Ryan (0%), "Evidence Basis for Mass Casualty Medical and Health System Preparedness from Limited Nuclear or Radiologic Device Incidents," Sponsored by UT Southwestern and Rabin Medical Center, Other, Awarded/Funded. (July 2020 - July 2021). $12,912.

Christie Sayes, Improving efficacy of nanoparticles for delivery of therapeutics to HLB-infected Citrus Trees. US Dept of Agriculture (2021), $250,682.00.

Christie Sayes, Zap-O-Particles: Improving SIT using X-ray excitable nanoparticles. US Dept of Agriculture (2021), $243,833.00.

Christie Sayes (Principal Investigator, 100%), "Evaluating the efficacy of insect delivery," Sponsored by US Dept of Agriculture, Awarded. (July 1, 2019 - September 1, 2022). (32370268 / 2103959) - Award Letter Amount: $267,077.

Christie Sayes (Principal Investigator, 100%), "Reducing radiation dose in MexFly SIT using X-ray excitable environmentally friendly nanoparticles," Sponsored by US Dept of Agriculture, Awarded. (September 15, 2020 - September 14, 2021). (1001077 /) - Award Letter Amount: $190,316.

Christie Sayes (Principal Investigator, 100%), "Develop an insect-based delivery of antimicrobial nanoparticle-enabled therapeutics to Citrus plants through the feeding activity of Asian Citrus psyllid.," Sponsored by US Dept of Agriculture, Awarded. (June 15, 2020 - June 14, 2021). (1001022 /) - Award Letter Amount: $13,000.

Christie Sayes (Principal Investigator, 100%), "Mitochondrial-Based Biometric Sensor to Monitor Stress in Airmen Training Activities and Combat Environments," Sponsored by Henry M. Jackson Foundation, Awarded. (August 1, 2019 - June 8, 2021). (32370269 / 2104022) - Award Letter Amount: $93,669.

Christie Sayes (Principal Investigator, 100%), "Understanding the Exposure and Hazard Risks Associated with Nanomaterial Enabled Agriculture Products," Sponsored by Univ Texas Health Science Center, Awarded. (January 31, 2020 - September 29, 2020). (32370300 / 2103919) - Award Letter Amount: $10,000.

Christie Sayes (Key Personnel, 100%), "Nanotechnology Development Fund," Sponsored by Notable, Private, Awarded/Funded. (October 1, 2020 - Present). $5,000.

Rebecca Sheesley, Logistics for and extension of Detecting Events and seasonal trends in biomass burning plumes using black and brown carbon: (BC)2 El Paso. University of Houston (2021), $337,552.00.

Rebecca Sheesley, Collaborative Proposal: BEAR-oNS: Biogenic Emissions and Aerosol Response on the North Slope. National Science Foundation (2021), $266,622.00.

Rebecca Sheesley (Principal Investigator, 50%), Sascha Usenko (Co-PI, 50%), "TRACER-MAP: Mapping Aerosol Processes Across Houston During Convective Cell Events," Sponsored by US Dept of Energy, Awarded. (September 1, 2020 - August 31, 2023). (379-20 /) - Award Letter Amount: $891,761.

Rebecca Sheesley (Principal Investigator, 50%), Sascha Usenko (Co-PI, 50%), "Perform trace gas measurements in Tyler, TX," Sponsored by University of Houston, Awarded. (September 1, 2020 - November 15, 2021). (/) - Award Letter Amount: $7,710.

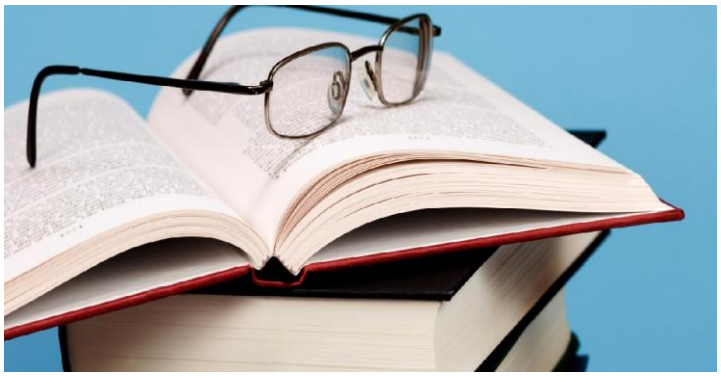
Rebecca Sheesley (Principal Investigator, 50%), Sascha Usenko (Co-PI, 50%), "AMBIENT MONITORING NEAR THE GRANBURY CONTINUOUS AIR MONITORING STATION," Sponsored by University of Houston, Awarded. (July 16, 2020 - October 31, 2021). (496-20 /) - Award Letter Amount: $14,812.

Rebecca Sheesley (Principal Investigator, 50%), Sascha Usenko (Co-PI, 50%), "Detecting Events and Seasonal Trends in Biomass Burning Plumes Using Black and Brown Carbon: (BC)2 Houston and El Paso," Sponsored by University of Houston, Awarded. (January 31, 2020 - June 1, 2021). (32370282 / 2104228) - Award Letter Amount: $417,806.

Sascha Usenko, Air Quality Data Collection Support for Tracer-AQ (Air Quality) in Houston. University of Houston (2021), $191,865.00.

Sascha Usenko (Principal Investigator, 50%), Rebecca Sheesley (Co-PI, 50%), "Perform trace gas measurements in Waco, TX," Sponsored by University of Houston, Awarded. (June 15, 2020 - October 31, 2021). (/) - Award Letter Amount: $7,627.

Sascha Usenko (Principal Investigator, 50%), Rebecca Sheesley (Co-PI, 50%), "Focus on the air quality and atmospheric chemistry in two urban areas of Texas (Corpus Christi and San Antonio)," Sponsored by Univ of Texas at Austin, Awarded. (July 21, 2020 - August 31, 2021). (1001024 /) - Award Letter Amount: $99,798.



RECENT PUBLICATIONS

Lari E., Burket S.R., Steinkey D., **Brooks B.W.**, Pyle G.G. **2021**, In press. Interaction of the olfactory system of rainbow trout (Oncorhynchus mykiss) with diltiazem. *Environmental Toxicology and Chemistry*

Ryan B.J., Muehlenbein M.P., Allen J., Been J., Boyd K., Brickhouse M.; **Brooks B.W.**, Burchett M., Chambliss C.K., Cook .JD., Ecklund A., Fogleman L., Granick P., Hynes S., Hudson T., Huse M., Lamb M., Lowe T., Marsh J., Nixon N., Nolan D., Nuñez G., Matthews W., Stern S., Wheelis M., Brickhouse N. **2021**, In press. Sustaining university operations during the COVID-19 pandemic. *Disaster Medicine and Public Health Preparedness*

Fedorova G., Grabic R., Grabicová K., Turek J., Nguyen T.V., Randak T., **Brooks B.W.**, Zlabek V. **2022**. Water reuse for aquaculture: Comparative removal efficacy and aquatic hazard reduction of pharmaceuticals by a pond treatment system during a one year study. *Journal of Hazardous Materials* 421: 126712.

Modal A., Saha P., Bose D., Chatterjee S., Seth R.K., Xiao S., Porter D.E., **Brooks B.W.**, Scott G.I., Nagarkatti M., Nagarkatti P., Chaterjee S. **2021**. Environmental Microcystin exposure in underlying NAFLD-induced exacerbation of neuroinflammation, blood brain barrier dysfunction and neurodegeneration is NLRP3 and S100B dependent. *Toxicology* 461: 152901.

Wang Z., Wang Y.Y.L., Scott W.C., Williams E.S., Ciarlo M., DeLeo P., **Brooks B.W.**. **2021**. Comparative influences of dermal and inhalational routes of exposure on hazards of cleaning product ingredients among mammalian model organisms. *Environment International* 157: 106777.

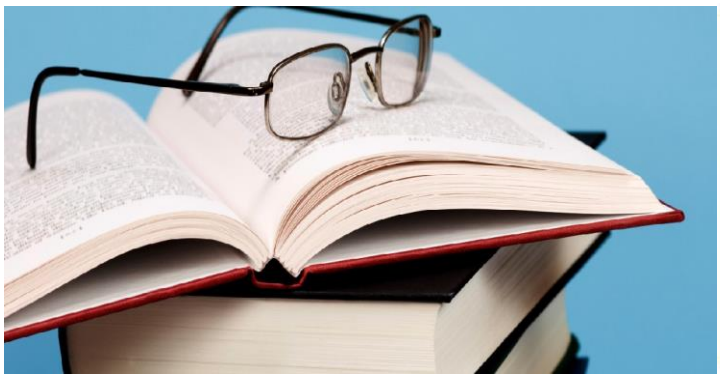
Mehinto A.C., Smith J., Wenger E., Stanton B., Linville R., **Brooks B.W.**, Sutula M.A., Howard M.D.A. **2021**. Synthesis of ecotoxicological studies on cyanotoxins in freshwater habitats – evaluating the basis for developing thresholds protective of aquatic life in the United States. *Science of the Total Environment* 795: 148864.

Horký P., Grabic R., Grabicová K., **Brooks B.W.**, Douda K., Slavík O., Hubená P., Sancho Santos E.M., Randák T. **2021**. Methamphetamine pollution elicits addiction in wild fish. *Journal of Experimental Biology* 224 (13): jeb242145.

Cheng F., Li H., **Brooks B.W.**, You J. **2021**. Signposts for aquatic toxicity evaluation in China: Text mining using event-driven taxonomy within and among regions. *Environmental Science & Technology* 55: 8977–8986.

Ford A.T., Ågerstrand M., **Brooks B.W.**, Allen H.J., Bertram M.G., Brodin T., Dang Z.C., Duquesne S., Sahm R., Hoffmann F., Hollert H., Jacob S., Klüver N., Lazorchak J.M., Ledesma M., Melvin S.D., Mohr S., Padilla S., Pyle G.C., Scholz S., Saaristo M., Smit E., Steevens J.A., van den Berg S., Kloas W., Wong B.B.M., Ziegler M., Maack G. **2021**. The role of behavioral ecotoxicology in environmental protection. *Environmental Science & Technology* 55: 5620–5628.

Fox G.A., Munoz-Carpena R., **Brooks B.W.**, Hall T. **2021**. Advancing surface water pesticide exposure assessments for ecosystem protection. *Transactions of the ASABE* 64(2): 377-387.



RECENT PUBLICATIONS

Lovin L.M., Kim S., Taylor R.B., Scarlett K.R., Langan L.M., Chambliss C.K., Chatterjee S., Scott J.T., **Brooks B.W.**. **2021**. Differential influences of (±) anatoxin-a on photolocomotor behavior and gene transcription in larval zebrafish and fathead minnows. *Environmental Sciences Europe* 33:40.

Kim S., Thapar I., **Brooks B.W**. **2021**. Epigenetic changes by per- and polyfluoroalkyl substances (PFAS). *Environmental Pollution* 279: 116929.

Wagner N.D., Quach E., Buscho S., Ricciardelli S., Kannan A., Win Naung S., Phillip G., Sheppard B., Ferguson L., Allen A., Sharon C., Duke J.R., Taylor R.B., Austin B.J., Stovall J.K., Haggard B.E., Chambliss C.K., **Brooks B.W.**, Scott J.T. **2021**. Nitrogen form, concentration, and micronutrient availability affect microcystin production in cyanobacterial blooms. *Harmful Algae* 103: 102002.

Peace A., Frost P.C., Wagner N.D., Danger M., Accolla C., Antczak P., **Brooks B.W.**, Costello D.M., Everett R.A., Flores K.B., Heggerud C.M., Karimi R., Kang Y., Kuang Y., Larson J.H., Mathews T., Mayer G.D., Murdock J.N., Murphy C.A., Nisbet R.M., Pecquerie L., Pollesch N., Rutter E.M., Schulz K.L., Scott J.T., Stevenson L., Wang H. **2021**. Stoichiometric ecotoxicology for a multi-substance world. *Bioscience* 71: 132-147.

Švecová H., Grabic R., Grabicová K., Staňová A.V., Fedorova G., Červený D., Turek J., Randák T., **Brooks B.W**. **2021**. De facto reuse at the watershed scale: Seasonal changes, population contributions, instream flows and water quality hazards of human pharmaceuticals. *Environmental Pollution* 268: 115888.

Taylor R.B., Hill B.N., Langan L.M., Chambliss C.K., **Brooks B.W. 2021**. Sunlight concurrently reduces Prymnesium parvum elicited acute toxicity to fish and prymnesins. *Chemosphere* 263: 127927.

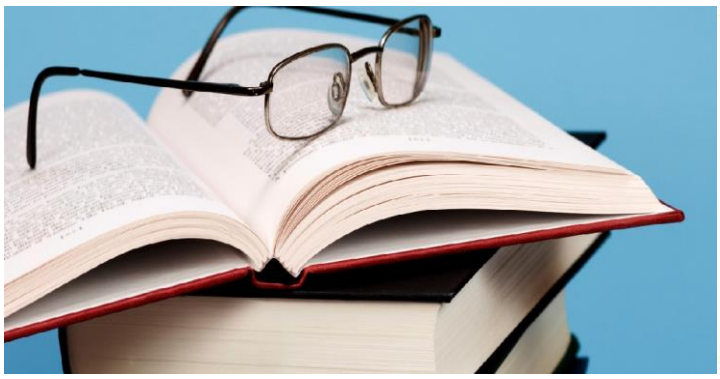
Ganesh K.N., Zhang D., Miller S.J., Rossen K., Chirik P.J., Kozlowski M.C., Zimmerman J.B., **Brooks B.W.**, Savage P.E., Allen D.T., Voutchkova-Kostal A.M. **2021**. Green Chemistry: A Framework Towards a Sustainable Future. *Environmental Science & Technology* 55: 8459-8463.

Brooks B.W., Ryan B.J. **2021**. Building Environmental Public Health Back Better. *Environmental Science & Technology Letters* 8: 443-444.

Brooks B.W., Arnold W.A., Boehm A.B., Martin J.W., Mihelcic J.R., Schlenk D., Wang S. **2021**. Quantity, Quality and Accessibility: Big Data Collection, Analysis and Synthesis in Environmental Science and Technology. *Environmental Science & Technology Letters* 8: 287–288.

Brooks B.W. 2020. Measurement and Monitoring: Essential for Managing Environment and Health. *Environmental Science & Technology Letters* 7: 620-621.

Cheng F., Li H., **Brooks B.W.**, You J. **2020**. Retrospective Risk Assessment of Chemical Mixtures in the Big Data Era: An Alternative Classification Strategy to Integrate Chemical and Toxicological Data. *Environmental Science & Technology* 54: 5925–5927.



RECENT PUBLICATIONS

Franco M.E., Stroski K.M., Sims J.L., Burket S.R., Ashcroft C., Luers M., **Brooks B.W.**, Lavado R. **2020**. Plasma vitellogenin reveals potential seasonal estrogenicity in fish from onsite wastewater treatment systems in semi-arid streams influenced by snowmelt. *Bulletin of Environmental Contamination and Toxicology* 105: 692-698.

Grabicova K., Grabic R., Fedorova G., Stanova A.V., Blaha M., Randak T., **Brooks B.W.**, Zlabek V. **2020**. Water reuse and aquaculture: Pharmaceutical bioaccumulation by fish during tertiary treatment in a wastewater stabilization pond. *Environmental Pollution* 267: 115593.

Sarkar S., Saha P., Seth R., Modall A., Bose D., Kimono D., Al-Badrani M., Mukherjee A., Porter D.E., Scott G.I., Xiao S., **Brooks B.W.**, Ferry J., Nagarkatti M., Nagarkatti P., Chatterjee S. **2020**. Higher intestinal and circulatory lactate associated NOX2 activation leads to an ectopic fibrotic pathology following microcystin coexposure in murine fatty liver disease. Comparative Biochemistry and Physiology Part C: *Toxicology and Pharmacology* 238: 108854.

Al-Badrani M., Saha P., Mondal A., Seth R.K., Sarkar S., Kimono D., Bose D., Porter D.E., Scott G.I., **Brooks B.W.**, Raychoudhury S., Nagarkatti M., Nagarkatti P., Chatterjee S. **2020**. Early microcystin-LR exposure-linked inflammasome activation in mice causes development of fatty liver disease and insulin resistance. *Environmental Toxicology and Pharmacology* 80: 103457.

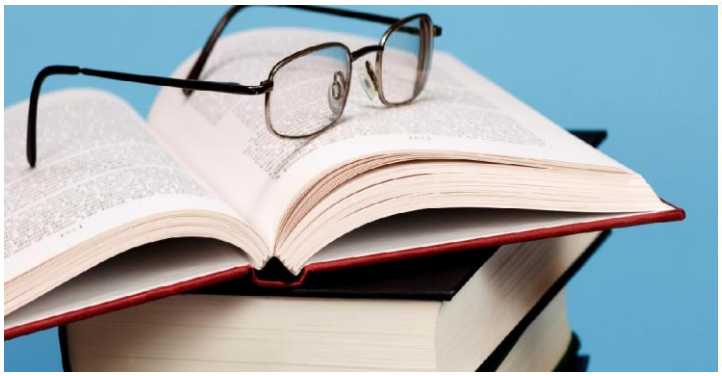
Burket S.R., Wright M.V., Baker L.F., Chambliss C.K., King R.S., Matson C.W., **Brooks B.W**. **2020**. Periphyton, bivalves and fish differentially accumulate select pharmaceuticals in effluent-dependent stream mesocosms. *Science of the Total Environment* 745: 140882.

Leung K.M.Y., Yeung K.W.Y., You J., Choi K., Zhang X., Smith R., Zhou G.J., Yung M.M.N., Arias-Barreiro C., An Y.J., Burket S.R., Dwyer R., Goodkin N., Hii Y.S., Hoang T., Humphrey C., Iwai C.B., Jeong S.W., Juhel G., Karami A., Kyriazi-Huber K., Lee K.C., Lin B., Lu B., Martin P., Nillos M.G., Oginawati K., Rathnayake V., Risjani Y., Shoeb M., Tan C.H., Tsuchiya M.C., Ankley G.T., Boxall A.B.A., Rudd M.R., **Brooks B.W**. **2020**. Towards sustainable environmental quality: Priority research questions for Asia. *Environmental Toxicology and Chemistry* 39: 1485-1505.

Borik A., Vojs Stanova A., **Brooks B.W.**, Grabicova K., Randak T., Grabic R. **2020**. Determination of citalopram in fish brain tissue: Benefits of coupling laser diode thermal desorption with low and high resolution mass spectrometry. *Analytical and Bioanalytical Chemistry* 412: 4353-4361.

Franco M.E., Burket S.R., Sims J.L., Lovin L.M., Scarlett K.R., Stroski K., Steenbeek R., Chambliss C.K., Ashcroft C., Luers M., **Brooks B.W.**, Lavado R. **2020**. Multi-approach assessment for the evaluation of spatio-temporal estrogenicity in fish from effluent-dominated surface waters under low instream flow. *Environmental Pollution* 165: 115122.

Sapozhnikova Y., Salamova A., Haddad S.P., Burket S.R., Luers M., **Brooks B.W**. **2020**. Spatial and seasonal occurrence of semi-volatile organic compounds (SVOCs) in fish influenced by snowmelt and municipal effluent discharge. *Science of the Total Environment* 737: 140222.



RECENT PUBLICATIONS

Scarlett K.R., Kim S., Lovin L.M., Chatterjee S., Scott J.T., **Brooks B.W.**. **2020**. Global scanning of cylindrospermopsin: Critical review and analysis of aquatic occurrence, bioaccumulation, toxicity and health hazards. *Science of the Total Environment* 738: 139807.

Sims J.L., Burket S.R., Franco M.E., Lovin L.M., Scarlett K.R., Steenbeek R., Chambliss C.K., Ashcroft C., Luers M., Lavado R., **Brooks B.W**. **2020**. Pharmaceutical uptake kinetics in Rainbow Trout: In situ bioaccumulation in an effluent-dominated river influenced by snowmelt. *Science of the Total Environment* 736: 139603.

Kim S., Stroski K.M., Killeen G., Smitherman C., Simcik M.F., **Brooks B.W**. **2020**. 8:8 perfluoroalkyl phosphinic acid affects neurobehavioral development, thyroid disruption, and DNA methylation in developing zebrafish. *Science of the Total Environment* 736: 139600.

Lovin L.M., **Brooks B.W**. **2020**. Global scanning assessment of anatoxins in aquatic systems: environment and health hazards, and research needs. *Marine and Freshwater Research* 71: 689-700.

Grover J.P., Scott J.T., Roelke D.L., **Brooks B.W**. **2020**. Dynamics of nitrogen-fixing cyanobacteria with heterocysts: A stoichiometric model. *Marine and Freshwater Research* 71: 644-658.

Brooks B.W., Sabo-Attwood T., Choi K., Kim S., Kostal J., LaLone C.A., Langan L.M., Margiotta-Casaluci L., You J., Zhang X. **2020**. Toxicology Advances for 21st Century Chemical Pollution. *One Earth* 2: 312-316.

Fink R., Wang Z., Oder M., **Brooks B.W**. **2020**. Balancing chemical function with reduced environmental health hazards: A joint probability approach to examine antimicrobial product efficacy and mammalian toxicity. *Journal of Cleaner Production* 262: 121323.

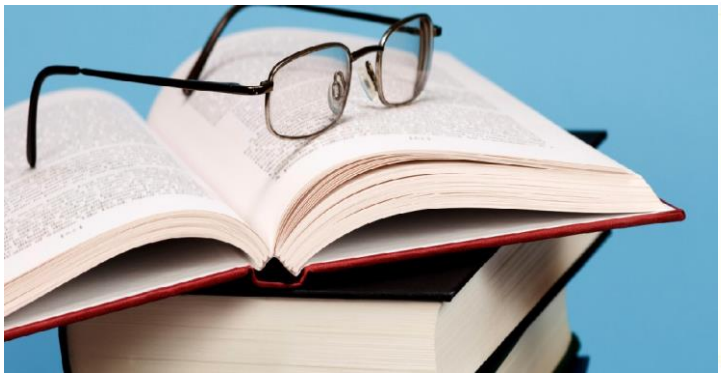
Hill B.N., Saari G.N., Steele W.B., Corrales J., **Brooks B.W**. **2020**. Nutrients and salinity influence Prymnesium parvum (UTEX LB 2797) elicited sublethal toxicity in Pimephales promelas and Danio rerio. *Harmful Algae* 93: 101795.

Wang D., Ning Q., Dong J., **Brooks B.W.**, You J. **2020**. Predicting mixture toxicity and antibiotic resistance of fluoroquinolones and their photodegradation products in Escherichia coli. *Environmental Pollution* 262: 114265.

Wang Z., Berninger J.P., You J., **Brooks B.W**. **2020**. One uncertainty factor does not fit all: Identifying mode of action and species specific acute to chronic ratios for aquatic life. *Environmental Pollution* 262: 114262.

Grabicova K., Grabic R., Fedorova G., Kolarova J., Turek J., **Brooks B.W.**, Randak T. **2020**. Psychoactive pharmaceuticals in aquatic systems: A comparative assessment of environmental monitoring approaches for water and fish. *Environmental Pollution* 261: 114150.

Gerding J.A., **Brooks B.W.**, Landeen E., Whitehead S., Kelly K.R., Allen A., Banaszynski D., Campbell D., Dorshorst M., Drager L., Eshenaur T., Freund J., Inman A., Long S., Maloney J., McKeever T., Pigman T., Rising N., Scanlan S., Scott J., Shukie C., Stewart G., Tamekazu D., Wade V., White C., Sarisky J. **2020**. Identifying needs for advancing the profession and workforce in environmental health. *American Journal of Public Health* 110: 288-294.



RECENT PUBLICATIONS

Mills M.G., Ramsden R., Ma E.Y., Corrales J., Kristofco L.A., Steele W.B., Saari G.N., Melnikov F., Kostal J., Kavanagh T.J., Zimmerman J.B., Voutchkova-Kostal A., **Brooks B.W.**, Coish P., Anastas P.T., Gallagher E. **2020**. CRISPR-generated Nrf2a loss- and gain-of-function mutants facilitate mechanistic analysis of chemical oxidative stress-mediated toxicity in zebrafish. *Chemical Research in Toxicology* 33: 426-435.

Steele W.B., Kristofco L.A., Corrales J., Saari G.N., Corcoran E.J., Hill B.N., Mills M.G., Gallagher E., Kavanagh T.J., Melnikov F., Zimmerman J.B., Voutchkova-Kostal A., Anastas P.T., Kostal J., **Brooks B.W**. **2020**. Towards less hazardous industrial compounds: coupling quantum mechanical computations, biomarker responses and behavioral profiles identify bioactivity of SN2 electrophiles in alternative vertebrate models. *Chemical Research in Toxicology* 33: 367-380.

Wang Y., Xu J., Stanley J.E., Xu M., **Brooks B.W.**, Scott G.I., Chatterjee S., Zhang Q., Zelinski M.B., Xiao S. **2020**. A closed vitrification system enables a murine ovarian follicle bank for high-throughput ovotoxicity screening, which identifies endocrine disrupting activity of microcystins. *Reproductive Toxicology* 93: 118-130.

Taylor R., Hill B.N., Bobbit J.M., Hering A.S., **Brooks B.W.**, Chambliss C.K. **2020**. Suspect and non-target screening of acutely toxic Prymnesium parvum. *Science of the Total Environment* 715: 136835.

Saari G.N., Haddad S.P., Mole R.M., Hill B.N., Steele W.B., Lovin L.M., Chambliss C.K., **Brooks B.W**. **2020**. Low dissolved oxygen increases uptake of a model calcium channel blocker and alters its effects on adult Pimephales promelas. Comparative Biochemistry and Physiology Part C: *Toxicology and Pharmacology* 231:108719.

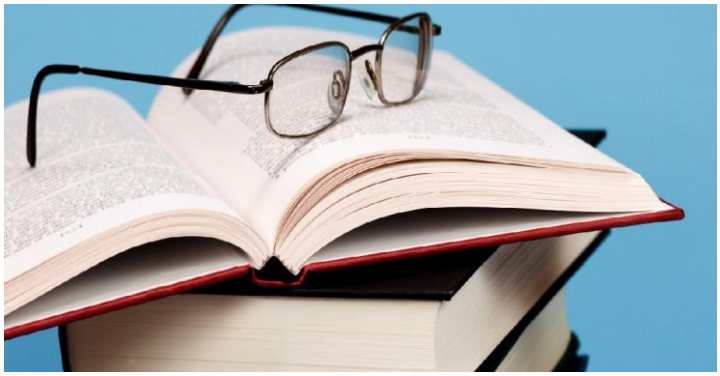
Ågerstrand M., Arnold K., Balshine S., Brodin T., **Brooks B.W.**, Maack G., McCallum E.S., Pyle G., Saaristo M., Ford A.T. **2020**. Use of behavioural endpoints in regulation of chemicals. *Environmental Science: Processes & Impacts* 22: 49-65.

Sarkar S., Alhasson F., Kimono D., Albadrani M., Seth R.K., Porter D.E., Scott G.I., **Brooks B.W.**, Nagarkatti M., Nagarkatti P., Chatterjee S. **2020**. Microcystin exposure worsens nonalcoholic fatty liver disease associated ectopic glomerular toxicity via NOX-2-miR21 axis. *Environmental Toxicology and Pharmacology* 73: 103281.

Borik A., Vojs Stanova A., Rodesova R., **Brooks B.W.**, Grabicova K., Novakova P., Grabic. **2020**. Ultrafast laser diode thermal desorption method for analysis of representative pharmaceuticals in soil leachate samples. *Talanta* 208:120382.

Grace V. Aquino, Amjad Dabi, Gabriel J. Odom, Fan Zhang, **Erica D. Bruce,** Evaluating the endothelial-microglial interaction and comprehensive inflammatory marker profiles under acute exposure to ultrafine diesel exhaust particles in vitro, *Toxicology,* Volume 454, **2021**, 152748, ISSN 0300-483X, https://doi.org/10.1016/j.tox.2021.152748

Fan Zhang, Grace V. Aquino**, Erica D. Bruce**, A quantitative and non-invasive method for nanoparticle translocation and toxicity evaluation in a human airway barrier model, *MethodsX*, Volume 7, **2020**, 100869, ISSN 2215-0161, https://doi.org/10.1016/j.mex.2020.100869



RECENT PUBLICATIONS

Liu, JQ , Lujan, H, Dhungana, B, Hockaday, WC, Sayes, CM, **Cobb, GP**, Sharma, VK, Ferrate(VI) pretreatment before disinfection: An effective approach to controlling unsaturated and aromatic halo-disinfection byproducts in chlorinated and chloraminated drinking waters, *Environment International*, Volume 138, Article Number 105641, DOI 10.1016/j.envint.2020.105641, Published MAY **2020.**

Shaw, Katherine R.; Lynch, Jennifer M.; Balazs, George H.; Jones, T. Todd; Pawloski, Jeff; Rice, Marc R.; French, Amanda D.; Liu, Jing; **Cobb, George P.**; Klein, David M., Trace Element Concentrations in Blood and Scute Tissues from Wild and Captive Hawaiian Green Sea Turtles (Chelonia mydas), *Environmental Toxicology and Chemistry*, Volume 40, Issue 1, Page 208-218, DOI 10.1002/etc.4911, Published JAN **2021.**

Liu, Jing; Li, Jining; Wolfe, Kyle; Perrotta, Brittany; **Cobb, George P.**, Mobility of arsenic in the growth media of rice plants (Oryza sativa subsp. japonica. 'Koshihikari') with exposure to copper oxide nanoparticles in a life-cycle greenhouse study, *Science of Total Environment,* Volume 774, Article Number 145620, DOI 10.1016/j.scitotenv.2021.145620, Published JUN 20 **2021.**

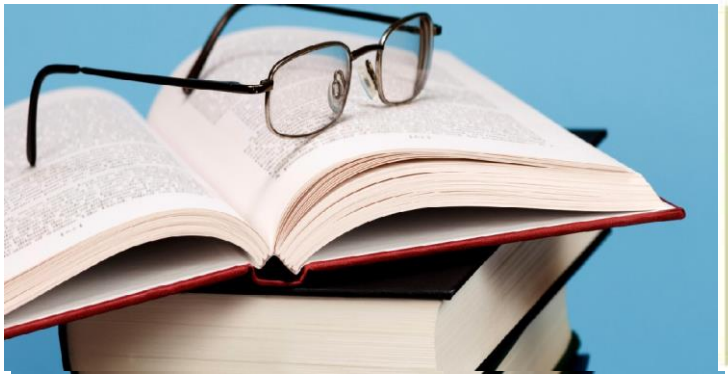
Ball, A. L., & **Lavado, R**. (2021). Ecotoxicology assessments in avian species using cell-based models: A review. *Avian Biology Research*. https://doi.org/10.1177/17581559211030850.

Franco, Marco E., Stroski, Kevin M., Sims, Jaylen L., Burket, S. Rebekah, Ashcroft, Craig, Luers, Michael, Brooks, Bryan W., **Lavado, Ramon**. Plasma Vitellogenin Reveals Potential Seasonal Estrogenicity in Fish from On-Site Wastewater Treatment Systems in Semi-Arid Streams Influenced by Snowmelt. *Bulletin of Environmental Contamination and Toxicology* 105, 692-698 (**2020**). https://doi.org/10.1007/s00128-020-03021-6.

Marco E. Franco, S. Rebekah Burket, Jaylen L. Sims, Lea M. Lovin, Kendall R. Scarlett, Kevin Stroski, Ruud Steenbeek, Craig Ashcroft, Michael Luers, Bryan W. Brooks, **Ramon Lavado**, (**2020)**.Multi-approach assessment for the evaluation of spatio-temporal estrogenicity in fish from effluent-dominated surface waters under low instream flow, *Environmental Pollution*, Volume 265, Part B, 2020, 115122, ISSN 0269-7491, https://doi.org/10.1016/j.envpol.2020.115122.

Jaylen L. Sims, S. Rebekah Burket, Marco E. Franco, Lea M. Lovin, Kendall R. Scarlett, Ruud Steenbeek, C. Kevin Chambliss, Craig Ashcroft, Michael Luers, **Ramon Lavado**, Bryan W. Brooks, (**2020**). Pharmaceutical uptake kinetics in rainbow trout: In situ bioaccumulation in an effluent-dominated river influenced by snowmelt, *Science of The Total Environment*, Volume 736, 2020, 139603, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2020.139603.

Marco E. Franco, Maria T. Fernandez-Luna, Alejandro J. Ramirez, **Ramon Lavado**, (**2020**). Metabolomic-based assessment reveals dysregulation of lipid profiles in human liver cells exposed to environmental obesogens, *Toxicology and Applied Pharmacology*, Volume 398, 2020, 115009, ISSN 0041-008X, https://doi.org/10.1016/j.taap.2020.115009.



RECENT PUBLICATIONS

Ismaeel, A.; Papoutsi, E.; Miserlis, D.; **Lavado, R.**; Haynatzki, G.; Casale, G.P.; Bohannon, W.T.; Smith, R.S.; Eidson, J.L.; Brumberg, R.; Hayson, A.; Kirk, J.S.; Castro, C.; Sawicki, I.; Konstantinou, C.; Brewster, L.P.; Pipinos, I.I.; Koutakis, P. The Nitric Oxide System in Peripheral Artery Disease: Connection with Oxidative Stress and Biopterins. *Antioxidants* **2020**, *9*, 590. https://doi.org/10.3390/antiox9070590.

Marco E. Franco, Grace E. Sutherland, Maria T. Fernandez-Luna, **Ramon Lavado**, (**2020**). Altered expression and activity of phase I and II biotransformation enzymes in human liver cells by perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS), *Toxicology*, Volume 430, **2020**, 152339, ISSN 0300-483X, https://doi.org/10.1016/j.tox.2019.152339.

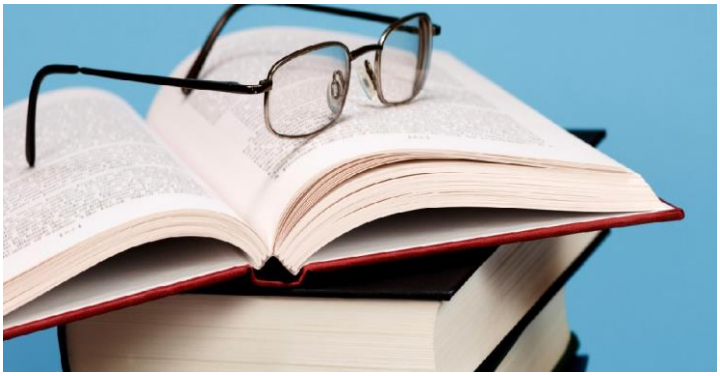
Polidoro, Beth; **Matson, Cole W.**; Ottinger, Mary Ann; Renegar, D. Abigail; Romero, Isabel C.; Schlenk, Daniel; Wise, John Pierce, Sr.; Beltran Gonzalez, Jesus; Bruns, Peter; Carpenter, Kent; Cobian Rojas, Dorka; Collier, Tracy K.; Duda, Thomas F., Jr.; Gonzalez-Diaz, Patricia; Di Giulio, Richard; Grubbs, R. Dean; Haney, J. Christopher; Incardona, John P.; Horta-Puga, Guillermo; Linardich, Christi; Moore, Jon A.; Pech, Daniel; Perera Valderrama, Susana; Ralph, Gina M.; Strongin, Kyle; Ringwood, Amy H.; Wursig, Bernd, A multi-taxonomic framework for assessing relative petrochemical vulnerability of marine biodiversity in the Gulf of Mexico, *Science of The Total Environment,* Volume 763, Article Number 142986, DOI 10.1016/j.scitotenv.2020.142986, Published APR 1 **2021.**

Custer, CM, Custer, TW, Dummer, PM, Schultz, S, Tseng, CY, Karouna-Renier, N, **Matson, CW**, Legacy and Contaminants of Emerging Concern in Tree Swallows Along an Agricultural to Industrial Gradient: Maumee River, Ohio, *Environmental Toxicology and Chemistry*, Volume 39, Issue 10, Page 1936-1952, DOI 10.1002/etc.4792, Published OCT **2020.**

S. Rebekah Burket, Moncie V. Wright, Leanne F. Baker, C. Kevin Chambliss, Ryan S. King, **Cole W. Matson**, Bryan W. Brooks, Periphyton, bivalves and fish differentially accumulate select pharmaceuticals in effluent-dependent stream mesocosms, *Science of The Total Environment*, Volume 745, **2020**, 140882, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2020.140882.

Brittany G. Perrotta, Marie Simonin, Jeffrey A. Back, Steven M. Anderson, Astrid Avellan, Christina M. Bergemann, Benjamin T. Castellon, Benjamin P. Colman, Gregory V. Lowry, **Cole W. Matson**, Emily S. Bernhardt, and Ryan S. King, Copper and Gold Nanoparticles Increase Nutrient Excretion Rates of Primary Consumers, *Environmental Science & Technology* **2020** *54* (16), 10170-10180 DOI: 10.1021/acs.est.0c02197.

Astrid Avellan, Marie Simonin, Steven M. Anderson, Nicholas K. Geitner, Nathan Bossa, Eleanor Spielman-Sun, Emily S. Bernhardt, Benjamin T. Castellon, Benjamin P. Colman, Jane L. Cooper, Mengchi Ho, Michael F. Hochella, Heileen Hsu-Kim, Sayako Inoue, Ryan S. King, Stephanie Laughton, **Cole W. Matson**, Brittany G. Perrotta, Curtis J. Richardson, Jason M. Unrine, Mark R. Wiesner, and Gregory V. Lowry, Differential Reactivity of Copper- and Gold-Based Nanomaterials Controls Their Seasonal Biogeochemical Cycling and Fate in a Freshwater Wetland Mesocosm, *Environmental Science & Technology* **2020** *54* (3), 1533-1544, DOI: 10.1021/acs.est.9b05097.



RECENT PUBLICATIONS

Beth Polidoro, **Cole W. Matson**, Mary Ann Ottinger, D. Abigail Renegar, Isabel C. Romero, Daniel Schlenk, John Pierce Wise, Jesús Beltrán González, Peter Bruns, Kent Carpenter, Dorka Cobián Rojas, Tracy K. Collier, Thomas F. Duda, Patricia González-Díaz, Richard Di Giulio, R. Dean Grubbs, J. Christopher Haney, John P. Incardona, Guillermo Horta-Puga, Christi Linardich, Jon A. Moore, Daniel Pech, Susana Perera Valderrama, Gina M. Ralph, Kyle Strongin, Amy H. Ringwood, Bernd Würsig, A multi-taxonomic framework for assessing relative petrochemical vulnerability of marine biodiversity in the Gulf of Mexico, *Science of The Total Environment*, Volume 763, **2021**, 142986, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2020.142986.

Geitner, N.K., Ogilvie Hendren, C., Cornelis, G., Kaegi, R., Lead, J.R., Lowry, G.V., Lynch, I., Nowack, B., Petersen, E., Bernhardt, E., Brown, S., Chen, W., de Garidel-Thoron, C., Hanson, J., Harper, S., Jones, K., von der Kammer, F., Kennedy, A., Kidd, J., **Matson, C.**, Metcalfe, C.D., Pedersen, J., Peijnenburg, W.J.G.M., Quik, J.T.K., Rodrigues, S.M., Rose, J., Sayre, P., Simonin, M., Svendsen, C., Tanguay, R., Tefenkji, N., van Teunenbroek, T., Thies, G., Tian, Y., Rice, J., Turner, A., Liu, J., Unrine, J., Vance, M., White, J.C., Wiesner, M.R., Harmonizing across environmental nanomaterial testing media for increased comparability of nanomaterial datasets, **2020**, 13, 36, *Environmental Science: Nano*, Environ. Sci.: Nano, 7, 1, The Royal Society of Chemistry, 2051-8153, 10.1039/C9EN00448C, 10.1039/C9EN00448C, http://dx.doi.org/10.1039/C9EN00448C.

McManamay, R.A., C.R. Vernon, H.I. Jager. **2021**. Global biodiversity implications of alternative electrification strategies under the Shared Socioeconomic Pathways. *Biological Conservation* (in press).

George, R.N., M.B. Lueders, B.L. Ruddell, **R.A. McManamay**. **2021**. Earth's Imperiled Rivers. *Reference Module in Earth Systems and Environmental Sciences*. DOI: 10.1016/B978-0-12-821139-7.00066-0.

Major, J., D. Perry, C. Aslan, **R. McManamay**. **2021**. Identifying gaps in protected areas to expand integrated riverine ecosystem conservation. *Conservation Science and Practice* DOI: 10.1111/csp2.470.

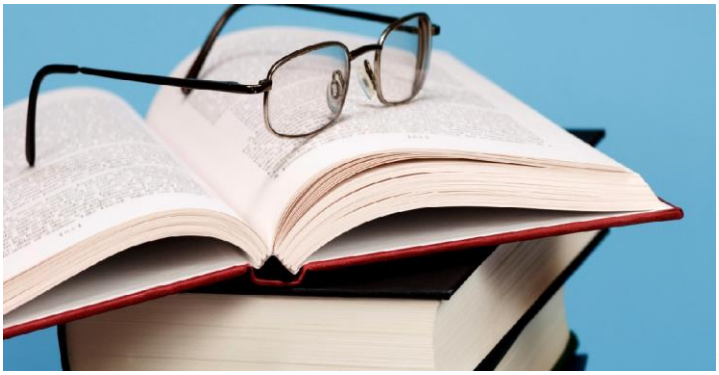
Bhaduri, B., **R. McManamay**, O. Omitaomu, J. Sanyal, A. Rose. **2021**. Urban energy systems: Research at Oak Ridge National Laboratory, pgs 281-308, In Shi, W., M.F. Goodchild, M. Batty, M-P. Kwan, A Zhang (Ed.) *Urban Informatics*, The Urban Book Series, Springer DOI:

10.1007/978-981-15-8983-6.
McManamay, R.A., B. KC, M.R. Allen-Dumas, S-C. Kao, C.M. Brelsford, J. Sanyal, R.N. Stewart, B.L. Bhaduri. **2021**. Reanalysis of water withdrawal for agriculture, electric power, and public supply sectors in the conterminous United States, 1950 to 2016. *Water Resources Research* 57: e2020WR027751. https://doi.org/10.1029/2020WR027751.

Canyon, D & **Ryan, B**. (**2021**). Military and Private Sector HADR – Now a Sophisticated Too for Strategic Completion. Security Nexus, 22.

Brooks, B & **Ryan, B**. (**2021**). Building Environmental Public Health Back Better. Environmental Science & Technology Letters 2021 8 (6), 443-444. DOI: https://doi.org/10.1021/acs.estlett.1c00391.

Ryan, B., Muehlenbein, M., Allen, J., et al (**2021**). Sustaining university operations during the COVID-19 pandemic. Disaster Medicine and Public Health Preparedness. DOI: https://doi.org/10.1017/dmp.2021.69.



RECENT PUBLICATIONS

Ryan, BJ, Coppola, D., Williams, J., Swienton, R., COVID-19 Contact Tracing Solutions for Mass Gatherings, *Disaster Medicine and Public Health Preparedness,* Volume 15, Issue 3, Page E1-E7, Article Number PII S1935789320002414, DOI 10.1017/dmp.2020.241, Published JUN **2021.**

Ryan, BJ. ; Swienton, R.; Harris, C.; James, J.J., Environmental Health Workforce - Essential for Interdisciplinary Solutions to the COVID-19 Pandemic, *Disaster Medicine and Public Health Preparedness,* Volume15, Issue 2, Page E1-E3, DOI 10.1017/dmp.2020.242, Published APR **2021.**

Ryan, B.J., Foug, K.L., Gioscia-Ryan, R.A., Varshney, P., Ludzki, A.C., Ahn, C., Schleh, M.W., Gillen, J.B., Chenevert, T.L., Horowitz, J.F., Exercise training decreases whole-body and tissue iron storage in adults with obesity Volume 106, Issue 4, Page 820-827, DOI 10.1113/EP089272, Published APR **2021.**

Burkle, F.M., Jr., Bradt, D.A., **Ryan, B.J.**, Global Public Health Database Support to Population-Based Management of Pandemics and Global Public Health Crises, Part I: The Concept, *Prehospital and Disaster Medicine*, Volume 36, Issue 1, Page 95-104, Article Number PII S1049023X20001351, DOI 10.1017/S1049023X20001351, Published FEB **2021.**

Burkle, F.M., Bradt, D.A., Green, J., **Ryan, B.J.**, Global Public Health Database Support to Population-Based Management of Pandemics and Global Public Health Crises, Part II: The Database, *Prehospital and Disaster Medicine*, Volume 36, Issue 1, Page 105-110, Article Number PII S1049023X20001363, DOI 10.1017/S1049023X20001363, Published FEB **2021.**

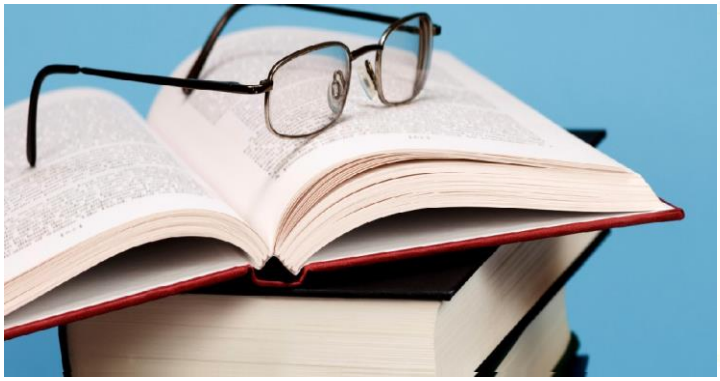
Akinci, E.Y., Boutros, S., **Ryan, B.J.**, Sargin, P., Akinci, B., Neidert, A.H., Hench, R., Horowitz, J.F., Oral, E.A., Iron parameters in patients with partial lipodystrophy and impact of exogenous leptin therapy, *BMJ Open Diabetes Research & Care*, Volume 9, Issue 1, Article Number e002385, DOI 10.1136/bmjdrc-2021-002385, Published **2021.**

Ryan, B.J., Coppola, D., Canyon, D.V., Brickhouse, M., Swienton, R., COVID-19 Community Stabilization and Sustainability Framework: An Integration of the Maslow Hierarchy of Needs and Social Determinants of Health, *Disaster Medicine and Public Health Preparedness,* Volume 14, Issue 5, Page 623-629, Article Number PII S1935789320001093, DOI 10.1017/dmp.2020.109, Published OCT **2020.**

Ryan, B.J., Foug, K.L., Gioscia-Ryan, R.A., Ludzki, A.C., Ahn, C., Schleh, M.W., Gillen, J.B., Chenevert, T.L., Horowitz, J.F., Skeletal muscle ferritin abundance is tightly related to plasma ferritin concentration in adults with obesity, *Experimental Physiology,* Volume 105, Issue 11, Page 1808-1814, DOI 10.1113/EP089010, Published NOV **2020.**

Al Naggar, Y, Brinkmann, M, **Sayes, CM**, AL-Kahtani, SN, Dar, SA, El-Seedi, HR, Grunewald, B, Giesy, JP, Are Honey Bees at Risk from Microplastics? *Toxics*, Volume 9, Issue 5, Article Number 109, DOI 10.3390/toxics9050109, Published MAY **2021.**

Patel, I., Woodcock, J., Beams, R., Stranick, S.J., Nieuwendaal, R., Gilman, J.W., Mulenos, M.R., **Sayes, C.M.** , Salari, M., DeLoid, G., Demokritou, P., Harper, B., Harper, S., Ong, KJ, Shatkin, JA, Fox, DM, Fluorescently Labeled Cellulose Nanofibers for Environmental Health and Safety Studies, *Nanomaterials*, Volume 11, Issue 4, Article Number 1015, DOI 10.3390/nano11041015, Published APR **2021.**



RECENT PUBLICATIONS

Gibb, M., Pradhan, S.H., Mulenos, M.R., Lujan, H., Liu, J., Ede, J.D., Shatkin, J.A., **Sayes, C.M.**, Characterization of a Human In Vitro Intestinal Model for the Hazard Assessment of Nanomaterials Used in Cancer Immunotherapy, *Applied Sciences-Basel*, Volume 11, Issue 5, Article Number 2113, DOI 10.3390/app11052113, Published MAR **2021.**

Sayes, C.M., Singal, M., The link between delivered aerosol dose and inflammatory responses: Exposing a lung Cell Co-Culture system to selected Allergens and irritants, *Journal of Aerosol Science*, Volume 151, Article Number 105677, DOI 10.1016/j.jaerosci.2020.105677, Published JAN **2021.**

Liu, J.Q., **Sayes, C.M.**, Sharma, V.K., Li, Y., Zhang, X.R., Addition of lemon before boiling chlorinated tap water: A strategy to control halogenated disinfection byproducts, *Chemosphere*, Volume 263, Article Number 127954, DOI 10.1016/j.chemosphere.2020.127954, Published JAN **2021.**

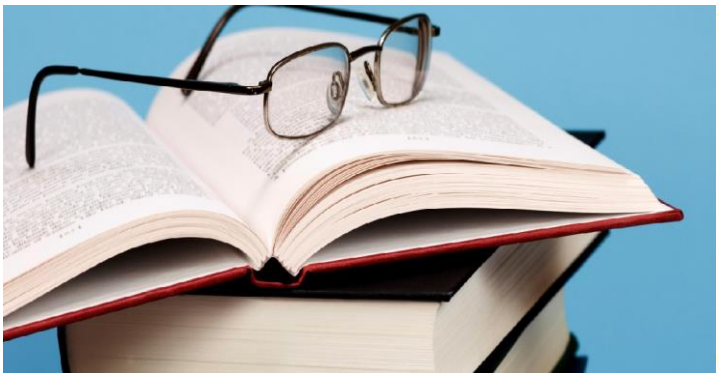
Liu, J.Q., Mulenos, M.R., Hockaday, W.C., **Sayes, C.M.**, Sharma, V.K., Ferrate(VI) pretreatment of water containing natural organic matter, bromide, and iodide: A potential strategy to control soluble lead release from PbO2(s), *Chemosphere*, Volume 263, Article Number 128035, DOI 10.1016/j.chemosphere.2020.128035, Published JAN **2021.**

Ede, J.D., Ong, K.J., Mulenos, M.R., Pradhan, S., Gibb, M., **Sayes, C.M.**, Shatkin, J.A., Physical, chemical, and toxicological characterization of sulfated cellulose nanocrystals for food-related applications using in vivo and in vitro strategies, *Toxicology Research*, Volume 9, Issue 6, Page 808-822, DOI 10.1093/toxres/tfaa082, Published DEC **2020.**

Mulenos, M.R., Lujan, H., Pitts, L.R., **Sayes, C.M.**, Silver Nanoparticles Agglomerate Intracellularly Depending on the Stabilizing Agent: Implications for Nanomedicine Efficacy, *Nanomaterials*, Volume 10, Issue 10, Article Number 1953, DOI 10.3390/nano10101953, Published OCT **2020.**

Liu, J.Q., Olson, C., Qiu, N., **Sayes, C.M.**, Differential Cytotoxicity of Haloaromatic Disinfection Byproducts and Lead Co-exposures against Human Intestinal and Neuronal Cells, *Chemical Research in Toxicology,* Volume 33, Issue 9, Page 2401-2407, DOI 10.1021/acs.chemrestox.0c00157, Published SEP 21 **2020.**

Liu, J.Q., Li, Y., Jiang, J.Y., Zhang, X.R., Sharma, V.K., **Sayes, C.M.**, Effects of ascorbate and carbonate on the conversion and developmental toxicity of halogenated disinfection byproducts during boiling of tap water, *Chemosphere*, Volume 254, Article Number 126890, DOI 10.1016/j.chemosphere.2020.126890, Published SEP **2020.**



RECENT PUBLICATIONS

Pradhan, S.H., Mulenos, M.R., Steele, L.R., Gibb, M., Ede, J.D., Ong, K.J., Shatkin, J.A., **Sayes, C.M.**, Physical, chemical, and toxicological characterization of fibrillated forms of cellulose using an in vitro gastrointestinal digestion and co-culture model, *Toxicology Research*, Volume 9, Issue 3, Page 290-301, DOI 10.1093/toxres/tfaa026, Published JUN **2020.**

Lujan, H., Romer, E., Salisbury, R., Hussain, S., **Sayes, C.**, Determining the Biological Mechanisms of Action for Environmental Exposures: Applying CRISPR/Cas9 to Toxicological Assessments, Toxicological Sciences, Volume 175, Issue 1, Page 5-18, DOI 10.1093/toxsci/kfaa028, Published MAY **2020.**

Ong, K.J., Ede, J.D., Pomeroy-Carter, C.A., **Sayes, C.M.**, Mulenos, M.R., Shatkin, J.A., A 90-day dietary study with fibrillated cellulose in Sprague-Dawley rats, *Toxicology Reports*, Volume 7, Page 174-182, DOI 10.1016/j.toxrep.2020.01.003, Published **2020.**

Liu, J., Gunsch, M.J., Moffett, C.E., Xu, L., El Asmar, R., Zhang, Q., Watson, T.B., Allen, H.M., Crounse, J.D., St Clair, J., Kim, M., Wennberg, P.O., Weber, R.J., **Sheesley, R.J.**, Pratt, K.A., Hydroxymethanesulfonate (HMS) Formation during Summertime Fog in an Arctic Oil Field, *Environmental Science & Technology Letters,* Volume 8, Issue 7, Page 511-518, DOI 10.1021/acs.estlett.1c00357, Published JUL 13 **2021.**

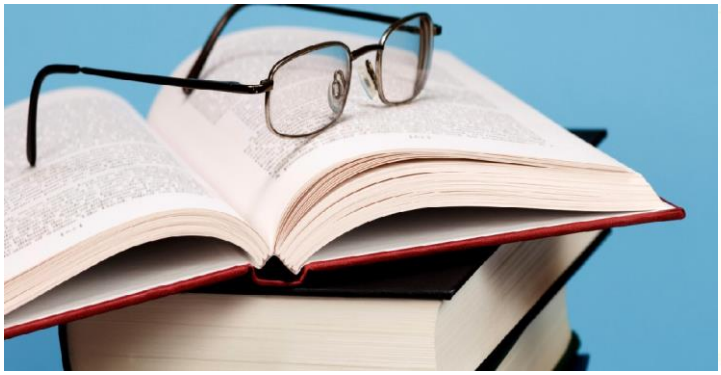
VerPloeg, S.L.G., Clark, A.E., Yoon, S., Ruiz, L.H., **Sheesley, R.J.**, Usenko, S., Assessing the atmospheric fate of pesticides used to control mosquito populations in Houston, *Chemosphere*, Volume 275, Article Number 129951, DOI 10.1016/j.chemosphere.2021.129951, Published JUL **2021.**

Sirmollo, C.L., Collins, D.R., McCormick, J.M., Milan, C.F., Erickson, M.H., Flynn, J.H., **Sheesley, RJ**, Usenko, S., Wallace, H.W., Bui, A.A.T., Griffin, R.J., Tezak, M., Kinahan, S.M., Santarpia, J.L., Captive Aerosol Growth and Evolution (CAGE) chamber system to investigate particle growth due to secondary aerosol formation, *Atmospheric Measurement Techniques*, Volume 14, Issue 5, Page 3351-3370, DOI 10.5194/amt-14-3351-2021, Published MAY 6 **2021.**

Yoon, S., Ortiz, S.M., Clark, A.E., Barrett, T.E., Usenko, S., Duvall, R.M., Ruiz, L.H., Bean, J.K., Faxon, C.B., Flynn, J.H., Lefer, B.L., Leong, Y.J., Griffin, R.J., **Sheesley, R.J.**, Apportioned primary and secondary organic aerosol during pollution events of DISCOVER-AQ Houston, *Atmospheric Environment*, Volume 244, Article Number 117954, DOI 10.1016/j.atmosenv.2020.117954, Published JAN 1 **2021.**

Moffett, C.E., Barrett, T.E., Liu, J., Gunsch, M.J., Upchurch, L.M., Quinn, P.K., Pratt, K.A., **Sheesley, R.J.**, Long-Term Trends for Marine Sulfur Aerosol in the Alaskan Arctic and Relationships with Temperature, *Journal of Geophysical Research-Atmospheres*, Volume 125, Issue 22, Article Number e2020JD033225, DOI 10.1029/2020JD033225, Published NOV 27 **2020.**

Yoon S, Usenko S, **Sheesley RJ**. Fine and Coarse Carbonaceous Aerosol in Houston, TX, during DISCOVER-AQ. Atmosphere. **2020**; 11(5):482. https://doi.org/10.3390/atmos11050482.



RECENT PUBLICATIONS

Guo, F.Z., Bui, A.A.T., Schulze, B.C., Yoon, S., Shrestha, S., Wallace, H.W., Sakai, Y., Actkinson, B.W., Erickson, M.H., Alvarez, S., Sheesley, R., **Usenko, S.**, Flynn, J., Griffin, R.J., Urban core-downwind differences and relationships related to ozone production in a major urban area in Texas, *Atmospheric Environment*, Volume 262, Article Number 118624, DOI 10.1016/j.atmosenv.2021.118624, Published OCT 1 **2021.**

VerPloeg, S.L.G., Clark, A.E., Yoon, S., Ruiz, L.H., Sheesley, R.J., **Usenko, S.**, Assessing the atmospheric fate of pesticides used to control mosquito populations in Houston, *Chemosphere*, Volume 275, Article Number 129951, DOI 10.1016/j.chemosphere.2021.129951, Published JUL **2021.**

Sirmollo, C.L., Collins, D.R., McCormick, J.M., Milan, C.F., Erickson, M.H., Flynn, J.H., Sheesley, R.J., **Usenko, S.**, Wallace, H.W., Bui, A.A.T., Griffin, R.J., Tezak, M., Kinahan, S.M., Santarpia, J.L., Captive Aerosol Growth and Evolution (CAGE) chamber system to investigate particle growth due to secondary aerosol formation, Atmospheric Measurement Techniques, Volume 14, Issue 5, Page 3351-3370, DOI 10.5194/amt-14-3351-2021, Published MAY 6 **2021.**

Mansouri, F., Winfield, Z.C., Crain, D.D., Morris, B., Charapata, P., Sabin, R., Potter, C.W., Hering, A.S., Fulton, J., Trumble, S.J., **Usenko, S.**, Evidence of multi-decadal behavior and ecosystem-level changes revealed by reconstructed lifetime stable isotope profiles of baleen whale earplugs, *Science of the Total Environment*, Volume 757, Article Number 143985, DOI 10.1016/j.scitotenv.2020.143985, Published FEB 25 **2021.**

Yoon, S., Ortiz, S.M., Clark, A.E., Barrett, T.E., **Usenko, S.**, Duvall, R.M., Ruiz, L.H., Bean, J.K., Faxon, C.B., Flynn, J.H., Lefer, B.L., Leong, Y.J., Griffin, R.J., Sheesley, R.J., Apportioned primary and secondary organic aerosol during pollution events of DISCOVER-AQ Houston, *Atmospheric Environment*, Volume 244, Article Number 117954, DOI 10.1016/j.atmosenv.2020.117954, Published JAN 1 **2021.**

Mansouri, F., Crain, D.D., Winfield, Z.C., Sabin, R., Potter, C.W., Zhang, R., Trumble, S.J., **Usenko, S.**, A lipid normalization model for the analysis of stable isotopes in baleen whale earplugs, *Marine Mammal Science*, Volume 37, Issue 2, Page 690-695, DOI 10.1111/mms.12756, Published APR **2021.**

Winfield, Z.C., Mansouri, F., Potter, C.W., Sabin, R., Trumble, S.J., **Usenko, S.**, Eighty years of chemical exposure profiles of persistent organic pollutants reconstructed through baleen whale earplugs, *Science of the Total Environment*, Volume 737, Article Number 139564, DOI 10.1016/j.scitotenv.2020.139564, Published OCT 1 **2020.**

Crain, D.D., Thomas, A., Mansouri, F., Potter, C.W., **Usenko, S.**, Trumble, S.J., Hormone comparison between right and left baleen whale earplugs, *Conservation Physiology*, Volume 8, Article Number coaa055, DOI 10.1093/conphys/coaa055, Published JUN 24 **2020.**

Yoon S**, Usenko S**, Sheesley RJ. Fine and Coarse Carbonaceous Aerosol in Houston, TX, during DISCOVER-AQ. Atmosphere. **2020**; 11(5):482. https://doi.org/10.3390/atmos11050482.

The Environmental Science Department produces a newsletter each semester.

If you are an Environmental Science student, working on a project, serving an internship, studying abroad, graduating or have some exciting news and want to share an article or picture, send an email to:

Erica _C_Johnson@baylor.edu

Baylor University
COLLEGE OF ARTS & SCIENCES
Department of Environmental Science
One Bear Place #97266 | Waco, TX 76798-7266