

AEESP Newsletter

Published three times yearly by the Association of Environmental Engineering & Science Professors

February 2024

VOLUME 59 No. 1

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Need to renew your 2024 AEESP membership? Go to "Membership > Renew My AEESP Membership" on the AEESP Website: AEESP.org

AEESP Newsletter Submissions

Please send news, conference announcements, job postings, letters to the editor, and other contributions to the newsletter to Kyle Doudrick at kdoudrick@nd.edu. The next newsletter will appear in June 2024.

President's Letter: A Semester of Dedication and Progress

By Debora Frigi Rodrigues, Ph.D.
University of Houston



As I reflect upon the past semester, it fills me with immense pride and gratitude for the accomplishments we have achieved together as a community. Our success would not be possible without the participation of our members, partners, and sponsors. In addition, I would like to acknowledge the unwavering dedication of the AEESP executive board, committees, and members for taking their personal time to guide and grow this organization. It is a true honor to be part of an organization where passion and commitment thrive. Despite the demands of our academic and personal lives, our members consistently find time to contribute voluntarily to AEESP's success.

In the short span of four months, significant progress has been made across various fronts:

can Academy of Environmental Engineers

- 1. Committee Membership Transparency:** We are refining our guidelines to ensure transparency in committee member selection to ensure diversity and inclusion, making the process uniform across all committees and aligning it seamlessly with our website format. I would like to give a special thanks to Mira Olsen and Susan Masten for assisting me with this endeavor.
- 2. Engagement with Students and Sustaining Members:** We have launched a campaign to identify and recruit more Sustaining Members to participate in our organization. We have also partnered with the Ameri-

can Academy of Environmental Engineers and Scientists (AAEES) to hold joint career fairs to better serve the student membership. I would like to give special thanks to Daniel Oerther, Fabrizio Sabba, and Karl Linden for helping me with this endeavor this year.

- 3. Financial Review:** We've undertaken a comprehensive financial review this year with Allen Murphy. A significant outcome of this review was the presence of uninvested funds. I am pleased to inform you that, in collaboration with Morgan Stanley, we are channeling these funds into a high-yield savings account, ensuring optimal utilization and growth of these funds to continue supporting the AEESP administrative costs and the AEESP foundation endeavors. A special thanks to Treavor Boyer and Donna Fennell for spearheading this initiative with the board.
- 4. New Task Forces:** Upon my start at AEESP, I established three new task forces, each aimed at fostering growth and collaboration within AEESP:
 - a. Request for applications (RFA) task force:** This group is developing a RFA for funding requests to the AEESP board for workshops, symposia, and conferences. Stay tuned for more updates! A special thanks to Kara Nelson, Belinda Strum, and Treavor Boyer for taking charge of this initiative.
 - b. International Affairs task force:** With a robust team of 16 AEESP members, we are identifying current success models used by other international organizations, expanding our international footprint by identifying a pilot country to expand our membership internationally, and identifying benchmarks and mechanisms to promote international expansion by taking into consider-

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The AEESP Newsletter is published three times a year in February, July, and October by the Association of Environmental Engineering and Science Professors. Issues are published online at:

www.aeesp.org/news/newsletter-archive

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ation the mission and vision of our organization. The members of this new task force are Debora F. Rodrigues, Lee Blaney, Mira Olson, Belinda Strum, Yuxin Wang, Pedro Puente, Fuzhan Nasiri, Kyoung-Yeol Kim, Sudeep Popat, Amit Kumar, Srijan Aggarwal, Anu Ramaswami, Mohan B. Dangi, Shihong Lin, Syeed Iskander, and Lucia Rodriguez Freire. Thank you all for your service!

- c. **Liaison and Outreach task force:** With an enthusiastic team of 11 members, our focus is on amplifying support for under-represented groups within our organization. We aim to forge partnerships with BIPOC-led organizations, share successful recruitment and retention strategies, and elevate voices that often remain unheard. Heartfelt appreciation to our dedicated members, including Debora F. Rodrigues, Lee Blaney, Kara Nelson, Jose Cerrato, Jessica Ray, Isaiah Spencer-William, Gisella Lamas Samanamud, Andres F. Clarens, Christopher I. Olivares Martinez, Aaron Bivins, and Fernando L. Rosario-Ortiz, for their invaluable contributions.

In closing, I want to express my deepest gratitude to each one of you. Our successes, both past and those on the horizon, are a testament to the collective spirit and dedication of the AEESP family. As we look forward to the next semester, I am filled with optimism and excitement for the transformative journey ahead.

Warm regards,

Debora F. Rodrigues, Ph.D.
AEESP President

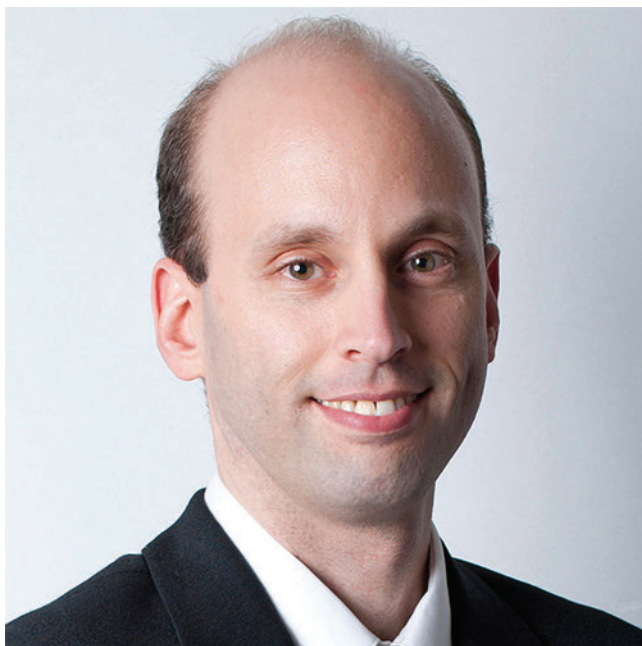
AEESP Foundation Board Welcomes Two New Members

By Jennifer Becker, AEESP Foundation Chair

In December, 2023, the AEESP Foundation Board of Directors elected two new members, Dr. Donna Fennell (Rutgers University) and Dr. Philip Larese-Casanova (Northeastern University), who began their three-year terms in January, 2024. Dr. Fennell was elected as a member of the AEESP Board of Directors. Dr. Larese-Casanova was elected from the general AEESP membership and most recently served as Chair of the Organizing Committee of the 2023 AEESP Research & Education Conference. Previously he served as Vice-Chair and Chair of the AEESP Student and Postdoc Services Committee and led a number of initiatives geared to advancing the careers of students, post-docs, and early career faculty.

The Foundation Board by-laws specify that three of its directors are to be members of the AEESP Board of Directors at the time of their election to the Foundation Board. Since 2022, the Foundation Board has solicited self nominations from the general AEESP membership with a strong history of involvement with, and service to, AEESP; the ability to dedicate the time needed to complete the work of the Foundation; strong organizational and leadership skills; and the willingness to ultimately serve as Foundation Chair. The AEESP Foundation was very pleased to receive several strong self-nominations from well-qualified candidates in 2023. The next request for self-nominations of prospective Board members from the general AEESP membership will be issued in Fall, 2024.

The Foundation Board welcomes Drs. Fennell and Larese-Casanova and also thanks Dr. Willie Harper (Air Force Institute of Technology) and Dr. Heileen Hsu-Kim (Duke University) for their dedicated service on the Board during the past three and four years, respectively!



*Phil Larese-Casanova, Ph.D.
Northeastern University*



*Donna E. Fennell, Ph.D.
Rutgers University*

AEESP Foundation appreciates and recognizes the generosity of all who donated in 2023

By Jennifer Becker, AEESP Foundation Chair



The AEESP Foundation works to enhance the public outreach and education efforts of AEESP members and encourage excellence in environmental engineering and science education and research. The Foundation accomplishes this mission, in part, by providing stewardship of the financial resources needed to support the AEESP Distinguished Lecturer Series and AEESP Awards. In recent years, the Foundation has worked to endow several awards, including the Edward J. Bouwer/AEESP Outstanding Doctoral Dissertation Award, which was awarded for the first time in 2023. Endowing the AEESP awards ensures that the AEESP Foundation can continue to provide cash prizes, plaques, and travel stipends to award recipients.

The AEESP Foundation is thankful to all of the individuals who have played key roles in fundraising efforts over the years. We are also grateful to all of the individuals who generously donated to the AEESP Foundation in 2023. Individuals who donated to the AEESP Foundation in 2023 are listed below in alphabetical order:

The AEESP Foundation is thankful to all of the individuals who have played key roles in fundraising efforts over the years. We are also grateful to all of the individuals who generously donated to the AEESP Foundation in 2023. Individuals who donated to the AEESP Foundation in 2023 are listed below in alphabetical order:

- William Arnold, University of Minnesota
- Shannon Bartelt-Hunt, University of Nebraska-Lincoln
- Bill & Colleen Batchelor, Texas A&M University
- Jennifer Becker & Eric Seagren, Michigan Technological University
- Lee Blaney, University of Maryland, Baltimore County
- Stephanie Bolyard, North Carolina Department of Environmental Quality
- Patricia Bouwer
- Treavor Boyer, Arizona State University
- Marisa Chrysochoou, University of Connecticut
- Cliff Davidson, Syracuse University
- Michael Dodd, University of Washington
- Willie Harper, Air Force Institute of Technology
- Heileen Hsu-Kim, Duke University
- Allison MacKay, The Ohio State University
- Susan Masten, Michigan State University
- Alan Rabideau, University at Buffalo, SUNY
- Debora Rodrigues, University of Houston
- David Sanchez, University of Pittsburgh
- Peter Strom, Rutgers University

In addition to the above individuals who made financial con-

tributions, several individuals supported the AEESP Foundation by opting to not receive an AEESP / AEESP Foundation plaque (valued at ~\$100) in recognition of their accomplishments or service to AEESP or the AEESP Foundation. These savings were then reallocated to an award endowment fund or the AEESP Foundation general operating fund. We express our gratitude to the individuals who supported the AEESP Foundation in this way and are listed below in alphabetical order:

Nirupam Aich, University of Nebraska-Lincoln
 W. Andrew Jackson, Texas Tech University
 William Ball, Johns Hopkins University
 Treavor Boyer, Arizona State University
 Marisa Chrysochoou, University of Connecticut
 Jeffrey Cunningham, University of South Florida
 Nicole Fahrenfeld, Rutgers University
 Mary Jo Kirisits, University of Texas at Austin
 Mark Krzmarzick, Oklahoma State University

Richard Luthy, Stanford University
 Allison MacKay, The Ohio State University
 Brooke Mayer, Marquette University
 Natalie Mladenov, San Diego State University
 Junko Munakata, Colorado School of Mines
 Alma Rocha, New York University
 Alan Stone, Johns Hopkins University
 Erin Surdo, University of Minnesota

To learn more about the AEESP awards, including their endowment status, please visit <https://aeespfoundation.org/awards>. To make a contribution to the AEESP Foundation via credit card, please visit <https://aeespfoundation.org/donate> or contact Brian Schorr by email at bschorr@aeesp.org or via telephone at 202-261-1309. To donate stock to the AEESP Foundation, please contact AEESP Foundation Chair, Jennifer Becker, at jgbecker@mtu.edu.

Bridging Gaps in PFAS Removal from Water: Dr. Xiao's Lecture at the AWWA-WQTC

Dr. Feng 'Frank' Xiao gave the AEESP Emerging Investigator Lecture at the AWWA-WQTC conference on November 6, 2023. Dr. Xiao, an Associate Professor at the University of Missouri, engaged his audience with a lecture titled "Tackling PFAS in Water Infrastructure: Strategies for Treatment and Management in Water Systems." His discussion focused on the challenges posed by perfluorinated chemicals and polyfluoroalkyl substances (or precursors) in water systems, highlighting advancements in both technical and non-technical methodologies. This lecture not only highlighted Dr. Xiao's significant contributions in the

field of PFAS treatment and remediation but also resonated with AEESP's commitment to advancing knowledge and bridging the gap between academia and the water industry. Corona Environmental Consulting has generously sponsored this talk. Dr. Xiao extends his gratitude to the anonymous colleague(s) who nominated him, the anonymous committee members who supported this nomination, and the entire AEESP Executive Committee for their dedicated service to the environmental community.



AEESP thanks the support of Sustaining Member Corona Environmental Consulting for making this lecture at AWWA-WQTC possible.



Dr. Xiao preparing to provide AEESP's lecture at AWWA-WQTC.

AEESP Distinguished Lecturer Dr. Elizabeth Edwards Visits 17 Schools in 2023-2024 Lecture Series



Each year, the Distinguished Lecturer is selected by the AEESP Lecturers Committee in recognition of his or her excellence as both a researcher and educator and ability to give engaging oral presentations to members of the environmental engineering community and the general public. This year, Dr. Elizabeth Edwards, P. Eng., from the University of Toronto is AEESP's Distinguished Lecturer.

Dr. Edwards is visiting 17 schools across 3 continents and offering two lectures:

- "Adventures in anaerobic bioremediation" and
- "The complex microbiology of pilot and full-scale anaerobic digestion systems"

Abstracts for each of these lectures as well as Dr. Edwards' background and series schedule may be found on the AEESP Foundation's website [here](#).

The Lecturers Committee is currently reviewing nominations for next year's Distinguished Lecturer. If your school would like to host the Lecturer, you may submit an application online [here](#).

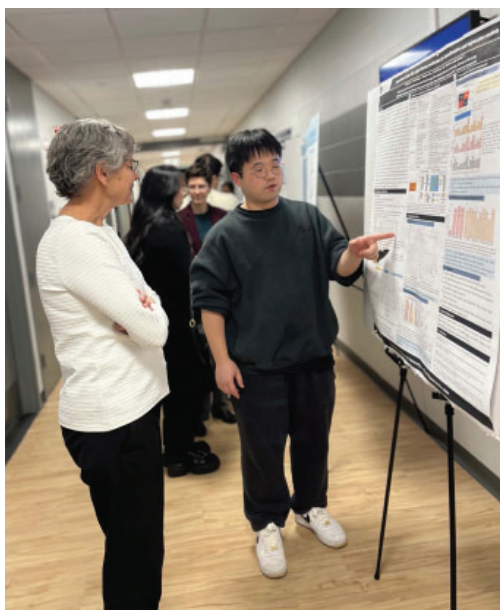
On December 1, 2023, the University at Buffalo, along with co-hosts Case Western Reserve University, Cornell University, and Syracuse University, hosted Dr. Edwards. The following are a collection of pictures taken of Dr. Edwards' visit. We hope you enjoy them!



Lecture Session
12/1/2023



Evening Reception
12/1/2023



Graduate Student Poster Session
12/1/2023



Tour of Frank Lloyd Wright's Martin House
12/2/2023

AEESP Foundation Educational Grant Reports

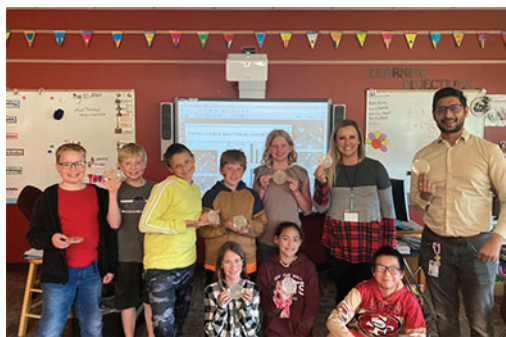
Each year, the AEESP Foundation's Educational Grant program allows individuals and/or organizations to utilize expertise garnered from research and teaching at the university level to improve K-12 instruction, with the goal of preparing students to be future environmental engineers and scientists. The following Executive Summaries were provided by recent grant recipients following the conclusions of their projects. Their full reports, along with reports of other past grant recipients, as well as information on how to apply for future Educational Grants, may be found on the AEESP Foundation's website [here](#). Click on the title of each project to view the full reports.

Microbiome of the Built Environment

*Project Team: Dr. Obulisamy Parthiba Karthikeyan, Dr. Gadhamshetty Venkataramana, and Dr. Purushotham Tukkaraja
South Dakota School of Mines and Technology*

PROJECT SUMMARY:

The project aim was to provide scientific knowledge and training for the K-12 students, specifically to help them study and understand the importance of microbiome of the built indoor environment (Be-Microbiome). The training included lectures, hands-on training, and sample collection from indoor environment including school buildings and deep subsurface environment of the Sanford Underground Research Facility (SURF). Training materials included lecture notes and information sheets. They focused on key air quality parameters including temperature, humidity, gases and microbial community (mainly bacterial population), all in responses to changes in the ambient conditions of built environments. We trained nearly ~200 students from Spearfish, South Dakota, USA. Hands on training was provided for students to measure the indoor air quality including microbial diversity analysis. We have developed questionnaires to gauge their level of their understanding before and after the training. We have used an assessment metrics that was previously developed by the SD EPSCoR office for ongoing projects funded by National Science Foundation. The study outcome was promising, and the feedback from students and teachers were used to improve the lecture contents and training activities for future outreach programs. Using this pre-pilot project outcomes and accomplishments, we are preparing an NSF-SD EPSCoR SEED funding application to expand this outreach activity for other schools within South Dakota region.



Connecting Our Future Scientists and Engineers to Environmentally Friendly Water Treatment Technology in the Post-COVID Era: A Better World Starts with Your Bioreactor

*Project Team: Dr. Guangbin Li, Dr. Marya Orf Anderson, and Dr. Natasha Andrade
University of Maryland, College Park*

PROJECT SUMMARY:

The COVID-19 pandemic result in a long-lasting impact, even permanent changes for the K-12 STEM students as the curriculums of STEM programs depends heavily on the active learning strategies, including implementation of hands-on activities, which allows students to discover new concepts and develop new understandings. In this proposed education project, we plan to design a hybrid workshop to reconnect the STEM students in a safe manner to the environmental science and engineering. We also expect to offer a potential solution to narrow the theory–practice gap by engaging K-12 students in project-based activities and highlighting the correlation between their class topics (i.e., science and manufacture/3D design) to real-world environmental issues. The goal of this project is to apply an effective and practical method to educate future generations about sustainable technologies, with the intention of inspiring students’ interest in pursuing higher education and becoming future environmental engineers and scientists. The specific objectives of this project include:

1. Objective #1: introduce students to the concept of environmentally sustainable technologies through hybrid platforms (virtual and in-person);
2. Objective #2: engage high school students in learning environmental engineering by conducting project-based hands-on activities in a safe manner;
3. Objective #3: collect data and feedback from students, parents, and teachers to improve the future outreach plan.

To achieve this, the PIs collaborated with the Science & Technology Program and Research Internship Program at the Oxon Hill High School (Maryland). The school has a total enrollment is 1,445, with 98% is minority and 51% facing economic disadvantages. In particular, PIs worked with teachers and program coordinators at the school to ensure the educational materials and resources will be properly developed to adhere to the guidelines set by the Next Generation Science Standards (NGSS), fit their students’ need, and effectively disseminated and promoted among students, making the materials/resources greater impact than what is already available online.



Spotlight: Environmental Engineering Science, AEESP Journal

AEESP Publications Committee: Dr. Adeyemi S. Adeleye, Columbia University, Dr. Baolin Deng, University of Missouri, Dr. Veera Gnanaswar Gude (Purdue University Northwest, and Dr. David A. Ladner, Committee Chair; Clemson University

The “Spotlight” column draws attention to selected articles in *Environmental Engineering Science* (EES), the official journal of the Association of Environmental Engineering and Science Professors (AEESP). Spotlight articles appear three times per year in the journal as well as in the AEESP Newsletter. Through publication of high-quality peer-reviewed research, the EES Journal helps AEESP achieve its mission of developing and disseminating knowledge in environmental engineering and science. In this entry (Early 2024) we shine the spotlight on selected articles from the August through November 2023 issues of EES. Congratulations to all whose work is highlighted.

[Elizabeth Dach, Lara David, Julian Van der Made, Mariah Pope, Joshua Chabeda, Adam Brown, John C. Foo, & Ngai Yin Yip \(2023\)](#). Are Showerhead Filters Retailed Online a Scam? Investigating Water Quality Claims Through a Course-Based Research Experience. *Environmental Engineering Science*, 40(10), 414-425.

The popular quote, “tell me and I forget, teach me and I remember, involve me and I learn” finds relevance in a paper authored by students enrolled in a technical elective course on environmental physicochemical processes at Columbia University, New York ([Dach et al., 2023](#)). The instructor, Professor Ngai Yin Yip, worked with the students to design and perform laboratory experiments to evaluate the water quality claims made by vendors of online-retailed showerhead filters. Showerhead filters are gaining popularity in the U.S., but they are not regulated and there is hardly any investigation of their water quality improvement claims. The research team evaluated five well-reviewed showerhead filters sold on Amazon for eight water quality parameters: pH, dissolved oxygen, hardness, fluoride, nitrite, nitrate, chlorine, and vitamin C levels. The tests were conducted using EPA-approved protocols or other technically robust methods. The filters affected water pH, as advertised, but not in a consistent manner. Contrary to claims that most of the filters can soften water, effluent calcium concentrations were either higher than or the same as feed concentrations. Claims of substantial removal of fluoride, nitrate and nitrite, and improvement in dissolved oxygen were also not experimentally proven. However, as advertised, all the filters led to increases in effluent vitamin C content and decreases in chlorine concentration. Overall, the authors concluded that the showerhead filters did not meet most of the investigated water quality claims. The authors postulated several hypotheses about the performance of the filters based on their vendor-disclosed content. This course-based research experience allowed the students to fill an important knowledge gap while applying some of the theories and principles learned in the course.

[Chelsea Linvill, Michael Butkus, Elle Bennett, Marley Wait, Alexander Pytlar, & Andrew Pfluger \(2023\)](#). Energy Balances for Proposed Complete Full-Scale Anaerobic Wastewater Treatment Facilities. *Environmental Engineering Science*, 40(11), 482-493.

“It takes money to make money,” is an often-heard phrase. “It takes energy to make energy,” might also be appropriate, as we learn from Linvill et al. ([2023](#)). Their subject is energy generation from wastewater, specifically through anaerobic processes in wastewater treatment facilities (WWTFs). The team took on the challenge of evaluating net energy use and production through full-scale WWTFs intentionally designed with energy recovery in mind. The calorific content of typical wastewater is about 1.54 kWh/m³; how much of that can be recovered and how much input energy is required to recover it? When all major WWTF processes are considered (from headworks through disinfection, as well as sludge treatment), only one of four studied configurations achieved energy neutrality. This was the anaerobic primary treatment plus biological nutrient removal configuration. It used about 15,000 kWh of electricity per day to treat 38,000 m³ of wastewater and recovered about the same amount of electricity through a biogas microturbine. Importantly, two of the comparison configurations included anaerobic membrane bioreactors (AnMBRs), but their energy use was greater than their energy-generating potential; research groups working on AnMBRs need to find ways to make them less energy-intensive. As readers explore further details in the paper, they might particularly enjoy Figure 1, which shows detailed flow diagrams combined with Sankey-like variable-width lines denoting energy flows.

[Eric R. Noe, Jiaqi Li, William A. Arnold, & Raymond M. Hozalski \(2023\)](#). Preoxidation Effectively Destroys N-Nitrosodimethylamine Precursors in Raw, Lime-Softened, and Recarbonated Surface Waters. *Environmental Engineering Science*, 40(11), 574-583.

N-nitrosodimethylamine (NDMA) is a known carcinogenic agent to animals and represents a 10⁻⁶ lifetime cancer risk at a nanogram per liter concentration level in drinking water. Noe et al evaluated whether preoxidation with ozone, free chlorine, or both could be effective at controlling NDMA formation through batch experiments ([Noe et al., 2023](#)). The study tested raw, lime-softened, and recarbonated water samples from two different watersheds. Their results demonstrated that ozone effectively removed NDMA precursors at a concentration as low as 1 mg/L. Preozonation at a dose of 2 mg/L followed by free chlorine at a dose of 5 mg/L resulted in the

largest reduction in NDMA under the uniform formation conditions (UFC) among all preoxidation treatments tested.

[Jasmine Quiambao, Kendra Z. Hess, Sloane Johnston, Eliane El Hayek, Achraf Noureddine, Abdul-Mehdi S. Ali, Michael Spilde, Adrian Brearley, Peter Lichtner, José M. Cerrato, Kerry J. Howe, & Jorge Gonzalez-Estralla \(2023\)](#). Interfacial Interactions of Uranium and Arsenic with Microplastics: From Field Detection to Controlled Laboratory Tests. *Environmental Engineering Science*, 40(11), 562-573.

Natural waters, especially those near urban or industrial areas, often contain a wide variety of contaminants, which interact in ways we don't fully understand. An aspect of this important knowledge gap was addressed in the study by Quiambao and coworkers (2023), which uniquely combines field observations and mechanistic laboratory investigations. The researchers surveyed several surface waters in New Mexico to assess the occurrence of microplastics and two heavy metals, uranium and arsenic. While the surveyed waters in urban locations had a higher amount of microplastics, elevated levels of uranium—up to 332.8 µg/L—was detected in rural waterbodies impacted by mining. Building on this foundational knowledge, the authors performed batch studies to investigate interfacial interactions between three types of microplastics (poly(methyl-methacrylate), polyethylene, and polystyrene) and the two heavy metals at acidic (pH 3) and neutral (pH 7) conditions. The authors observed no interactions at pH 3, likely due to lack of electrostatic attraction between the metal ions and the microplastics. At pH 7 however, while arsenic still did not interact with the microplastics, a substantial amount of uranium adsorbed to the microplastics. Microplastics also served as nucleation sites for the heterogeneous precipitation of uranyl solids due to saturation in the reaction system. Precipitation of uranyl solids was confirmed by electron microscopy and spectroscopy. The results of this study are important because the accumulation of uranium on microplastics, either as adsorbed ions or precipitated solids,

could drastically increase the exposure of aquatic organisms that ingest microplastics to uranium and possibly other adsorbed contaminants.

[Abhas Singh, Rakesh Tejavath, Tathagata Bandyopadhyay, Vinod Bhojwani, Mainak Bhattacharya, Maniratnam Prakash, & Lalit Mohan Sharma \(2023\)](#). Enabling Marginalized Communities to Monitor and Treat Chromium-Polluted Groundwater with Decentralized and Affordable Technologies. *Environmental Engineering Science*, 40(11), 584-595.

Developing cost-effective technologies for treating heavy metals-containing groundwater is an on-going challenge for developing countries. Marginalized communities face additional cost- and technology-related barriers in monitoring and treating heavy metal-polluted groundwater. Singh et al. (2023) developed affordable methods for quick and accurate on-site measurement and treatment of Cr(VI)-polluted groundwater in the economically marginalized community of Khanchandpur village in the Rania region of Uttar Pradesh, India. Systematic interventions by academic, non-governmental and start-up organizations in collaboration with local communities resulted in the implementation of cost-effective and scalable solutions using smartphone based field monitoring. Chemical treatment (ferrous sulfate amendment) followed by biosand filtration method reached >99% efficiency in Cr(VI) removal from the heavily polluted groundwater. This scalable unit provided treated water of consistent quality with significantly reduced Cr(VI) concentrations and other water quality parameters over 65 days of operation. This low-key technology produced water at a low cost of USD 0.057/100L of purified water without the need for electricity for the process. The simplified process combined with smartphone based toolkits allowed for easy field monitoring with minimal training and supervision. This project is an ideal example of utilizing citizen science in engaging local communities to address their water quality challenges.

A Legacy to Continue Environmental Education

Submitted by Prof. Dr. Edita Baltrėnaitė-Gedienė, Institute of Environmental Research



The concept of the interaction between the natural environment and humans has changed in various stages of humanity and affected the behavior of mankind in relation to the natural environment in different ways. The fact that humans are a part of nature and that humans' affected nature influences humans, characterizes the natural determinism of human

practical activity. Protecting people from themselves as a species is considered a paradoxical and urgent problem of environmental protection.

Environmental protection engineers aim to find and use various tools and measures to protect the natural environment. One of the measures – environmental education of society and especially the young generation – remains relevant at all times and must cross national boundaries because the scale of humanity's impact on the environment, even on a global scale, is already huge. What a meaningful role we, as environmentalists, play!

“Without the past - there is no future, and without science - there will be no future”, - emphasized my father of bright memory, Professor Pranas Baltrėnas, the founder of Lithuania's first environmental protection study program. Rejoicing over the winning Erasmus+ project, the professor passed away on the eve of the project's official launch on January 15, 2021.

Three years have passed, during which a group of scientists from Vilnius Gediminas University of Technology (VILNIUS TECH) participated in the ERASMUS+ project GEOCLIC (Geospatial Engineering for Climate Change Adaptation of Coastal Ecosystems /GEOCLIC). The project aimed to modernize and increase the internationality of bachelor's, master's and doctoral degree studies for monitoring and protecting coastal ecosystems with the help of new technologies in Azerbaijan, Kazakhstan and Turkmenistan.

In carrying out the project, the universities of European countries (Lithuania, Germany, Romania and the Netherlands) helped prepare new modules of taught subjects, which are planned to be included in the university study programs of the countries of the Caspian Sea region. Lithuania was represented in the project by VILNIUS TECH

Environmental Protection Institute: project manager Prof. Dr Edita Baltrėnaitė-Gedienė, researchers Assoc. Prof. Dr Raimondas Grubliauskas, Assoc. Prof. Dr Teresė Leonavičienė, Assoc. Prof. Dr Yevgenijus Kirjackis, Dr Aleksandras Chlebnikovas, project administrator Assoc. Prof. Dr Jolita Bradulienė, technical support specialist – Ms Simona Bitarytė and financial specialist – Ms. Lina Bražėnienė. With the help of best practices, new modern study programs were designed to train specialists in various fields related to solving environmental problems in the Caspian Sea Region. The specialists' training focused on tools and methods that help monitor, analyse, use, and interpret environmental data to create methodologies that allow the Caspian Sea ecosystem to improve. The modules' development, adaptation and presentation took place both through active means, directly meeting with the project participants, and remotely - presenting aspects of the module's practical implementation.

At the end of the project, the Project team was happy to share their experience in the form of educational publications. A group of Lithuanian scientists published four educational books in English. These are Environmental Impact Assessment, Environmental Process Modeling and Management, Ecological Design and Commercialization of Innovative Products, and Startup Initiatives for Future Engineers. Publications introduce young specialists to several main objects of environmental engineering research and stages of protection. Knowledge and understanding of technogenesis-induced anthropogenic (human) impact on the natural environment is important for monitoring and forecasting processes in the environment with the help of mathematical models. Subsequently, this understanding becomes essential in designing products and identifying their innovative features. The electronic books will soon be available from the VILNIUS TECH website.

The project's success is determined not so much by the number of its results but by its impact on each of the project participants and the overall benefit, which is best measured by time. A meaningful project is as valuable as it is to each participant. Real value can only be understood by feeling it. After the end of the project and counting the fourth year since the Professor's departure, we feel that the spirit of environmental protection is alive; it is here, among us, his followers.

####

“A Legacy” Article (cont.)

Edita BALTRĖNAITĖ-GEDIENĖ, PhD in Environmental Engineering and Land Management Sciences, Chief researcher and Professor at Vilnius Gediminas University of Technology, research leader of the “Biochar Environmental Technologies Laboratory”; Member of the Natural and Technical Sciences Expert Committee of the Research Council of Lithuania, VilniusTech Senate member; member of the EU “Climate Change Neutral and Advanced Cities” Assembly, Environmental Protection Science Network Institute (EISN-Institute) in Germany; Chairperson of the Committee of the award established by the Arūnas and Irena Draugelis (USA Vydūnas Youth Foundation); founder of the prize named after Prof Dr Habil Pranas Baltrėnas for young environmentalist; author/co-author of 102 scientific publications, four scientific monographs. Research directions – technogenic impact and assessment, biogeochemical processes in environmental engineering solutions.



Co-funded by the
Erasmus+ Programme
of the European Union



ENGINEERING CONFERENCES INTERNATIONAL (ECI) CONFERENCE Micro-Nano Plastics in Water: Characterization, Cure and Prevention Switzerland - July 2025

Submitted by Prof. Emeritus Nicholas L. Clesceri, Rensselaer Polytechnic Institute

<https://engconf.us/conferences/civil-and-environmental-engineering/microplastics-in-water-characterization-cure-and-prevention/>

Plastics are ubiquitous in all aspects of modern life, including food packaging, health care and household products. There has been a massive increase in plastics production over the past several decades and there has been serious attention paid to managing plastic wastes, particularly focused on recycling/reuse. However, as of the present time it has not been feasible, either technically or economically, to achieve a fully circular system. Those plastic materials that are not processed for reuse, known as end-of-life plastics, end up in landfills or in other waste processing systems (e.g., incineration) or advanced recycling (e.g., pyrolysis) or directly disposed of in the environment. Here, micro- and nano-plastic (MNP) may be generated through incomplete decomposition of the materials. These MNP enter the air, soil and water environments where plants, animals, and humans may be exposed. The widespread occurrence of plastic globally, including in the ocean environment, has caused concern in the scientific community. Recently, there have been reports of MNP being found in drinking water supplies of major cities, raising additional concerns over potential public health risks.

As an example of focus on MNP, the US National Science Foundation (NSF) has identified the need for fundamental research in the areas of characterizing and separating plastics and decomposing them into environmentally benign or useful molecules. Additionally, an emerging topic is forensic analysis techniques to detect, quantify, and track MNP in environmental and engineering systems. Ideally, any transformations would be accomplished prior to plastic reaching the environment, e.g., possible technological advances in the design of water and wastewater treatment systems may offer some viable solutions.

This ECI conference will present timely research and advancements to explore the issue of MNP in the marine and freshwater environment. Importantly, this conference will explore research and technological solutions for MNP being conducted by universities, the plastics industry, and governmental institutions. Achieving a circular economy for plastics is being debated on the global stage, but MNP are currently widespread in the environment and mitigation of potential risks is a public health priority.



Dr. Dani Or Joins Faculty at University of Nevada, Reno



Soil and water scientist **Dr. Dani Or**, a member of the National Academy of Engineering, has joined the Department of Civil and Environmental Engineering at the University of Nevada, Reno as the Nevada Engineering Distinguished Professor. He is known for his contributions coupling soil physics, hydromechanics and microbiology through

novel measurements, theory and models of key near-surface hydrologic processes. His research focuses on mass and energy transport in porous media; mechanics of landslides and avalanches; evaporation from porous surfaces and on biophysical process and biological activity in the soil.

Or comes to the College from the Desert Research Institute, where he has been a research professor since 2020. He is the former editor in chief of Vadose Zone Journal, an outlet for interdisciplinary research and assessment of the vadose zone, the portion of critical zone that comprises the earth's critical living surface down to groundwater. He is a member of the National Academy of Engineering, a recipient of the Kirkham Soil Physics Award and a fellow of the Soil Science Society of America, among other honors. Before his time at Desert Research Institute, Or was a professor of terrestrial environmental physics from 2008 to 2020 at ETH Zurich in Switzerland and a professor of soil and environmental physics from 2005 to 2008 at EPF Lausanne in Switzerland. He has taught at the University of Connecticut and Utah State University, where he earned his doctorate in 1990. Or has a Master's in soil and water sciences and a Bachelor's in soil and water sciences from the Hebrew University of Jerusalem in Israel.

Dr. Kelsea Best Joins Faculty at The Ohio State University



Dr. Kelsea Best began her appointment in the Department of Civil, Environmental and Geodetic Engineering (CEGE) at The Ohio State University in August 2023. She joins CEGE's environmental engineering faculty as Assistant Professor of Ur-

ban Climate Resilience and Adaptation Disparities. Prof. Best's research examines how climate change interacts with human societies, how people may adapt to climate impacts, and how climate adaptation measures can be designed and implemented in a just and equitable way. Her highly interdisciplinary work connects methods, disciplines, and researchers from across geographies and fields. Dr. Best holds a BSE in Chemical and Biological Engineering from Princeton University and earned an MS and PhD in Earth and Environmental Sciences from Vanderbilt University. Most recently, she served as post-doctoral researcher and faculty assistant in the Department of Civil and Environmental Engineering at the University of Maryland.

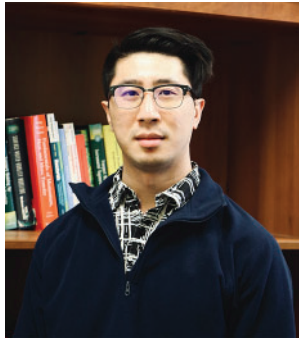
Dr. Courtney Gardner Joins Faculty at The University of Texas at Austin



Dr. Courtney Gardner will join the Civil, Architectural, and Environmental Engineering department at the University of Texas at Austin as an Assistant Professor in January 2024. Dr. Gardner completed her PhD and MS in Civil & Environmental Engineering at Duke University. Her expertise lies at the intersection of

environmental biotechnology and environmental engineering, where she applies molecular biotechnology to tackle pressing challenges in environmental quality. Her research will aim to assess microbial genetic adaptation to environmental stressors and manipulate microbial communities to enhance engineered systems and environmental quality. Her current projects are focused on evaluating the environmental fate and behavior of genetic biotechnology, unraveling microbe-nutrient dynamics in post-wildfire landscapes, and applying microbiome engineering tools to improve stormwater management.

Dr. Jonathan Boualavong Joins Faculty at University at Buffalo



Dr. Jonathan Boualavong joined the Department of Civil, Structural and Environmental Engineering at the University at Buffalo as an Assistant Professor in Spring 2024. His research uses a combination of experiments, modeling, and critical analyses to develop better electrochemical

separation processes for energy and the environment, primarily electrochemical carbon capture. He has also contributed to projects in areas such as inorganic waste management, bioelectrochemistry, and desalination. He received his PhD in Environmental Engineering from the Pennsylvania State University, his MPhil in Chemical & Process Engineering from the University of Strathclyde as a US/UK Fulbright Scholar, and his BS in Biomedical (cell and tissue) Engineering from the University of Rochester.

Dr. Allyson L. McGaughey Joins the University of New Mexico



Dr. Allyson L. McGaughey joined the Gerald May Department of Civil, Construction, and Environmental Engineering at the University of New Mexico as an assistant professor in January 2024. Her research group will focus on developing and leveraging mechanistic understanding of relationships between materials fabrication, properties, and performance, towards advanced separation processes that enable sustainable water treatment, reuse, and resource recovery. Prior to joining UNM, Dr. McGaughey was a Distinguished Postdoctoral Fellow at the Andlinger Center for Energy and the Environment at Princeton University. She received her bachelor's degree in Chemical Engineering from the University of Washington and her master's and doctoral degrees in Civil and Environmental Engineering from the University of Southern California.

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Environmental Engineers Solve Problems of Planetary Health

By Daniel B. Oerther, Ph.D., PE, BCEE, FAEESP



In September 2023, the United States Department of Labor updated the definition of environmental engineering to "solving problems of planetary health." (Oerther et al, Environmental Engineering Science 2023. doi:10.1089/ees.2023.0301). The prior definition emphasized research, design, planning, and performing engineering to prevent, control, and remediate environmental hazards. The shift in definition – from an emphasis on the "how" and "what" to an emphasis on the "why" – is consistent with the National Academy's Changing the Conversation Campaign (NAE, 2008. doi: 10.17226/12187) and the Grand Challenges and Opportunities in Environmental Engineering Report (NAE, 2019. doi:10.17226/25121). Among the 29 current job summaries of architecture and engineering occupations, environmental engineering is one of only four to mention "solving problems" and the only definition that considers a "global scale" (see: <https://www.bls.gov/ooh/architecture-and-engineering/>).

Environmental engineering has been identified as a caring profession (Oerther et al, Journal of Environmental Engineering 2022. doi:10.1061/(ASCE)EE.1943-7870.000201). An improved job description was suggested as part of the solution to the care penalty, which is a function of market dynamics that tends to undervalue the work of caring professionals who generate substantial unpriced benefits for others. A second suggested solution was increased emphasis on life-cycle principles and full-cost accounting (Oerther, Environmental Engineering Science 2022. doi: 10.1089/ees.2021.0385). Median pay for environmental engineers is going up, and in 2022 was \$96,530 per year for those with a baccalaureate degree (12th among 29 professions and 7% higher than civil engineers) (see: <https://www.bls.gov/ooh/architecture-and-engineering/>).

Principles of Environmental Engineering & Science, 2024 Release

Susan J. Masten, Michigan State University

Mackenzie L. Davis, Emeritus, Michigan State University

McGraw Hill ISBN, 978-1-259-89354-4

Principles of Environmental Engineering is intended for a course in introductory environmental engineering for 2nd or 3rd year engineering students. This text provides a background in fundamental science and environmental engineering principles for students who may or may not become environmental engineers. *Principles* places more emphasis on scientific principles, ethics, and safety and focuses less on engineering design. The text exposes students to a broad range of environmental topics – including risk management, water quality and treatment, air pollution, hazardous waste, solid waste, and ionizing radiation as well as discuss relevant regulations and practices.

The book also uses mass and energy balance as a tool for understanding environmental processes and solving environmental engineering problems.

Highlights include:

- Focuses on the principles used in environmental science and engineering.
- Significant chapter updates made throughout including rewritten Ch 8 on Sustainability and the first half of the chapter on Air Pollution.
- Case Studies in all text chapters to show the application of concepts to real-world situations.
- End-of-chapter content includes chapter review, problems, discussion questions, and FE Exam formatted problems.

The 2024 Evergreen Release means you will have the most relevant and up-to-date content, tools, and accessibility delivered directly to your Connect course. New for Fall 2024 classes, includes assignable adaptive reading, auto-scored assessment with feedback, and the McGraw Hill eBook, as well as a completely revised and updated Solutions Manual.

For more information, please contact your McGraw Hill representative at mhhe.com/rep.





Environmental Engineering

UNIVERSITY OF COLORADO BOULDER

2024 Water Reuse Academy, March 14th-15th, 2024 **University of Colorado at Boulder,** **[Environmental Engineering Program](#)**

The **time for water reuse** on multiple scales for non-potable to direct potable reuse is now. For this vision to be realized, there is a need for water engineers to be grounded not only in engineering fundamentals, but the breadth and communication skills to navigate water supply issues, and the complexities of dealing with multiple stakeholders.

The mission of the [Water Reuse Program](#) at the University of Colorado at Boulder is to educate students through coursework and research to be successful water reuse professionals. We currently have teamed with the Water Research Foundation (Project #5197) and others on a multi-year, multi-million-dollar U.S. EPA research grant (84046201-0) "Unlocking the Nationwide Potential of Water Reuse." In addition, we are pleased to announce the Water Reuse Academy, which will become an annual in-person 2- to 3-day event in Boulder directed to **practicing professionals**. It will cover non-potable reuse and direct and indirect potable reuse.

Our first offering, impacted by our caution for COVID, was a remote 5-hour event in March of 2021 designed to educate young professionals and practicing engineers in the regulations, treatment technologies and implementation of water reuse treatment. It was attended by 30 professionals from 10 states and 3 countries.

Now, we are excited to offer a 1.5-day CU [Water Reuse Academy](#) to be held on March 14-15th, 2024 at the University of Colorado-Boulder SEEC facility, after the WaterReuse Symposium (Denver). The focus this year is on potable reuse with emphasis on raw and finished water quality concerns, operational considerations, and treatment process fundamentals linked to design. In future offerings we will add management and planning.

Attendees must have a basic understanding of water and wastewater treatment, with either a degree in engineering or at least five years of professional experience in treatment. The course is taught by CU Boulder faculty and affiliated faculty. Our keynote speaker, Doug Owen, will use his experience with the San Diego Pure Water Program to address big picture issues and approaches.

Registration is \$1,000 and is limited to 25 attendees. All instructional costs, a set of course notes, and meals (lunch and dinner on the 14th and breakfast and lunch on the 15th) are included. Lodging is not included. The deadline for registration is February 28th, 2024. Cancellations made up until that date and will receive a refund less a \$100 cancellation fee. Registrations will be confirmed by email. Participants can register [here](#). For more information contact [Anna Segur](#).

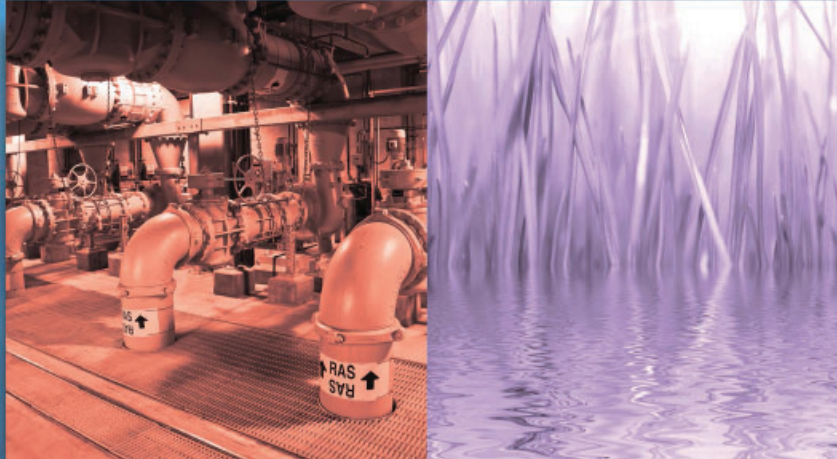
What you will learn about potable water reuse in this spring 2024 course:

- *An overview of water reuse, drivers and the regulations and guidelines that guide it.*
- *Which microbiological and chemical contaminants are of concern.*
- *The impact of upstream wastewater treatment on reuse water quality and operational concerns.*
- *Process fundamentals, design criteria and implementation of treatment technologies*
 - o *Oxidation – ozone, UV and AOP*
 - o *Membranes – microfiltration, nanofiltration and reverse osmosis*
 - o *Advanced treatment use of coagulation, biofiltration, activated carbon adsorption and ion exchange*



**Water Reuse
is our Future!**

AVAILABLE NOW



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MOP 8 Series



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AEESP Membership

Membership in AEESP offers important benefits to educators, researchers, students, professionals, corporations and organizations engaged in the environmental engineering and science profession. All who are eligible for membership are welcome to join the Association and to participate in the full range of benefits and opportunities. Membership categories and fees are described below, with complete definitions provided in the AEESP Bylaws. Applying online is easy! We welcome your participation!

Regular and Student Membership

Regular Membership in AEESP is open to persons of full-time faculty or instructional rank (instructors, lecturers, assistant, associate, full professors) in environmental engineering or environmental science at academic institutions that offer baccalaureate, diploma, or graduate degrees in environmental engineering, environmental science or related fields.

Rank	Annual Fee
Full Professors	\$130
Associate Professors	\$100
Assistant Professors	\$65
Affiliate Members	\$75
Students and Post-docs	\$20

Members residing in low and middle income countries as identified by the World Bank may request a discount by contacting the Business Office.

Applying for regular membership is made by submitting a completed application form and a brief, 2 page curriculum vitae online with payment. Alternatively, application materials may be mailed to the Business Office with a check enclosed.

Affiliate Membership

Affiliate Membership is open to individuals who are not eligible for regular membership including:

- Individuals primarily employed outside academia who also hold academic appointments in an environmental engineering or related academic program (e.g. adjunct faculty).
- Individuals primarily employed outside academia who have made contributions to education in environmental engineering or related fields.
- Educators in environmental engineering or related fields who are employed at junior colleges or other educational institutions that do not offer the degrees specified above.
- Individuals who were members at one time and who have retired from active teaching.

Application for affiliate membership is the same as for regular membership. The annual dues for affiliate members are \$75.

Sustaining Membership

Sustaining Membership is open to individuals and organizations whose concern for education in environmental engineering and related fields stimulates them to assist in strengthening university programs devoted to this area. Sustaining members are often those who employ or interact closely with graduates of environmental engineering and science programs such as consultants, utilities, research foundations, professional organizations, publishers and equipment manufacturers. The financial support provided by Sustaining Members allows AEESP to carry out a variety of special programs that benefit all members of the profession. Sustaining Members have access to all AEESP publications and are invited to all AEESP events. Organizations or individuals desiring more information on Sustaining Membership should write to the Secretary, the President, or the Business Office.

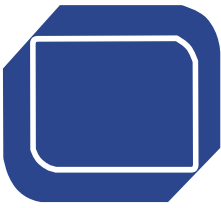
Annual dues for Sustaining Members are \$500. Organizations or individuals desiring more information on Sustaining Membership should write the Secretary, President, or Business Office.

Ready to join? You can apply for membership online!

<https://aeesp.org/membership>

More information can also be obtained from the AEESP Business Office:

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