



# AEESP Newsletter

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

**October 2021**

Volume 56 No. 3

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**21 Member News**

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## 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](mailto:kdoudrick@nd.edu). The next newsletter will appear in February 2022.

## President's Letter

BY BILL ARNOLD  
University of Minnesota



As I'm writing this, we are back on campus *en masse* for the first time since March of 2020. We are all experiencing different scenarios. Some of us are in places where people are required to be vaccinated and wear masks, and others are at institutions where there are no requirements or restrictions. The start to the academic year has been scary, exciting, and stressful. We not only have to worry about preparing lectures and training new researchers, but also how best to manage the safety of our students in laboratories and classrooms with respect to COVID-19 exposure. Additionally, we have to consider those that we affect who are outside our place of work. I know the choices of our employers and political leaders have led to many difficult discussions and decisions for all of you, and some of you are feeling more supported than others. I specifically want to acknowledge new assistant professors and new graduate students and postdoctoral researchers who started their positions during the past 18 months. You have faced challenges to which none of your predecessors can fully relate, and I hope you know we are all impressed with your perseverance.

Even with these challenges, I have seen many examples of the AEESP community coming together and providing support to colleagues, friends, family, and the public at large. When someone tweets they are feeling stressed, worried, or frustrated, it is nice to see AEESP colleagues responding with well wishes and support.

Interestingly, the impacts of the pandemic have encouraged the need for me to operationalize the goals of our new strategic plan. I'll admit for me, the words "strategic plan" immediately bring to mind the image of the pointy haired boss from Dilbert. The effort in which we engaged, however, was truly inspirational. The process we used brought together a broad spectrum of our AEESP community. Everyone involved was engaged with

and excited by the work, and I feel we were able to gather and highlight key ideas that will drive our organization and community forward.

For our first theme, Academic Career Networks and Skills, we need to continue to build on the connections we have to support each other as we navigate our career cycle. We need to ensure that those entering our ranks have a support network and are able to set goals and work/life balance. We need to enable AEESP members seeking leadership positions within and beyond academia. Many of the communication tools we have used over the past year and a half provide us opportunities to be more connected.

Our second theme, Impact of Members' Scholarship and Creative Expression, is focused on helping AEESP members communicate what they do and the impact of their work. My social media stream has shown me a long list of people demonstrating the importance of environmental engineers during the pandemic. A prime example is people building "Corsi/Rosenthal" boxes for their offices and for classrooms (for their students and their children). Wastewater monitoring for SARS-CoV-2 entered the mainstream, and we have all seen our air/particulate expert colleagues discuss virus transmission and the importance of masks and air exchange rates per hour. Among all the challenges brought by the pandemic, amazingly the field of environmental engineering and science has received attention. We need to continue to seek opportunities as an organization to highlight the work performed by environmental engineers and scientists within and beyond AEESP. We also need to continue to work to have the experts in our community heard by decision makers at local, national, and global levels. Lastly, we need to make sure that AEESP does what it can do best, and develop and leverage partnerships with other professional organizations.

One of our main goals as faculty is to train and help shape the environmental engineering and science workforce. Our third theme focuses on increasing our reach to ensure we have a diverse and inclusive workforce within and beyond academia. Plans include reinvigorating our partnerships with Sustaining Members, finding ways to increase the visibility of the profession, and plan-

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

[www.aeesp.org/news](http://www.aeesp.org/news)

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ning for deep discussions about our educational goals and pathways.

Now that we have a strategy in place, how do we embody our organization's vision and mission? The process will certainly span the service of multiple AEESP Presidents, but my specific goals for the year have been shaped by our strategic planning discussions and include:

- Expanding our networking and mentoring infrastructure,
- Finding connections with other professional organizations to leverage opportunities,
- Seeking to broaden membership and continue the work of broadening participation of underrepresented groups in environmental engineering and science,
- Highlighting the work done by AEESP and its members,
- Developing a Community Engagement and Outreach Taskforce, and
- Reviewing and improving how AEESP, the BOD, and committees work.

The Board of Directors has already started the process of identifying objectives that can be accomplished quickly, plotting longer term goals for the organization, and setting an overall vision. As President, my plan is to have the Board provide input to the committees and empower them with the flexibility to act so that we can efficiently make progress.

Our goals are big ones, and it will take time and effort to fulfill them. As an all-volunteer organization, we have to recognize the oncoming and rapid challenges in some areas versus others. Yet, I have seen the dedication of AEESP members over many years, and I am confident that many will step up to the challenges. We will also make mistakes — I know I have made them — and we won't always live up to our ideals. As individuals and as an organization, it is important to learn, enact continuous improvement standards and keep moving forward to help our members, our organization, and the students, stakeholders, and partners for whom we serve.

I'd like to close by saying I'm truly honored to be serving as President of AEESP for the 2021-2022 year. It has been a pleasure to work (this past year virtually) with Joel Ducoste, Allison MacKay, Helen Hsu-Kim, Rob Nerenberg, Amy Pruden, Willie Harper, Treavor Boyer, Junko Munakata Marr, and Debora Frigi Rodrigues. We will miss Amy, Helen, and Joel, but I'm looking forward to engaging with and hearing the ideas of our new board members, Lee Blaney, Susan Masten, and Mira Olson. My perspective and experience was also shaped by previous board members, and you all have my thanks.

I hope you will enthusiastically support and participate in the AEESP activities and endeavors in the coming year, and I look forward to seeing you all in St. Louis in 2022, and as of yet to be determined site in 2023!

## Spotlight: Environmental Engineering Science, AEESP Journal

Mark J. Krzmarzick (Chair of the AEESP Publications Committee), Venkata Gadhamshetty (Member of AEESP Publications Committee, EES Associate Editor), Catherine A. Peters (EES Editor-in-Chief)

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 regularly in the journal as an Editor’s Note, as well as in the AEESP newsletter. Through the 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, we shine the spotlight on selected articles from April 2021 through July 2021 issues of EES. Congratulations to all whose work is highlighted.

Many of the articles spotlighted here are in the special issue (May 2021) “Global Environmental Engineering for and with Historically Marginalized Communities.” As summarized by Masten et al. (2021), this issue contained 13 articles focused on the unique challenges of historically marginalized communities. The issue shows transdisciplinary research being done within a large diversity of communities and highlights community-based participatory research. We applaud the guest editors and all contributions of this outstanding special issue. Most articles in the special issue are Open Access, thanks to funds provided by AEESP and the AEESP Foundation and discounts provided by Mary Ann Liebert, Inc.

**Mattos, K.J., Eichelberger, L., Warren, J., Dotson, A., Hawley, M., Linden, K.G.** (2021). Household water, sanitation, and hygiene practices impact pathogen exposure in remote, rural, unpiped communities. *Environ. Eng. Sci.* 38(5), 355-366.

Household water, sanitation, and hygiene (WASH) practices have a large role in pathogen exposures in unpiped communities. Mattos et al. studied 43 homes in rural, remote, unpiped Alaskan communities for their water handling practices and water quality over four seasons. The authors found that the amount of water hauled was 3.0-5.4 gallons per capital per day (gpcd) and natural, untreated water was 0.5-1.1 gpcd. Coliforms were highly seasonal and source specific and were detected in 30% of all samples. The authors cited that the major concerns related to pathogen exposure were low water use, untreated water reuse, inadequate greywater disposal, and

inadequate disposal of human waste. This study provided a detailed analysis of how WASH practices in unpiped communities may lead to pathogen exposure and provided recommendations for how WASH practices can be improved.

**Vélez-Torres, I., Torres, A.M., Bernal-Galeano, S., Muriel, I., Moreno, H.F., Alzate Lozano, S., Bahamon-Pinzon, D., Vanegas, D.C.** (2021). AfroColombian struggles for food, land, and culture: The case of El Tiple. *Environ. Eng. Sci.* 38(5), 340-354.

Vélez-Torres et al. studied the impacts of agro-industrial expansion in El Tiple, a marginalized Afro descendant community restricted within a green desert in Colombia. This study involved the characterization of the socioenvironmental context in terms of ethnography, autoethnography, social cartography, and ethnobotany. Their results show systemic food dispossession that was attributed jointly to factors related to land transformation, depletion and contamination of natural assets, and biodiversity loss. All these factors have been reported to be associated with the presence of bordering sugarcane plantations. In collaboration with community members, they designed, constructed and analyzed a greenhouse hydroponic cultivation system as an actionable means to gradually restore local production of food and medicinal plants for the community. Overall, they demonstrate that academics can partner with vulnerable communities for coproducing knowledge and solutions to pressing social needs.

**Tariqi, A.Q., Naughton, C.C.** (2021). Water, health, and environmental justice in California: Geospatial analysis of nitrate contamination and thyroid cancer. *Environ. Eng. Sci.* 38(5), 377-388.

Methemoglobinemia and thyroid cancer are two examples of health impacts caused by consumption of drinking water contaminated with nitrate. Tariqi and Naughton developed a method of geospatial analysis for assessing the health impacts due to the nitrate contamination. Impacts of nitrate contamination in disadvantaged communities (DACs) in California (CA) were assessed using the CA Cancer Registry and California Water Board’s well data. A statistically significant correlation between nitrate contamination and thyroid cancer incidents was reported. DACs displayed double the rate of thyroid cancer

compared with non-DACs, and higher numbers of nitrate-contaminated wells compared with the state averages. Future studies can validate findings using localized, private health data on thyroid cancer incidence.

**Verbyla, M.E., Calderon, J.S., Flanigan, S., Garcia, M., Gersberg, R., Kinoshita, A.M., Mladenov, N., Pinongcos, F., Welsh, M.** (2021). An assessment of ambient water quality and challenges with access to water and sanitation services for individuals experiencing homelessness in riverine encampments. *Environ. Eng. Sci.* 38(5), 389-401.

Unsheltered homeless people face restricted access to water, sanitation, and hygiene services. Verbyla et al. studied the risks associated with such a lack of access to service provision. This study included analysis of water samples upstream and downstream of three homeless encampments near the San Diego River watershed and interviews with service providers from public and nonprofit sectors. Detectable levels of caffeine and sucralose were found in the upstream water. Their study revealed higher levels of *Escherichia coli* in downstream water. However, the accumulated evidence did not prove the influence of encampments on the river pollution. Instead, the encampment residents were found to be at potential risks with the use of this river water, especially when intercepted by anthropogenic sources of contamination during dry weather. The interviewees perceived that the provision of water and sanitation services for these residents would entail significant expenses. A lack of trust among service providers and residents was perceived to be a major challenge for enabling the provision of water and sanitation services.

**Orner, K.D., Cornejo, P.K., Rojas Camacho, D., Alvarez, M., Camacho-Céspedes, F.** (2021). Improving life cycle economic and environmental sustainability of animal manure management in marginalized farming communities through resource recovery. *Environ. Eng. Sci.* 38(5), 310-319.

Manure is a growing global problem as the world population grows and diets shift. Orner et al. in-

*Continued on next page*

investigated four animal manure management scenarios in Costa Rica and performed a life cycle assessment of each to identify relative environmental costs and benefits. Treatment scenarios included no treatment, biodigesters, biodigesters with struvite precipitation, and a combination of biodigesters, struvite precipitation and lagoons. The authors found that carbon neutrality was achieved from energy recovery of methane emissions with biodigesters. Eutrophication potential decreased with each successive treatment option. Overall, the study showed how small-scale farmers can gain economically while avoiding environmental degradation through manure management practices.

**Cherchi, C., Lin, Y., Gu, A.Z.** (2021). Nano-titanium dioxide exposure impacts nitrogen me-

tabolism pathways in cyanobacteria. *Environ. Eng. Sci.* 38(6), 469-480.

The increasing use of nano-titanium dioxide (nTiO<sub>2</sub>) in consumer products has led to their increased presence in water systems. Cherchi et al. studied the impact of sublethal concentrations of nTiO<sub>2</sub> on the nitrogen metabolism of the cyanobacteria *Anabaena* PCC 7120. They analyzed transcriptional-level information of biomarker genes involved in pathways pertinent to regulation, fixation, assimilation, and storage of nitrogen (N). Both the circadian patterns of cyanobacterial metabolism and intrinsic properties of nTiO<sub>2</sub> have been reported to influence the toxicity responses during light and dark exposure to nTiO<sub>2</sub>. During exposure to the light, most genes linked to cellular N status were found to be

upregulated in the dose range of 6–60 mg/L-h. Downregulation of genes was observed at the end of dark cycle, characterized by low cell metabolism and energy levels. Overall, the environmental perturbations caused by nTiO<sub>2</sub> have been reported to modify the intracellular carbon and N balance in cyanobacteria. This finding suggests potential impacts of nTiO<sub>2</sub> on ecological trophic interactions and food web dynamics within complex ecological systems.

#### Reference

Masten, S. J., Harris, A., Kearns, J., Borrión, A., Peters, C. A., Gadhamshetty, V. R. (2021) Global environmental engineering for and with historically marginalized communities. *Environ. Eng. Sci.*, 38(5), 285-287.

## AEESP Policy Corner

The Government Affairs Committee (GAC) has been growing its membership and working with the BoD to enhance its service to AEESP. The GAC aims to make AEESP members aware of important policy decisions, opportunities to advise policy making, and opportunities to participate on advisory committees and boards. This includes raising awareness of AEESP and helping our members earn appointments to important civic advisory panels and boards. We will meet these aims through regular communication to the members in a “Policy Corner” of the Newsletter, and through the use of the AEESP listserv and Twitter (@AEESPProfs) for time-critical content. We welcome members to submit content and expect this to play an important role in rapidly disseminating information to the membership. Please reach out to the current committee chairs Kelvin Gregory (kelvin@andrew.cmu.edu) and Greg Lowry (glowry@andrew.cmu.edu) with suggested content. Let us know of any opportunities and/or desires for appointment with which we may be of assistance.

Current GAC members include (Kelvin Gregory-co chair), Greg Lowry (co-chair), Jason Ren (co-chair-elect), Colleen Naughton (co-chair-elect), Baikun Li (vice chair), Courtney Gardner, Berrin Tansel, Julie Zimmerman, Drew Story, Caitlin Grady, Craig Just, Heather Goetsch, Siddhartha Roy, Bryan Brooks, Allen Davis, Eugene LeBoeuf, Jade Mitchell, Yeufeng Xie, Alex Haluska, Christine Prouty, and Bill Arnold. The chair-elects will move into the chair position July 2022, and vice chair will become chair-elect at that time.



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## ***AEESP Research and Education Conference Update***

### ***Environmental Engineering and Science at the Confluence***

***June 28-30, 2022 • [aeesp2022.wustl.edu](https://aeesp2022.wustl.edu)***

Now that we have had our “appetizer” this past July, we look forward to hosting the AEESP community for the main course in St. Louis on June 28-30, 2022 ([aeesp2022.wustl.edu](https://aeesp2022.wustl.edu)). The conference will open with a great set of workshops developed by our community. There will be two full days of oral and poster presentations, including an in-person version of the “meet the candidate” session that was piloted at the 2021 “appetizer.” Two platform panel discussions on the theme of convergence will complement the opening and closing keynote presentations.

Keep an eye out for the official call for abstracts in November. Abstracts will be due in mid-January. Registration will open in January with an early registration deadline of May 6. We have secured a block of 400 residence hall rooms on campus to make this an immersive and cost-effective event. We are grateful for sponsorship by the National Science Foundation and the National Institute of Environmental Health Sciences that will support a set of travel grants.

We look forward to seeing you next summer,

Daniel Giammar

## Report of Fall 2021 AEESP Board Meeting, Sept. 23-24, 2021

The AEESP Board held its first hybrid meeting with half of the members hosted in person at Duke University and others participating via an early morning ZOOM link.

The Board recognized and thanked the members whose terms ended in 2021 – Joel Ducoste (NCSU, AEESP President), Helen Hsu-Kim (Duke, Treasurer), Amy Pruden (VA Tech, Chief Technology Officer). The Board welcomed new members – Lee Blaney (UMBC), Susan Masten (MSU), Mira Olson (Drexel).

The Board elections confirmed Allison MacKay to the position of President-Elect and voted Debora Rodrigues (Univ. Houston) to be Vice President, Treavor Boyer (ASU) to be Treasurer, and Junko Munakata Marr (CSM) to be Chief Technology Officer. The Board appointed Treavor Boyer to be the AEESP Board representative to the AEESP Foundation Board.

Dan Giammar (WUSTL) provided an update on the 2021 AEESP Annual Meeting Appetizer that had 450 registrants and a maximum of 220 attendees a single individual session. A post-event survey indicated the value of virtual options for participating in AEESP events, although most respondents were looking forward to getting back together in person in 2022. The Conference Planning Committee will evaluate how to best integrate on-line elements to the upcoming conference, scheduled for June 28 – 30, 2022. AEESP members can expect communications for abstract submissions to open Nov. 1, 2021.

Brian Schorr provided the business report and indicated that all membership metrics are trending well. There are 923 current AEESP members and 134 members who are in arrears.

Helen Hsu-Kim presented the Treasurers' report that showed the AEESP organization to be in good financial stability. The COVID-19 pandemic resulted in some shifts in amounts between individual revenue and expense categories, but the net impact on the overall organization finances was small. Total revenues and expenses have continued to remain constant at levels typical of the past five years. The Board noted that an RFP will be released

in Fall 2021 by the AEESP Foundation Board for financial services to manage the endowment portfolio of the Foundation and the savings of AEESP.

The Board approved a new policy to help longtime members maintain continuous membership from their initial date of joining the organization. It will be added as an addendum to the AEESP Handbook.

The redesigned AEESP Foundation website is set to launch this fall. The AEESP website redesign is still in progress. High resolution images are needed for each website to showcase environmental engineering themes related to air, water, and soil. Please consider submitting your original images for credit to the Internet Resources Committee, care of IRC Chair Sanjay Mohanty, at mohanty@ucla.edu.

Considerable time at the Board meeting was devoted to aligning committee activities with the 2021 Strategic Plan. This included realignment of some ongoing activities and developing new activities to better serve the AEESP community and implement the 2021 Strategic plan. The Board also identified complementary activities to improve communication between committees. The upcoming RFP for 2023 Biennial Conference pre-proposals will also integrate ideas identified in the strategic planning session. The Board also discussed how to enhance the value for Sustaining Members of the organization and the role of various committees to potentially contribute to advancing these efforts.

Upcoming AEESP lectures include: The 2021 WEFTEC Master Lecturer has been rescheduled to be Krishna Pagnilla (UNLV). Kimberly Prather (UC San Diego) will be the 2021 AAAR lecturer. Dave Dzombak (CMU) is the 2021 AAES Kappe Lecturer. Émilie Bédard (Polytechnique Montréal) will give the 2021 WQTC lecture. Detlef Knappe (NCSU) will be the 2022 ACE lecturer.

Respectfully Reported, Allison MacKay and Debora Rodrigues



## Congratulations to the AEESP Fellows, Class of 2021

AEESP congratulates the following individuals elected as 2021 Fellows! These individuals were selected for this recognition based on their many and impactful accomplishments in environmental engineering research, teaching, and professional service, with an emphasis on service within AEESP. (In order by last name):

### Kimberly L. Jones, Howard University



Dr. Kimberly L. Jones is a professor of Environmental Engineering, Chair of the Department of Civil and Environmental Engineering and Associate Dean for Research and Graduate Education at Howard University in Washington, DC. She holds a B.S. in Civil Engineering from Howard University, a M.S. in Civil and Environmental Engineering from the University of Illinois in Champaign, IL and a Ph.D. in Environmental Engineering from The Johns Hopkins University. Dr. Jones' research interests include developing membrane

processes for environmental applications, physical-chemical processes for water and wastewater treatment, remediation of emerging contaminants, global drinking water quality, environmental justice, and environmental nanotechnology.

Dr. Jones currently serves on the Chartered Science Advisory Board of the US Environmental Protection Agency, and as chair of the Drinking Water Committee of the Science Advisory Board. She has served on the Water Science and Technology Board of the National Academy of Sciences, and the Board of Association of Environmental Engineering and Science Professors, where she was Secretary of the Board. She has served on several committees of the National Academy of Science and the Institute of Medicine. She served as the Deputy Director of the Keck Center for Nanoscale Materials for Molecular Recognition at Howard University. She also serves on the Center Steering Committee of the Center for the Environmental Implications of Nanotechnology (CEINT). Dr. Jones has received a Top Women in Science Award from the National Technical Association, the Outstanding Young Civil Engineer award from University of Illinois Department of Civil and Environmental Engineering, a NSF CAREER Award, an Outstanding Leadership and Service and Outstanding Faculty Mentor award from Howard University, and Top Women Achievers award from Essence Magazine. She also served as an associate editor of the Journal of Environmental Engineering (ASCE).

### Gregory V. Lowry, Carnegie Mellon University

Greg Lowry is the Walter J. Blenko, Sr. Professor of Civil and Environmental Engineering. He is deputy director of the NSF/EPA Center for Environmental Implications of Nanotechnology (CEINT), and on the editorial board for Environmental Science: Nano and Nature: Scientific Data. Lowry holds a B.S. in chemical engineering from the University of California at Davis, an M.S. in civil and environmental engineering from University of Wisconsin at Madison, and a Ph.D. in civil and environmental engineering from Stanford University.

His research focuses on environmental geochemistry, nanochemistry, and environmental nanotechnology. His current professional interests include applications of nanomaterials for sustainable agriculture, robotics for autonomous soil sampling and site characterization, environmental fate and transport of chemicals, groundwater remediation, and environmental issues related to fossil energy.

Lowry is a Fellow of the American Association for the Advancement of Science (AAAS). He has published over 150 scientific articles in leading environmental engineering and science journals, and a book on nanoscale iron particles for groundwater remediation. He has received awards for his research from the American Society of Civil Engineers (Walter L. Huber Civil Engineering Research Award), the Association of Environmental Engineering and Science Professors (Malcolm Pirnie/AEESP Frontiers in Research Award), and the American Chemical Society (Best Feature Article in Environmental Science & Technology for 2012). He received the Distinguished Service award from AEESP in 2018, and was awarded the Fenves Award for Systems Research in 2011. He is a "highly cited" scientist (top 1%) in the area of ecology and environment according to Thompson Reuters/Clarivate (2014-2018).

Lowry's research has been supported by the federal government (National Science Foundation, U.S. Department of Defense, U.S. Army Research Office, U.S. Department of Energy, and U.S. Environmental Protection Agency), with additional grant support from industry. Lowry has served on two NAS panels; Science Breakthroughs to Advance Food and Agricultural Research by 2030 and the Committee to Develop a Research Strategy for Environmental Health and Safety Aspects of Engineered Nanomaterials. He served as a science advisory board member for the international research Centers, NANOREM and NANOFASE.

### Jerald L. Schnoor, University of Iowa



Dr. Jerald L. Schnoor, Ph.D., P.E., BCEE, Allen S. Henry Chair in Engineering; Professor, Civil & Environmental Engineering, College of Engineering; Professor, Occupational and Environmental Health, College of Public Health; and Co-Director, Center for Global and Regional Environmental Research; The University of Iowa, Iowa City, Iowa USA. Dr. Schnoor is a registered professional engineer and a member of the National Academy of Engineering (elected in 1999) for his pioneering work using



mathematical models in science policy decisions for environmental protection. He testified several times before Congress on the environmental effects of acid deposition and the importance of passing the 1990 Clean Air Act. Professor Schnoor was the Chair of the Iowa Climate Change Advisory Council, 2007-2009, appointed by Governor Chester J. Culver. In addition, Schnoor serves as a Core Director of the Iowa Superfund Research Program and leads the W.M. Keck Phytotechnology Laboratory, which specializes in using plants to help clean and protect the environment, while reducing chemical exposures to humans.

Serving as Editor-in-Chief of *Environmental Science and Technology* 2002-2014, Jerry guided the leading journal in both environmental science and environmental engineering (ISI Web of Science, Thomson-Reuters). His editorial writings on environmental protection have been widely accessed by the international community. Professor Schnoor has published (as author, co-author, or editor) seven books and 200 research articles in archival journals. Dr. Schnoor chaired the Board of Scientific Counselors for the U.S. Environmental Protection Agency, Office of Research and Development from 2000-2004 and was a councilor on the National Advisory Environmental Health Sciences Council to the National Institute of Environmental Health Science (NIEHS). Recently, he served as Chair of the National Research Council (NRC) Committee on Science for Environmental Protection in the 21st Century. He was also Chair of the 2008 National Research Council report on The Water Implications of Biofuels in the U.S.

Dr. Schnoor and his students pioneered phytoremediation, the use of plants to help clean the environment which is widely used at full-scale installations now. Schnoor's publications cover a wide range of topics including water sustainability, water quality modeling, phytoremediation, and climate change. Jerry won the 2010 Clarke Prize from the National Water Research Institute for his work on water sustainability. In 2013, he was honored as an Einstein Professor by the Chinese Academy of Sciences and lectured widely on water and climate change. An engaging and beloved teacher as well as a top researcher, Jerry received the teaching and mentorship award from the graduating class of Civil and Environmental Engineering students at the University of Iowa this year. A major honor from his peers came in 2015 when Jerry received the Perry L. McCarty AEESP Founders Award for excellence in environmental engineering education, research and practice from the Association of Environmental Engineering and Science Professors.

## Linda K. Weavers, The Ohio State University

Linda Weavers holds the John C. Geupel Endowed Chair and is Professor in the Department of Civil, Environmental and Geodetic Engineering at The Ohio State University. In addition, Dr. Weavers is co-Director of the Ohio Water Resources Center, the federally authorized and state-designated Water

Resources Research Institute for the State of Ohio and is co-Lead in the Sustainability Institute Healthy Air, Land, and Water Program Area. After obtaining her B.S. in Civil Engineering from the University of Minnesota, she received M.S. and Ph.D. degrees in Environmental Engineering Science from the California Institute of Technology (Caltech). She is a licensed professional engineer in Ohio and board certified environmental engineer.

Dr. Weavers' research is multi-pronged with expertise in developing water and hazardous waste treatment technologies, promoting innovation in the water industry and determining fate of emerging contaminants in water systems. Current research projects investigate ultrasound for emerging contaminant treatment, ultrasonic defouling of membranes, ultrasonic control of harmful algal blooms, fate of poly- and per-fluoro alkyl substances (PFAS), and developing design standards for emerging water technologies. She has received a National Science Foundation CAREER Award, a Presidential Early Career Award for Scientists and Engineers (PECASE), and the American Association of University Women Emerging Scholar Award for her research. She twice received the Distinguished Service Award from the Association of Environmental Engineering and Science Professors (AEESP).

In addition to her research, Dr. Weavers coordinates the capstone course for environmental engineering, teaches a study abroad course on sustainability and resilience in Italy, has taught courses on water treatment and hazardous waste remediation, and co-taught risk assessment joint with colleagues in Public Health. Dr. Weavers founded and ran for six years an engineering summer camp for middle school girls. She is past-president of AEESP and editorial board member for Ultrasonics Sonochemistry.

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Nominations for 2022 AEESP Fellows will open beginning on November 1 and run through March 15, 2022. See AEESP's Fellows page (<https://aeesp.org/fellows>) for more information on eligibility and how to nominate colleagues for this distinguished recognition. Questions can be addressed to Amy Childress ([amyec@usc.edu](mailto:amyec@usc.edu)), Chair, Fellows Steering Committee.



## 2021 AEESP Award Recipients

Submitted by Kevin T. Finneran, AEESP Awards Committee Chair (Clemson University)

The 2021 AEESP Awards were presented during an online awards ceremony hosted by incoming President William Arnold on July 14th, 2021. Below is a list of the recipients. Congratulations to all award winners!

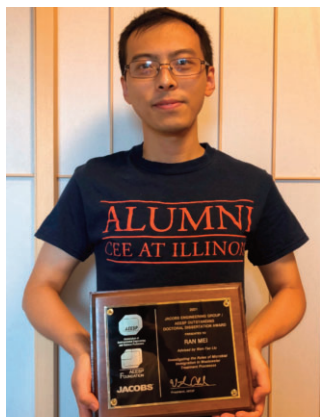
Thank you to the members of the Awards Committee and Sub-committees for thoughtful and thorough evaluation of the nominations: Trina McMahon, Paula Mouser, William Mitch, Sarina Ergas, R. Scott Summers, Wen Zhang, Wen-Tso Liu, Natalie Capairo, Quing Zhang, Guangbin Li, Navid Saleh, Brooke Mayer, Wenging Xu, Roland Cusick, and Prathap Parameswaran.

Thanks also to American Academy of Environmental Engineers and Scientists (AAEES) members for serving on joint AAEES-AEESP awards committees, and to Liz Pohland for assisting with the selection of the Frederick George Pohland award recipient. Special thanks to AEESP members that served on this committee as well.

\*Please also note that nominations for 2022 AEESP Awards will go live on November 1, 2021 and be open through January 31, 2022. See AEESP's Awards webpage (<https://aeesp.org/awards>) for more information and changes to this coming year's nomination eligibility.

### Student Awards

#### Jacobs Engineering Group /AEESP Outstanding Doctoral Dissertation Award



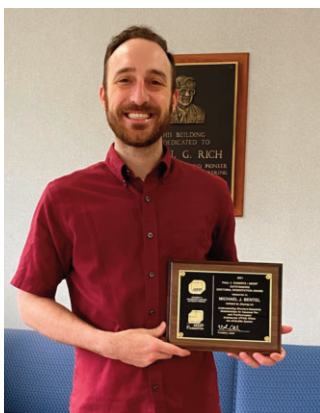
This award, endowed by Jacobs Engineering Group, is given annually to recognize an outstanding doctoral dissertation that contributes to the advancement of environmental science and engineering.

**Dr. Ran Mei, University of Illinois**

Dissertation Title: *Investigating the Roles of Microbial Immigration in Wastewater Treatment Processes*

**Advisor:** Prof. Wen-Tso Liu

#### Paul V. Roberts/AEESP Outstanding Doctoral Dissertation Award



This award is given annually to recognize an outstanding doctoral dissertation that advances the science and practice of water quality engineering for either engineered or natural systems.

**Dr. Michael Bentel, University of California-Riverside**

Dissertation Title: *Understanding Structure-Reactivity Relationships for Aqueous Per- and Polyfluoroalkyl Substances (PFAS) Within the UV/sulfite System*

**Advisor:** Prof. Jinyong Liu

### AEESP Master's Thesis Award

This award annually recognizes two most outstanding Master of Science theses that contribute to the advancement of environmental science and engineering. This year there were two awardees.

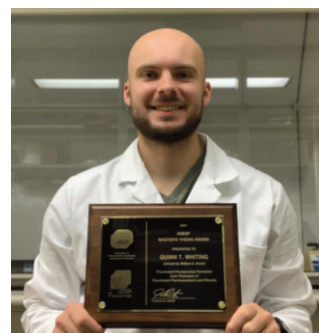


**Awardee 1:**

**Elizabeth 'Libby' McKenna, University of Nevada Reno**

Thesis Title: *Disinfection By-Products in Potable Reuse Water and Interpretation of Their Relative Toxicities*

**Advisor:** Prof. David Hanigan



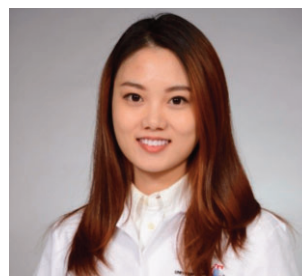
**Awardee 2:**

**Quinn Whiting, University of Minnesota**

Thesis Title: *Fluorinated Photoproduct Formation from Photolysis of Fluorinated Pharmaceuticals and Phenols*

**Advisor:** Prof. Bill Arnold

### W. Wesley Eckenfelder Graduate Research Award



This award, jointly administered by AEESP and AAEES, is given annually to recognize a student whose research contributes to the knowledge pool of industrial wastewater management.

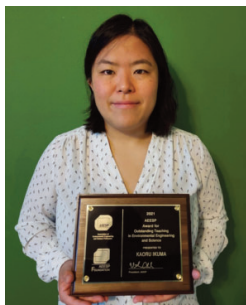
**(Ms.) Jiong Gao, University of Cincinnati** (Nominated by Dion Dionysiou)

## Education, Research, Practice and Outreach Awards

### AEESP Award for Outstanding Teaching in Environmental Engineering and Science

This award is given annually to recognize excellence in classroom performance and related activities.

**2021 Recipient: Kaoru Ikuma, Iowa State University**



Dr. Ikuma joined the Department of Civil, Construction and Environmental Engineering (CCEE) at Iowa State University (ISU) in Fall 2015 as a tenure-track assistant professor. She is currently in her sixth year of teaching and has taught 44 credits of coursework since then. Dr. Ikuma has enthusiastically discharged her teaching duties and has done more and beyond what is required of an assistant professor. Her efforts have enhanced the quality of teaching and the breadth of course offerings in the department. Since joining ISU, Dr. Ikuma has taught six different courses in the CCEE department at both undergraduate and graduate levels. Of the six courses she has taught, three of the courses are new courses she has developed.

### Steven K. Dentel AEESP Award for Global Outreach

This award, established in 2014, is given annually to recognize outstanding contributions and leadership by a faculty member through involvement in environmental engineering and science outreach activities to the global community.

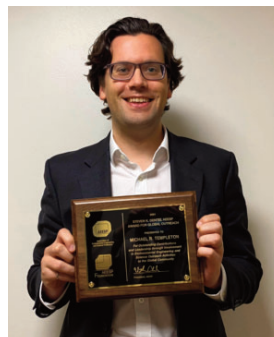
**2021 Recipients: Maya Trotz, University of South Florida and Michael Templeton, Imperial College London**



Dr. Maya Trotz's global initiatives on sustainability and community engagement integrate interdisciplinary education, research, and global partners, providing students, middle and high school science/math teachers, faculty, and community partners with mutually beneficial international engagement. Her programs are the crowning achievement of boundary-spanning, with a focus on grand

challenges of global importance that promote sustainability, especially in Caribbean economically challenged communities, but also through mentoring of graduate research to improve well-being in Barbados, Guyana, Trinidad and Tobago, Jamaica, Bolivia, Liberia, Madagascar, Mali, and Peru. Her extensive sustained portfolio of accomplishments has accordingly increased the global footprint of environmental engineering and sciences.

Michael's high-impact research, educational, and outreach activities over the past 15 years have contributed to addressing a range of public health challenges, including the development of WASH strategies to prevent schistosomiasis infections in Tanzania and Ethiopia, minimizing nitrate pollution



from on-site sanitation in west Africa and Nepal, and the promotion of in situ worm composting toilets for low-income households globally. He is widely recognized as a leader in the field, as evidenced by his service as a strategic advisor and reviewer for the WHO, the UK's Global Challenges Research Fund, the Swedish Research Council, and the Ethiopian Federal Ministry of Health.

### Excellence in Environmental Engineering and Science Education (E4) Award



This award, jointly administered by AEESP and AAEEES, is given annually by AAEEES to an individual who has made a significant contribution to the profession in the area of educating practitioners.

**Dr. Lynn Katz, University Texas at Austin** (Nominated by Desmond Lawler)

### Charles R. O'Melia AEESP Distinguished Educator Award

This award recognizes the significant contributions of Professor O'Melia to environmental engineering education and is awarded to an environmental engineering or science professor who has a record of excellent classroom teaching and graduate student advising; significant research achievements; and an outstanding record in mentoring of former students and colleagues.

**2021 Recipient: Michael Stenstrom, UCLA**



Prof. Stenstrom's research contributions to environmental engineering knowledge are in the following four areas: 1) Aeration and gas transfer; 2) Biological processes for wastewater treatment; 3) Stormwater runoff; and 4) Water reclamation.. Although he has researched on a variety of

topics on biological treatment such as nitrification and treatment of explosives at UCLA, the work that made him known the most was the use of an enricher reactor for treating hazardous compounds in wastewater. He was awarded the 1992 Water Environment Federation's Eddy Medal because of this work. In 2020, he received the Water Environment Federation's Eddy Medal again for his research on fate of antibiotic resistance genes and antibiotic-resistant bacteria in water resource recovery facilities. His stormwater research centers around urban runoff covering a broad range of topics such as toxicity, pollutant characterization and quantification, best management practices, and land use.

## AEESP Outstanding Publication Award

This award is given annually to recognize the author(s) of a “landmark environmental engineering and science paper that has withstood the test of time and significantly influenced the practice of environmental engineering and science.” At least one of the authors must be living and previous winners are ineligible for a period of three years. The selected recipient will receive a plaque.



The 2021 recipient is **Dion Dionysiou** for the paper “Radical generation by the interaction of transition metals with common oxidants.” *Environmental Science & Technology* Vol. 38, Issue 13 (2004), pp. 3705-3712.

Co-author is **George Anipsitakis**. The article has deeply influenced the practices of our environmental engineering and science. It is recognized as the one that established a new field of SR-AOP (sulfate radical-based advanced oxidation processes) to expand the domain of the AOP (advanced oxidation processes) concept. Later, SR-AOP has promptly became one of the hottest research topics in environmental engineering and also has been practiced in industrial areas such as site remediation. Beyond that, this study initiated a new research avenue for destruction of various contaminants in polluted water, wastewater, soil, and sludge, as detailed in Prof. Ma’s letter. Many studies followed the approach to activate common oxidants (e.g. persulfate and peroxide) with other materials (e.g., biochar and activated carbon) and heterogeneous catalysts, particularly in nanoscale, even more recently in single atom catalysis.



## AEESP/Mary Ann Liebert Award for Publication Excellence in Environmental Engineering Science Journal

This award, established in 2017, is given annually to the authors of an outstanding paper published in *Environmental Engineering Science* during the previous calendar year. *Environmental Engineering Science* is the official journal of AEESP, and this award recognizes publication excellence among its members.

The 2021 award recipients are **Emily Maher, Kassidy O’Malley, Michael Dollhopf, Brooke Mayer, and Patrick McNamara** from Marquette University. Their paper is entitled 2020 paper, “Removal of Estrogenic



L to R Emily Maher, Kassidy O’Malley, Michael Dollhopf, Brooke Mayer, and Patrick McNamara

Compounds from Water Via Energy Efficient Sequential Electrocoagulation-Electrooxidation.”

This was determined to be the best paper published in *EES* in 2020. The investigators examined a novel electrochemical approach for removing estrogenic micropollutants in drinking water. The approach is energy efficient and it sequentially couples electrocoagulation with electrooxidation. This work makes a valuable contribution to public health because of the dangers of estrogenic compounds in initiating unwanted hormonal responses in humans. The paper is exceptionally well written, clearly conveying the significance of the work and the broader impacts.

## Perry L. McCarty AEESP Founders’ Award

This award, established in 1991 and newly endowed in 2015, is given annually to recognize a member of AEESP who has made “sustained and outstanding contributions to environmental engineering education and practice.”

**2021 Recipient: Menachem Elimelech, Yale University**



Menachem Elimelech—the Sterling Professor of Chemical and Environmental Engineering and founder of the Environmental Engineering Program at Yale University—has made substantial contributions to the field of water science and technology. He is widely recognized for his pioneering work on membrane processes for desalination and water reuse, materials for next-generation desalination and water purification membranes, particle and pathogen filtration, water and sanitation in developing countries, environmental applications of nanomaterials, and engineered osmosis for sustainable water and power production. His work, at the nexus of several fields, has transformed the field of water science and technology and several of his findings have become textbook materials and applied to engineered water treatment systems. Professor Elimelech is the author of over 460 refereed journal publications, one book, and numerous conference proceedings and book chapters. He is the most cited and impactful scholar in the world in the field of environmental and water quality engineering, with over 110,000 citations and h index of 168 (Google Scholar).

## Walter J. Weber, Jr. AEESP Frontier in Research Award

This award recognizes an environmental engineering or science professor who has advanced the environmental engineering and science field through research leadership and pioneering efforts in a new and innovative research area.

**2021 Recipient: Susan Richardson, University of South Carolina**

Dr. Richardson has had a transformative impact on the field of disinfection byproducts. Her research has shifted the focus of the field from the regulated trihalomethanes and haloacetic acids to an array of novel disinfection byproducts exhibiting higher toxicity than those currently regulated. Dr. Richardson’s work was transformative in two ways. First, her work has



opened the eyes of researchers to recognize the rich array of byproducts beyond the trihalomethanes. Dr. Richardson has been the foremost expert in the world on the application of analytical chemistry to the characterization of byproducts of water disinfection. The diverse nature of the natural organic matter precursors in drinking water supplies results in the production of a wide array of halogenated byproducts when these waters are chlorinated.

Over 700 byproducts have been identified to date, and Dr. Richardson has been responsible for identifying a significant fraction of these. Second, Dr. Richardson has been at the forefront of transforming the DBP field into a truly interdisciplinary field. The field involves collaborations between chemists, engineers, toxicologists, and epidemiologists. Yet each sub-field had largely operated independently. While each might cite research from the other sub-fields as justification for their research in the introductions to publications, they each attended different meetings and rarely collaborated closely. Dr. Richardson was one of the first chemists to work closely with toxicologists to quantify the toxic potency of the novel disinfection byproducts she was identifying in order to assess their contributions to the toxicity of disinfected waters relative to trihalomethanes. She organized the first Gordon Research Conference on Drinking Water Disinfection Byproducts in 2006, bringing together chemists, engineers, toxicologists, epidemiologists and regulators.

### Fredrick George Pohland Medal



This award honors a member of AEESP and/or AAEEES who has made sustained and outstanding efforts to bridge environmental engineering research, education, and practice.

**2021 Recipient: Nancy Love, University of Michigan**

Two very consistent themes appear throughout her nomination letters: she conducts exceptional research that binds tightly with the state of practice and her love of education and her interest

in students shapes the field far beyond the academy. Her letter writers uniformly agree that Prof. Love's communication of science is "absolutely inspirational" and that her ability to "balance both impact (big picture goals) and attention to detail" unsurpassed. Prof. Love has made fundamental contributions in the areas of "...the kinetics, biochemistry, and ecology associated with the biodegradation of xenobiotic organic contaminants (Prof. Rittman)." With more than 200 publications, Profs. Rittman and Dzombak note that her selection as the AEESP 2015-16 Distinguished Lecturer is strong recognition of her enduring leadership and fundamental contributions. In fact, Prof. Love received the largest number of requests for lectures among recipients to date. Throughout her academic career, Prof. Love has been an ardent interdisciplinary researcher, one who routinely works at the interface between disciplines. A major element of her interdisciplinary spirit and scholarly effort focuses on connecting engineering practice and academia, which is a particularly noteworthy and consistent theme throughout

her career. She provides her students with field research opportunities that connects them to practice. She helps students create professional networks that reach equally into academia and professional practice.

### AEESP Distinguished Service Awards



**2021 AEESP Distinguished Service Award: AEESP President and Board Member: Joel Ducoste** (Pictured with departing Treasurer and Board Member Helen Hsu-Kim)

**2021 AEESP Distinguished Service Award: AEESP Treasurer and Board Member: Helen Hsu-Kim**



**2021 AEESP Distinguished Service Award: AEESP Chief Technology Officer and Board Member: Amy Pruden**



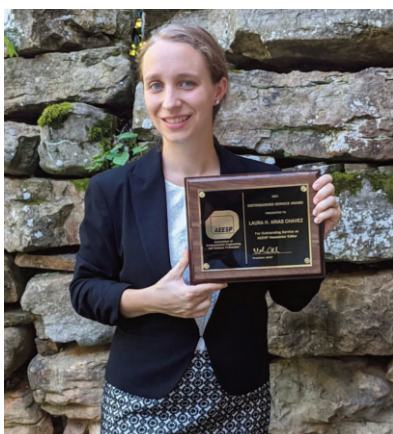
**2021 AEESP Distinguished Service Award: Chair of the AEESP Internet Resources Committee: Raju Badireddy**



2021 AEESP Distinguished Service Award: Chair of the AEESP Student Services Committee: **Patrick McNamara**



2021 AEESP Distinguished Service Award: AEESP Foundation Treasurer and Board Member: **Timm Strathmann**



2021 AEESP Distinguished Service Award: Newsletter Editor: **Laura Arias Chavez**



2021 AEESP Distinguished Service Award: AEESP Foundation Board Member: **Dion Dionysiou**



2021 AEESP Distinguished Service Award: Chair of the AEESP Fellows Committee: **Morton Barlaz**

## New Faculty Appointments

### Oklahoma State University Welcomes Three Faculty Members

Over the past year, Oklahoma State University (OSU) has welcomed three new Assistant Professors from the AEESP community.



**Dr. Jorge González Estrella** joined the School of Civil and Environmental Engineering at OSU in the Fall semester of 2020. He holds a PhD in Environmental Engineering from the University of Arizona (2015). Before joining OSU, Jorge worked as a Postdoctoral Research Associate at the South Dakota School of Mines and Technology. In 2017, he joined the University of New Mexico as a Postdoctoral Research Associate and continued

working as a Research Assistant Professor until the summer of 2020. Jorge's research group, the Gonzalez-Estrella Environmental Engineering (GE3), focuses on the generation and transformation of microplastics in the environment, as well as the interaction of microplastics with other contaminants of concern. These projects are funded by NIHMD and USGS.



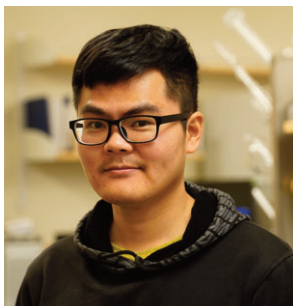
**Dr. Kiranmayi Mangalgi** joined the Department of Biosystems and Agricultural Engineering at OSU in July 2021. Her research interests lie at the intersection of determining the occurrence and fate of priority organic contaminants of emerging concern in natural and engineered systems, and the development and design of treatment systems for contaminant mitigation in water and waste streams, particularly to facilitate safe and sustainable water reuse

and resource recovery. Mangalgi received her bachelor's degree in Civil Engineering from National Institute of Technology Karnataka, India, and a master's degree in Civil Engineering from Texas A&M University. Her doctoral dissertation at the University of Maryland Baltimore County investigated the photolytic fate of agriculturally relevant antibiotics in natural and engineered systems. She then joined the University of California Riverside, where her postdoctoral research work was conducted in collaboration with Orange County Water District to investigate the application of advanced oxidation processes in potable water reuse systems. As a PhD student and postdoctoral scholar, Mangalgi has mentored more than 17 undergraduate and graduate students in research projects and provided career advice. In 2019, she was awarded the University of California Riverside Chancellor's Postdoctoral Fellowship for her promise and potential in research, teaching, and service that would contribute to faculty diversity.



**Dr. Mary Foltz** joined the School of Civil and Environmental Engineering at OSU in August 2021. She previously obtained her PhD in Environmental Engineering from the University of Illinois Urbana-Champaign. Her research focuses on agricultural nutrient loss, passive treatment systems for biogeochemical water treatment, and greenhouse gas emissions. Her work aims to incorporate multiphase contaminant transformations and use a combination of lab, field, and modeling at different scales to accomplish research goals.

### South Dakota School of Mines and Technology Welcomes Two Faculty Members



**Dr. Tao Ye** joined the Department of Civil and Environmental Engineering at South Dakota School of Mines and Technology as a tenure-track assistant professor in August 2021. He was previously at University of Washington as a postdoc in Bioengineering. Dr. Ye received his PhD from George Washington University in Environmental Engineering in 2018 and his MS from Tongji University in 2013.

The chief aim of his work is to develop advanced materials for water decontamination. Research in his new position includes developing sustainable adsorbents and catalysts for removing emerging contaminants of concern. He also explores water treatment methods for the control of disinfection byproducts. He is interested in finding novel applications of electrospinning in environmental engineering.



**Dr. Saurabh Dhimann** joined South Dakota Mines as a joint faculty member in the Department of Civil & Environmental Engineering, and Chemistry Biology & Health Sciences. He started his tenure track Assistant Professorship in March 2021. He is vastly experienced in standardizing the bioprocessing of second-generation and unconventional feedstocks for renewable energy production. He obtained his Ph.D. in Biotechnology (2009) from Kurukshetra University, Kurukshetra, India.

His current research directions are focused on standardizing a combinatorial approach elucidating the principles of microbial quorum sensing, their stress response mechanisms, and subsequent biofilm formation. Fundamentals of the System Biology approach have been revisited for revealing the unexplored facets of microbial "Rules of Life." Advanced Omics tools are in use to validate the conceptual information gained through in-silico research. The

standardized system reveals the significant genes, expression profiles, structural and functional contributions towards biofilm formation on specially crafted 2D materials.

## Iowa State University Welcomes Three Faculty Members



**Dr. Lu Liu** joined the Department of Civil, Construction, and Environmental Engineering at Iowa State University (ISU) as an assistant professor in August of 2021. A central challenge of the 21st century is to satisfy the demand for water, energy, and food under changing environment and socioeconomics. Dr. Liu's group seeks to fill important knowledge gaps in water-energy-food-climate nexus and support sustainable resource planning via decision-making tool development and science-policy integration. Prior to joining ISU, she worked at Rice University as a postdoctoral researcher and investigated the design and planning of sustainable and resilient urban water system by developing quantitative modeling tools. Dr. Liu earned her Ph.D. in Civil Engineering from the University of Maryland in 2017. She received an M.S. and an B.S. in Environmental Science from the University of Oklahoma. Dr. Liu is a determined optimist in the sustainable development of human society and seeks to actively engage private and public entities in achieving this goal.



**Dr. Antonio Arenas** joined the Department of Civil, Construction and Environmental Engineering at ISU as an assistant professor in August 2021. He has been working with computational models applied to water resources management for more than ten years. His current research focuses on the development and application of fully coupled surface-subsurface watershed models to evaluate flood mitigation strategies and to study the fate and transport of nutrients. Before joining ISU, Dr. Arenas worked as an associate research engineer at IIHR Hydrosience & Engineering at the University of Iowa (UI). He received his doctorate in Civil and Environmental Engineering from UI and an M.S. in Water Resources Engineering and Management from Universität Stuttgart (University of Stuttgart).



**Dr. Joe Charbonnet** will join the department of Civil, Construction and Environmental Engineering at ISU as an assistant professor in January 2022. His research group will focus on unlocking the potential of under-utilized resources such as stormwater and biosolids by understanding and remediating persistent pollutants such as PFAS. He earned his doctorate in Environmental Engineering at UC Berkeley, where he researched materials to treat stormwater contamination. He was previously a Staff Scientist at the Green Science Policy Institute, where he worked to reduce risks from flame retar-

dant chemicals, and a postdoctoral fellow at the Colorado School of Mines, where he studied PFAS forensics. Dr. Charbonnet enjoys podcasting and mentoring students through the Society of Hispanic Professional Engineers. The toxic contaminant he identifies with most closely is lead, because he considers himself flexible, yet somewhat dense.

## Duke University Welcomes Dr. Andrew Jones



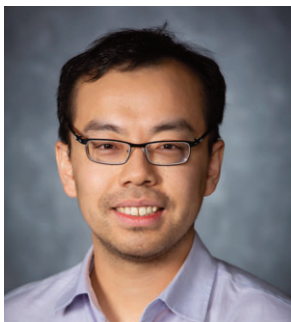
Duke University proudly welcomes **Dr. Akhenaton-Andrew (Andrew) Jones** as an assistant professor to the Department of Civil & Environmental Engineering. Dr. Jones' research focuses on addressing global challenges in water and bacteria using engineering and policy analysis. On the microscale this has included efforts exploring how bacteria and bacterial biofilms form and function under fluid, chemical, electrical, and nanomaterial stress. These efforts were recently awarded a Maximizing Investigators' Research Award (MIRA) (R35) 5 year \$2 million grant by the National Institute of General Medicine (NIGMS) of the NIH. On the human scale this has included systems engineering analysis on how material technology systems can be deployed to increase equity. Prior to joining the Duke faculty, Dr. Jones completed his Ph.D. in Mechanical Engineering at MIT and was an Assistant Professor and Faculty Fellow in the Department of Chemical Engineering and the School of Public and Urban Affairs at Northeastern University.

## Dr. Chris Olivares Joins University of California (UC)-Irvine



**Dr. Chris Olivares** (he/him) joined the Civil & Environmental Engineering Department at the University of California (UC)-Irvine as assistant professor in April 2021. The vision of his research group ([oli-vareslab.org](http://oli-vareslab.org)) is to address legacy and emerging waste issues in the face of wild-fires and other extreme weather events, by leveraging interactions between microorganisms and organic pollutants. Previously, Chris was a postdoctoral researcher at UC-Berkeley, working with Prof. Lisa Alvarez-Cohen and Prof. David Sedlak on biotransformation and chemical remediation of per- and polyfluorinated alkyl substances (PFAS) in fire-fighting foams. He has performed research on water quality impacts of wildfires and biotransformation and toxicity of nitroaromatics. Chris earned his Ph.D. degree in Environmental Engineering at the University of Arizona (UA) advised by Prof. Jim Field and Prof. Reyes Sierra-Alvarez. He also holds an M.A. in French from UA.

### **Dr. Dian Jiang Joins University of Alabama**



**Dr. Dian Jiang** joined the Department of Civil, Construction and Environmental Engineering at The University of Alabama (UA) as an assistant professor in August 2021. His research interests are in the areas of bioremediation and industrial ecology. He has worked on developing pilot-scale microbial fuel cells, bioelectrochemical denitrification, material flow analysis and life cycle assessment. DJ holds a PhD in Environmental Engineering from the

University of Connecticut, MS in statistics and science, technology and environmental policy from the University of Minnesota, and BS in environmental science from Renmin University of China. Prior to joining the University of Alabama, he was a faculty member at Montana Technological University.

### **Dr. Mohammad (Mim) Rahimi Joins University of Houston**



**Dr. Mohammad (Mim) Rahimi** is an assistant professor of environmental engineering at the Department of Civil & Environmental Engineering at the University of Houston (UH). Before joining UH, Mim was a postdoctoral associate at the Department of Chemical Engineering at the Massachusetts Institute of Technology (MIT) under the supervision of Prof. Alan Hatton. He conducted research on developing various electrochemical processes

for carbon capture and utilization. Mim obtained his Ph.D. in chemical engineering from The Pennsylvania State University in 2017, supervised by Prof. Bruce Logan. Mim authored and co-authored 18 peer-reviewed articles (11 as the first author) and served as a reviewer for more than 30 scientific journals. He also served as a guest editor for several journals on various topics related to electrochemistry and climate change. Mim's team at UH develops various electrochemical processes to assist in mitigating climate change issues. In 2020, Mim established an online educational platform on climate change ([www.ClimateChange.guide](http://www.ClimateChange.guide)) to promote discussions around this topic from different angles, especially highlighting the critical role of diversity, equity, and inclusion in designing, planning, and executing climate change mitigation options.

### **Dr. Rachel Scholes Joins University of British Columbia.**



**Dr. Rachel Scholes** (she/her) joined the Department of Civil Engineering as an assistant professor at the University of British Columbia. Dr. Scholes' research focuses on the transformation and degradation of trace contaminants in engineered and nature-based water treatment systems, and on identifying alternatives to harmful chemicals. Prior to joining UBC, Dr. Scholes evaluated the human health and ecotoxicological hazards of microbial compounds and safer alternatives at the U.S. Department of Agriculture's Bioproducts Research Unit. She also conducted laboratory and pilot-scale investigations of contaminant fate in constructed wetlands for treating waste-water and reverse osmosis concentrate. Dr. Scholes received her M.S. and Ph.D. in Environmental Engineering from the University of California, Berkeley, and a B.S. in Chemical Engineering from Northwestern University.

### **Dr. Sheldon V. Masters Joins University of Colorado**



**Dr. Sheldon Masters** joined the Environmental Engineering Program at the University of Colorado Boulder in August 2021 and is rostered in the Department of Civil, Environmental, and Architectural Engineering as an assistant professor. Prior to joining CU Boulder, he was a Senior Environmental Engineer at Corona Environmental Consulting and a Visiting Research Professor at Drexel University. At Corona, he conducted applied research and consulting related to inorganic contaminants, drinking water treatment, distribution sys-

tem water quality and building water quality. At CU Boulder, Dr. Masters' research will focus on the deterioration of treated drinking water quality caused by complex and poorly understood mechanisms, such as plumbing corrosion and microbial regrowth, and under water reuse conditions. Dr. Masters holds Ph.D. (2015) and M.S. (2011) degrees in Civil Engineering from Virginia Tech. He obtained his B.A. in Mathematics from the College of Wooster (2009).

## Dr. Siwen Wang Joins Clarkson University



**Dr. Siwen Wang** (she/her) joined the Department of Civil and Environmental Engineering as an assistant professor at Clarkson University in July of 2021. Her research interests focus on both treatment and detection of waterborne pathogens, including bacteria, viruses, parasites, and antibiotic resistance genes. Her lab endeavors to provide solutions to decentralized water disinfection and point-of-use pathogen detection methods covering the entire analytical process, e.g., sampling, pretreatment, and biomolecular detection.

Dr. Wang earned her Ph.D. in Environmental Science and Engineering from California Institute of Technology in 2020. She received the C. Ellen Gonter Environmental Chemistry Award by American Chemical Society in 2019. She holds a master's and a bachelor's degree both in Environmental Science and Engineering from Tsinghua University.

## Dr. Eric J. Anderson Joins Colorado School of Mines



**Dr. Eric J. Anderson** joined the Department of Civil and Environmental Engineering at the Colorado School of Mines as an associate professor in August 2021. His research group focuses on hydrodynamic processes of lakes, rivers, and coasts, with the goal of helping stakeholders and coastal communities make informed decisions re-garding extreme water and weather conditions. This work requires a combination of numerical

modeling, field work, and remote sensing to develop predictive tools for public use. Prior to joining the Colorado School of Mines, Dr. Anderson developed operational forecast models for the National Oceanic and Atmospheric Administration (NOAA) at the Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan. Dr. Anderson earned his B.S. and Ph.D. from Case Western Reserve University in Mechanical & Aerospace Engineering.

## Apply for a 2022 Water Industry Scholarship!



**September 1–December 20, 2021 for Fall 2022 award.**

AWWA's program includes scholarships for engineering, communications, IT, finance and finance, legal studies, and policy in the water industry.

## Life Cycle Assessment of the 2021 AEESP Virtual “Appetizer” Event

Julianne Aronson, Daniel Giammar, Young-Shin Jun, and Avni Solanki  
Washington University in St. Louis

### Introduction

The July 2021 AEESP Virtual “Appetizer” Event was a two-day, entirely virtual conference that brought together 374 professors, students, and other leaders in research and education in environmental engineering and science to collaborate, network, and learn. While events like these present advancements in environmental conservation and education, previous studies have demonstrated that conferences, particularly when held in-person, are resource-intensive and have a high carbon footprint, contributing to the acceleration of climate change (Hamant et al., 2019; Neugebauer et al., 2019; Hirsch & Hilty, 2002). This new AEESP Appetizer event provided a unique opportunity to compare the environmental impacts of a virtual and an in-person event. It also supplied useful information to conduct a preliminary assessment of the relative advantages and limitations of the different conference modalities and to identify considerations for future AEESP events.

### Methods

The process-based environmental life cycle assessment of the virtual event hosted by Washington University in St. Louis, Missouri University of Science and Technology, Southern Illinois University Edwardsville, and University of Missouri considered all processes in preparation and execution of the virtual “appetizer” event that were a direct result of the event’s occurrence. These include paper manufacturing and waste, electricity consumption, and transportation processes. Factors such as computer and car manufacturing and waste were excluded from the system boundary, as their use for the virtual event execution were considered an insignificant portion of their lifespan. Paper and electricity use data in preparation of the conference were collected from Washington University in St. Louis staff, the conference organizing committee, and the AEESP Student Services Committee. Electricity used by individuals attending the event was determined using login times collected by the virtual attendee hub, and the percentage of individuals who commuted to their offices to attend the virtual event was assessed by a post-event survey.

The assessment that was conducted using this data employed the US EPA’s Tool for the Reduction and Assessment of Chemical and other environmental Impacts (TRACI). This assessment considered seven of the TRACI impact categories: acidification (kg SO<sub>2</sub> eq), eutrophication (kg N eq), freshwater ecotoxicity (CTU eco), global warming (kg CO<sub>2</sub> eq), human health particulate matter (PM 2.5 eq), ozone depletion (kg CFC-11 eq), and smog formation (kg O<sub>3</sub> eq).

### Results

The assessment of the virtual event found the workplace commute had the largest influence on most impact categories, as seen in Figure 1 (*next page*). The commute was determined by a U.S. Bureau of Transportation study which found that the average commuter traveled 24.1 kilometers,

or 15.0 miles, to reach their office (2003). For this assessment, the conservative assumption was made that all individuals who commuted, 37.3% of conference attendees, operated a gasoline-powered vehicle this distance to their workplace to attend the virtual event. In particular, the virtual event emitted 2550 kg CO<sub>2</sub> eq total, which is roughly equivalent to the emissions of one person flying round trip from New York City (EWR) to Los Angeles (LAX) four and a half times (“Carbon Emissions,” 2016). The processes associated with the commute contributed 2480 kg CO<sub>2</sub> eq, or 97.1% of the total. Further, the virtual event emitted 310. kg O<sub>3</sub> eq total, with the commute contributing 306 kg O<sub>3</sub> eq, or 98.8%. Electricity consumption most significantly impacted freshwater ecotoxicity because of nuclear fuel extraction, processing, and transport, with the event contributing 1330 comparative toxicity units (CTU), ecotoxicity potential. 69.7% of the overall CTU, ecotoxicity potential comes from the US electricity consumption mix and 27.9% of it is a result of commute processes.

In addition to the comprehensive life cycle assessment conducted of the actual virtual “appetizer” event, an approximate input-output environmental life cycle assessment of the 2021 event was conducted as if it was held in-person. The same paper and electricity processes were considered as the actual virtual event, in addition to new transportation, catering, and accommodation processes based on the number of virtual conference attendees, previous studies, and current economic rates of expected services (Neugebauer et al., 2019; Washington University, 2021). As anticipated based on past literature, the impacts of the theoretical in-person event were substantially greater in all impact categories considered in this assessment as compared to the actual virtual event. In most categories, the impacts are at least ten times larger, as seen in Figure 2 (*next page*). Ozone depletion potential is over 250 times greater, eutrophication potential is nearly 100 times greater, and human health, particulate matter, potential is nearly 70 times greater.

### Discussion

The comparison between the actual virtual event and theoretical in-person event indicates that hosting an academic conference in an entirely virtual space dramatically reduces environmental impacts associated with the conference. However, the environmental benefits of transitioning from in-person to virtual are not the only factors to consider in the construction of a better conference model.

Successful environmental conferences should take action to minimize environmental impact, but they should do this without reducing the educational value of the gathering, as the dissemination of knowledge is often the primary goal of an academic conference. Although almost all attendees of the 2021 AEESP event agreed that the virtual event increased accessibility and flexibility, most individuals expressed that they felt the virtual event provided inferior networking opportunities as compared to an in-person conference due to the inability to interact with colleagues in a casual setting. While the economic barrier to entry was lower for the virtual event, the consensus is that the social barrier to entry felt higher. Students expressed having difficulty finding an opportunity to chat

with potential contacts and employers. Professors and professionals indicated that they missed eating meals and having impromptu conversations with colleagues about their field. Many individuals expressed in the post-event survey that they were unsure if they would take advantage of virtual engagement opportunities of in-person events if offered.

It is difficult to quantify environmental, economic, and social factors—including diversity, equity, and inclusion—on the same scale, and priorities among these categories are unique to each individual. As such, it is important that AEESP and future conference organizers offer options that allow event attendees to make decisions that align with their personal values. In-person conferences should be held as there is not a virtual equivalent to in-person networking, but those conferences can offer virtual engagement options to increase accessibility and reduce environmental impact. Although not an ideal solution, conference organizers could consider the benefits and drawbacks of purchasing carbon offsets for individuals that choose to attend events in-person. Post-pandemic, AEESP should consider holding entirely virtual events and workshops when appropriate. As individuals, when attending in-person events, AEESP members may want to think critically about their modes of transportation, food choices, and accommodation. Choosing more sustainable forms of transportation can significantly decrease global warming potential, as well as other impacts. Finally, host institutions could allow individuals to make these decisions by offering accessible and sustainable options to conference attendees. For example, the 2022 AEESP conference held at Washington University in St. Louis will offer on-campus accommodations in addition to having an affiliate hotel and will cater food appropriate to the number of conference attendees while still offering a variety to those with dietary preferences. Accessibility to all should be a primary goal of AEESP leadership and conference organizers, and this often means offering options. However, increasing accessibility without decreasing sustainability is often a complicated matter, and one that warrants further study.

## Next Steps

The organizing committee of the 2022 AEESP Research and Education conference is considering the findings from this preliminary research in

their plans for the upcoming conference in St. Louis. While the life cycle assessment of the 2021 event considered a theoretical event, the assessment framework developed as a result will be used to conduct a comprehensive life cycle assessment of the actual 2022 in-person conference. It will be the first life cycle assessment to systematically compare the impacts associated with hosting a virtual and in-person conference. Research following the 2022 event will also contribute to a broader understanding of social and economic factors related to conference modalities in the hopes of constructing a more sustainable and equitable academic conference model.

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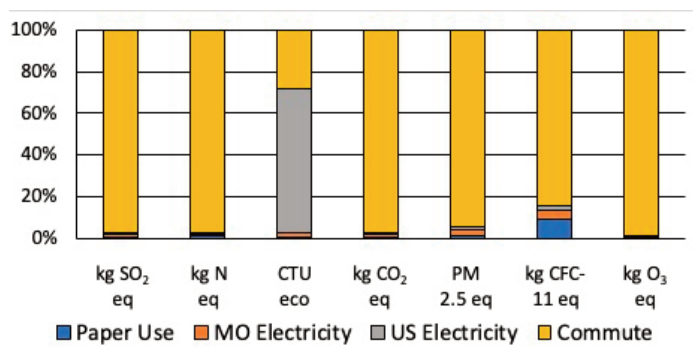


Figure 1: The percent contributions to impact categories of each process undertaken in preparing for and executing the 2021 virtual “appetizer” event. The U.S. electricity consumption mix includes conference preparation not conducted by Washington University in St. Louis staff and the 2021 event execution. The Missouri electricity mix encompasses preparation activities conducted by Washington University staff.

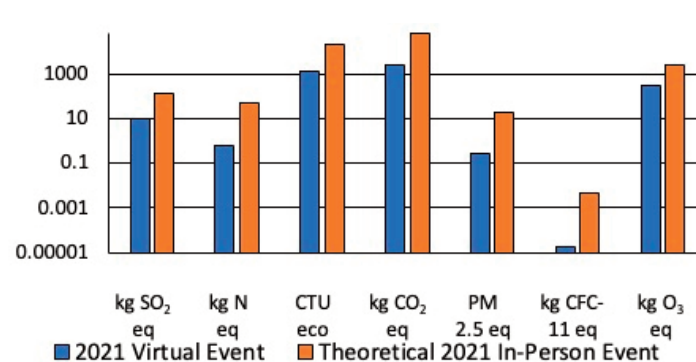


Figure 2: Logarithmic comparison of impact categories between the actual 2021 virtual “appetizer” event, including the impacts associated with commuting, and the same event if it were theoretically held in-person.

## A BLOSSOMING PARTNERSHIP

### USF Coverdell Fellows work with Greco Middle School technology teacher to build a rain garden on campus

*\*The project was funded in part through the AEESP Foundation's Educational Grant program. Our thanks to USF, Coverdell Fellows, and Greco Middle School for permission to publish their final report.*

Throughout Tampa Bay and other areas with heavy rainfall, flooding causes property damage and threatens the health of aquatic ecosystems. Rain gardens are a low-impact development technology used to promote water treatment and infiltration into the soil. Parts of Greco Middle School's campus in Temple Terrace have experienced chronic flooding, especially high-traffic areas with compacted soil. To improve stormwater flow, four Peace Corps Coverdell Fellows enrolled in engineering at the University of South Florida (USF) partnered with science and technology teacher Matt McKernan to educate students about stormwater management and build a rain garden on Greco's campus. This partnership was facilitated with previous education and community training partnerships between USF's Dr. Maya Trotz and her students with math and science instructors in the city of Tampa.

The Paul D. Coverdell Fellows program is a graduate fellowship program for returned Peace Corps Volunteers. There are several Coverdell Fellows programs at the University of South Florida and only one in the College of Engineering. Engineering Fellows are enrolled in either a Master's or PhD program in civil or environmental engineering. Besides their traditional graduate school requirements, Fellows must complete an internship in underserved communities in the U.S. that allows them to bring home and expand upon the skills they learned as a volunteer.



Rain Garden on Greco Middle School's campus

To give the students some background knowledge about stormwater, Mr. McKernan used lessons and activities from the Urban Stormwater Management unit at TeachEngineering.org, an open-access planning tool for STEM teachers. The curriculum was developed by USF alumnus Dr. Ryan Locicero, whose initial involvement with rain garden planning at Young Middle Magnet School in Tampa inspired the project at Greco. The unit includes lessons about the natural stormwater cycle and how low-impact technologies can be used to mitigate stormwater issues. Mr. McKernan's students studied transpiration and infiltration rates while planning and building the garden, and the hands-on experiences gave them a deeper understanding of stormwater issues and the engineering concepts of the garden.

In the first infiltration lab, students measured the infiltration rate of various media types: soil, mulch, sand, and gravel. Each student group built a small-scale "rain garden" using a planter basket filled with their assigned media. The basket was clipped into a bucket and students poured water through the

media, measuring the time taken to filter through and identifying properties of their media. While soil and mulch absorb some of the water, sand and gravel promote infiltration because of their large pore spaces and low porosity.

In the next infiltration rate lab, students created the same small-scale rain garden setup, but now used a combination of the media types of their own choosing. The results would help students determine what types of media they should incorporate into their garden plot. The rain garden on Greco's campus is unique because 13 groups used different combinations and layers of media within their 7-foot by 7-foot plot, encouraging student involvement, ownership, and collaboration. Each group of 4-6 students used Minecraft, a construction video game, to design their plot and experiment with different media layers and plants. Many students said the Minecraft design was their favorite part of the project, and the ability to see their garden plot exposed students to the concept of systems modeling.



Students measure the infiltration rate of water within a soil layer.



*Students measure the infiltration rate of water flowing through a mixture of sand, gravel, mch, and soil.*

In mid-March, the class was ready to break ground on the garden. The five days of excavation were tough – students worked hard and shared the responsibility of digging. Over the next few weeks, soil, gravel, and mulch were delivered to the site and students filled in their plots with the layers according to their plans. From the lab experience, students were able to draw connections between the infiltration rates of different media types and the potential impact of the garden. For example, the existing soil was mostly sand, so many students wondered by the site was draining so poorly. Mr. McKernan explained that because the bus loop was adjacent to the garden site, heavy foot traffic in the area had probably compacted the sand and worsened flooding.

By April, the students had filled in the plots, leaving six inches for a final layer of soil and plants. While some students were busy with shovels, others researched appropriate plants for the local climate and garden conditions. Anything planted in full Florida sun should be hardy and drought-tolerant, but



*Students excavate their group's plot within the garden.*

plants in a rain garden should also be able to tolerate having “wet feet.” Florida-native plants like coreopsis and Muhly grass require less maintenance to stay healthy and support the local pollinator population. Some plants may not thrive; garden maintenance will include replacing dead plants with different ones to see what fares best.

The partnership has been beneficial to the Coverdell Fellows, as they learned about classroom collaboration and communicating knowledge to students effectively. Coverdell Fellow Nicholas Ferreira described the project as “a breath of fresh air” during a challenging time of global pandemic, when many USF students were spending all day indoors behind a computer screen. The most important impact has been for the students, who were exposed to project planning and design skills throughout the garden build. They used technology tools, laboratory experiments, and internet research to develop a garden design and worked together to implement it. The students share the responsibility of maintaining the garden and will continue to observe its impact on flooding as the plants mature. The Coverdell Fellows at USF look forward to a flourishing relationship with Greco Middle School and future rain gardens on the school’s campus.



*Each plot in the garden was filled with different media layers according to the students’ plans.*



***“I really enjoyed picking out the plants for the garden. Our group named the plants in our plot, and we check on them every day.”***

– Sydney Smith

*Matt McKernan and math teacher Jen Butler implemented the rain garden project at Greco Middle School. 2020 Coverdell Fellows Nicholas Ferreira and Elizabeth Vicario worked with Mr. McKernan’s science and technology classes and coordinated the garden build. 2019 Coverdell Fellows Martha Mcalister and Chris Nenninger organized the project and acquired funding. Dr. James Mihelcic oversaw the project as the Coverdell Fellowship coordinator. The Coverdell Fellows would like to thank the Association of Environmental Engineering and Science Professors Foundation, University of South Florida Operations, and the Temple Terrace Garden Club for their financial donations and support of the project.*



With support from the U.S. National Science Foundation, AEESP member David Mays at the University of Colorado Denver has recently created a video to summarize the literature linking diverse teams with better outcomes. The bottom line is that diversity, equity, and inclusion (DEI) is a win-win. There is a full 18-minute version (<https://youtu.be/McbJDqIhxSE>) and a shorter 3-minute trailer (<https://youtu.be/T3ME84vQCVg>), both of which are on the YouTube channel <https://bit.ly/learningmodules>. As a side note, that YouTube channel has a few other videos that may be of interest to AEESP members, including E-Waste, Numerical Methods, Hydrostatics, and Water Treatment. Feedback is welcome by e-mail to [david.mays@ucdenver.edu](mailto:david.mays@ucdenver.edu).

## 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!

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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        | \$110       |
| Associate Professors   | \$ 85       |
| Assistant Professors   | \$ 55       |
| Students and Post-docs | \$ 15       |

*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 two page curriculum vitae online with payment. Alternatively, application materials may be mailed to the Business Office with a check enclosed.

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

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- 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 \$65.

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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 contact the Business Office at the phone number below.

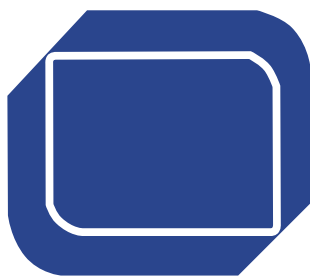
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