Pre-conference Workshops at the 2022 AEESP Conference

June 28, 2022

Conference website: https://aeesp2022.wustl.edu/

If you have any question, please feel free to reach out to the Workshop Chair, Dr. Young-Shin Jun, vsjun@wustl.edu

Community Networking Opportunities

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Bettering the Environmental Engineering and Science Community: Diversity, Equity, and Inclusion

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Career Support and Development

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Workshop Description

Community Networking Opportunities

1. AEESP Environmental Engineering Program Leaders (EEPL) Annual Workshop
   9:00AM-12:00 PM, Room Location: Crow Hall 204

**Description:** This workshop serves as the annual meeting of the EEPL. The workshop will address four topics: i) State of Environmental Engineering Programs (Chris Cox (University of Tennessee), Allison MacKay (Ohio State University), Larry Nies (Purdue), Mike Penn (UW-Platteville), ii) Leadership Development Mentoring: How to make the next step (Amy Childress (USC), Donna Fennell (Rutgers), Tim Vadas (UConn)), iii) ENVE Specific ABET Updates and Need to Know Items (Kurt Pennell (Brown), and iv) Update on BOK (Dan Oerther, AAEES). Adequate time will be provided for questions and discussion.

**Organizers:** Andrew Jackson (Co-Chair), Texas Tech University, Andrew.jackson@ttu.edu
John Sutherland (Co-Chair), Purdue University, jwsuther@purdue.edu
Mark Barnett, Auburn University, Barnem4@auburn.edu
Donna Fennell, Rutgers Univ., fennell@envsci.rutgers.edu
Patrick Gurian, Drexel Univ., plg28@drexel.edu
Allison Kennicutt, York College., akennicutt@ycp.edu
Simeon Komisar, Florida Gulf Coast Univ., skomisar@fgcu.edu
David Ladner, Clemson Univ., ladner@clemson.edu
William Pennock, NJ Inst. Tech., william.h.pennock@njit.edu
Alan Rabideau, Univ. of Buffalo, rabideau@buffalo.edu
Joe Ryan, U. of Col. Boulder, joseph.ryan@colorado.edu
Timm Strathmann, Colorado School of Mines, strthmn@mines.edu
Timothy Vadas, Univ. of Connecticut, timothy.vadas@uconn.edu
Erin Surdo, Univ. of Minnesota, surdo001@umn.edu
Rachel Wagner, Saint Francis University, rwagner@francis.edu

**Suggested Participants:** Any environmental program lead or individual with an interest in the administration of environmental programs.
2. Meet the Editors  
9:00AM-12:00 PM, Room Location: Crow Hall 206

Description: Publishing a research work is an important part of a professor’s job. The rapid movement to open access has created challenges for both publishing and academic communities. Promoting the contributions from and service to underrepresented groups is a key issue to address. The ongoing COVID-19 pandemic has clearly affected the publishing. To discuss and possibly address some of those and other new challenges associated with publishing, we propose this workshop “Meet the Editors” and aim to create a platform for a direct dialogue between researchers and chief editors of the popular journals in the field of environmental engineering and science.

This workshop is aligned well with the conference’s theme of convergence. Journal publications convey research findings to scientific community and provide educational materials for both students and the public. Journals are the platforms for multidisciplinary research collaboration and work. Many practices or entrepreneurships that have led to technological advancements started with obtaining front-edge research results from journal publications.

The workshop will consist of editor presentation, panel discussion, and individual interactions with editors. Before the conference starts, we will conduct a survey and collect questions from the registered workshop attendees.

Organizers: Zhen (Jason) He (Co-Chair), zhenhe@wustl.edu, Washington University in St. Louis and Young-Shin Jun (Co-Chair), ysjun@wustl.edu , Washington University in St. Louis

Suggested Participants: Any environmental scientists and engineers who are interested in meeting and discussing about journal publications with editors.

Confirmed Speakers

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<tr>
<th>Journal</th>
<th>Participating Editor</th>
<th>Affiliation</th>
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<tr>
<td>ACS ES&amp;T Engineering</td>
<td>Wonyong Choi, Editor in Chief</td>
<td>Korea Institute of Energy</td>
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<td>Chemical Engineering Journal</td>
<td>Dionysios (Dion) Dionysiou, Editor</td>
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<td>Amy Childress, Editor</td>
<td>University of Southern California</td>
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<td>Environmental Engineering Science</td>
<td>Catherine Peters, Editor in Chief</td>
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<td>Environmental Science: Atmosphere</td>
<td>Neil Donahue, Editor in Chief</td>
<td>Carnegie Mellon University</td>
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<td>Environmental Science: Nano</td>
<td>Peter Vikesland, Editor in Chief</td>
<td>Virginia Tech</td>
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<td>Environmental Science: Processes &amp; Impacts</td>
<td>Helen Hsu-Kim, Associate Editor</td>
<td>Duke University</td>
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<td>Environmental Science: Water Research &amp; Technology</td>
<td>Paige Novak, Editor in Chief</td>
<td>University of Minnesota</td>
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<td>Environmental Science &amp; Technology Letters</td>
<td>Bill Arnold, Executive Editor</td>
<td>University of Minnesota</td>
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<td>Journal of Hazardous Materials</td>
<td>Zhen (Jason) He, Editor in Chief</td>
<td>Washington University in St. Louis</td>
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<td>Journal of Hazardous Materials Letters</td>
<td>Shaily Mahendra, Co-Editor in Chief</td>
<td>University of California Los Angeles</td>
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<td>Journal of Hazardous Materials Advances</td>
<td>Wen Zhang, Co-Editor in Chief</td>
<td>New Jersey Institute of Technology</td>
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<tr>
<td>Marine Pollution Bulletin</td>
<td>Michel Boufadel, Co-Editor in Chief</td>
<td>New Jersey Institute of Technology</td>
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3. **U.S.-China Research and Education Workshop in Environmental Science and Engineering**  
   1:30 PM – 4:30 PM, Room Location: Hillman Hall 60

**Description:** This workshop, to be organized by the Chinese-American Professors in Environmental Engineering and Science (CAPEES), aims to provide a bridging platform for young researchers (PhD students, postdoc, and junior researchers) to learn about the career development and opportunities in the US and China. CAPEES plans to invite senior researchers, faculty and industrial representatives for face-to-face interactions in forms of panel discussions and spotlight presentations to share their insights and experiences in different stages of career. Two panel discussions will be hosted to discuss barriers and strategies in junior faculty career development in the north American universities and successful industrial collaborations/funding opportunities. Finally, CAPEES will introduce officers and present awards to faculty and student recipients of CAPEES scholarship/awards.

**Organizers:** Wen Zhang (CAPEES President; Chair of the workshop), New Jersey Institute of Technology, wen.zhang@njit.edu;  
Shihong Lin, Vanderbilt University, shihong.lin@vanderbilt.edu;  
Xing Xie, Georgia Institute of Technology, xing.xie@ce.gatech.edu;  
Mengyan Li, New Jersey Institute of Technology, mengyan.li@njit.edu;  
Jinkai Xue, University of Regina, jinkai.xue@uregina.ca;  
Tiezheng Tong, Colorado State University, Tiezheng.Tong@colostate.edu;  
Yanyan Zhang, New Mexico State University, zhangy@nmsu.edu.

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4. **Bettering the Environmental Engineering and Science Community: Diversity, Equity, and Inclusion**

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4. **Environmental Engineering for the 21st Century: Converging Networks to Advance Diversity, Equity, and Inclusion**  
   9:00AM-12:00 PM, Room Location: Jubel Hall 120

**Description:** This workshop builds from (1) a workshop at the 2019 AEESP meeting and (2) experiences across a number of institutions and two Engineering Research Centers, and invites participants to engage in action-oriented next steps to advance diversity, equity, and inclusion within Environmental Engineering. Topics we will address include (1) exposing students to community-based participatory methods, (2) establishing action research groups for faculty, (3) broadening the definition of research impact to improve tenure promotion experiences for minority faculty, (4) using a mixed methods approach to evaluate impact (in students and communities), and (5) building networks to increase capacity and outcomes. Workshop discussions will be captured and distributed to AEESP members, and participants will leave with tangible next steps, an expanded collective toolkit, and a larger community of practice.

**Organizers:**  
Lupita D. Montoya (Co-Chair), University of Colorado, Lupita.montoya@colorado.edu  
Sarah Miller (Co-Chair), Yale University, Sarah.M.Miller@yale.edu  
Angela Bielefeldt, University of Colorado, Angela.Bielefeldt@colorado.edu  
JoAnn Silverstein, University of Colorado, JoAnn.Silverstein@colorado.edu  
Maya Trotz, University of South Florida, matrotz@usf.edu  
Lorelay Mendoza, Stanford University, lorelay@stanford.edu  
Andrew Kim, Stanford University, andrewhk@stanford.edu  
Ana Barrios, Arizona State University, acbarrios@asu.edu
5. **Beyond Recruitment: Development of a Guidance Framework to Foster Black Junior Environmental Engineering Faculty Success**  
1:30 PM – 4:30 PM, Room Location: Whitaker Hall 216  

**Description:** This workshop seeks to identify attributes of success for Black faculty academic success (e.g., professional development, promotion and tenure, and job satisfaction and support), and provide a guidance framework for faculty allies to support their Black junior faculty, junior faculty of color, and underrepresented faculty. Prior to the workshop, the organizers will identify predictors of junior faculty success (e.g., publications, service, teaching), and begin to collect and analyze survey data from participating Black junior faculty in Environmental Engineering regarding these success factors. We are interested in delineating the differences in factors that influence or predict junior faculty success in STEM fields and comparing those factors to perceived success indicators among Black and non-Black junior faculty, cross-referencing those factors with indirect stakeholders (e.g., department chairs and deans). Findings from surveys and interviews with Black faculty will be presented during the workshop to interested attendees to create strategies and actionable items for allies and indirect stakeholders to support their Black faculty. We feel the nature of this workshop is timely considering the racial reckoning in the country and the important role Environmental Engineers play in protecting public safety in response to emerging challenges of our changing world.

**Organizers:**  
Jessica Ray (Chair), University of Washington, jessray@uw.edu;  
William Tarpeh (Co-Chair), Stanford University, wtarpeh@stanford.edu;  
Jacelyn Rice-Boayue, University of North Carolina Charlotte, Jacelyn.Rice@uncc.edu  
Maureen Kinyua, mnkinyua@ucdavis.edu  

**Suggested Participants:** All

6. **Eliminating Systemic Racism and Sexual Harassment in STEM**  
1:30 PM – 4:30 PM, Room Location: Jubel Hall 120

**Description:** A recent NASEM report titled Engineering Societies’ Activities in Promoting Diversity and Inclusion: Proceedings of a Workshop in Brief (NASEM 2018b) declared that “Barriers to advancement are no longer primarily a result of ‘bad apples’ who resist the inclusion of
underrepresented minorities. Instead, subtle beliefs and practices, such as micro-aggressions, cognitive biases, and cultural processes, create disadvantages that progressively accumulate.”

More recently, the highly respected journal Science published an Open Letter to the scientific community titled Systemic Racism in Higher Education, which was signed by over 10,000 STEM scholars (Barber et al., 2020) asking for action. While many universities host workshops to have faculty confront such micro-aggressions and cognitive biases on a personal level, there are few opportunities to confront such beliefs and practices on an institutional level so as to truly effect change. In this workshop, we will explore how we, as members of AEESP, can affect the much-needed institutional change in academia, using the NASEM reports and the Science Open Letter as foundations.

Such hard work has already started at other scientific communities like the American Association for Aerosol Research (AAAR), with their new Representation and Equity Affairs Committee. As part of their annual meeting, AAAR hosted Systemic Racism in Higher Education: Panel Discussion and Next Steps at AAAR on October 8, 2020. Attendees suggested, among other things, to work together with other scientific communities to combat Systemic Racism and similar injustices. We converge with their assessment and their recommendation and propose this workshop in response.

Organizers: Lupita D. Montoya (Chair), University of Colorado, Lupita.montoya@colorado.edu
Angela Bielefeldt, University of Colorado, Angela.Bielefeldt@colorado.edu
Cliff Davidson, Syracuse University, davidson@svr.edu
Andrea Ferro, Clarkson University, aferro@clarkson.edu
Susan J. Masten, Michigan State University, masten@msu.edu
JoAnn Silverstein, University of Colorado, JoAnn.Silverstein@colorado.edu
Maya Trotz, University of South Florida, matrotz@usf.edu
C-Y Wu, University of Florida, cywu@essie.ufl.edu

Suggested Participants: All

Career Support and Development

7. Careers in Environmental Engineering & Science after Graduate School
   9:00AM-12:00 PM, Room Location(s): Hillman Hall 60 & 70

Description: The AEESP Student Services Committee (SSC) plans to continue the tradition of conducting career-oriented workshops for graduate students and postdoctoral scholars. This workshop will be broken up into two timed sessions and will be conducted in hybrid mode (in-person and online). The first part of the workshop will be an interactive panel discussion with members representing various career paths available to environmental engineers and scientists after their graduate degrees: academic, national lab, consulting, government positions, and entrepreneurship. This hour will then be followed by a 1-hour session where participants will be divided in breakout rooms according to their specific interest group. The breakout rooms will have their own discussion and Q&A, moderated by an SSC member. The Academic Job Application Review (AJAR) will also happen simultaneously in a hybrid fashion with preconference application submission and some faculty-application interactions during conference.
Organizers: The AEESP Student Services Committee (SSC)

Dr. Fabrizio Sabba, (Chair), Black and Veatch, fabrizio.sabba@northwestern.edu
Dr. Nirupam Aich, (Vice-Chair), University at Buffalo (SUNY), nirupama@buffalo.edu
Dr. Sanjay Tewari, (Secretary), Missouri S&T University
Dr. Lucia Rodriguez-Freire, (Vice-Secretary), New Jersey Institute of Technology
Dr. Manish Kumar, University of Texas – Austin
Dr. Patrick McNamara, Marquette University
Dr. Ilke Celik, South Dakota School of Mines & Technology
Dr. Jennifer Benning, Virginia Tech
Dr. Philip Larese-Casanova, Northeastern University
Dr. Ellison Carter, Colorado State University
Dr. Lauren Studler, Rice University
Dr. Sudeep Popat, Clemson University
Dr. Ramesh Goel, University of Utah
Dr. Jeremiah Johnson, North Carolina State University
Dr. Elizabeth Butler, University of Oklahoma
Dr. Katherine Alfredo, University of South Florida
Dr. Vikram Kapoor, University of Texas at San Antonio
Dr. Kiranmavi Mangalgiri, Oklahoma State University
Dr. Matthew Berens, Natural Resources Research Institute (NRRI)

Suggested participants: the AEESP community (primarily students and postdocs) who are interested in learning more about the academic and non-academic job search.

8. Equity in the Job Search: Tools to Successfully Navigate the Job Search and Promote Gender Equity in STEM
1:30 PM – 4:30 PM, Room Location: Crow Hall 206

Description: To help women overcome barriers in the academic job search, our event will combine practical “how-to” advice with discussion of gender bias and explicit tools to overcome it. Our workshop will be open to individuals of all genders and career stages, as limiting the demographic of attendees fails to address all angles of gender bias. Further, the workshop will provide data-supported awareness of implicit biases and critically needed methods to surmount those challenges in a university setting. Ultimately, we seek to impart the idea that everyone benefits from and can act to cultivate inclusivity.

Organizers: Desiree Plata (Co-Chair), Massachusetts Institute of Technology, dplata@mit.edu, Bridget Hegarty (Co-Chair), University of Michigan, hegartyb@umich.edu, and Kara Nelson, University of Berkeley, karanelson@berkeley.edu

Suggested Participants: All
9. NSF CAREER Proposal Workshop
   9:00AM-12:00 PM, Room Location: Brauer Hall 12

Description: The NSF CAREER program is a convergence of scientific discovery through cutting-edge research with the broader impacts that these endeavors have on the education system and society. This workshop will bring together NSF program managers and past CAREER award winners to help guide and field questions from early career scientists.

Organizers: Kimberly Parker (Co-Chair), kmparker@wustl.edu Washington University in St. Louis and Fangqiong Ling (Co-Chair), fangqiong@wustl.edu, Washington University in St. Louis

Suggested Participants: Anyone who are interested in submitting NSF CAREER proposals

10. Developing Future Academic Leaders in Environmental Engineering and Science
    1:30 PM – 4:30 PM, Room Location: McDonnell 362

Description: The workshop will help mid-career professors learn about skills and interests needed for leadership positions in academia. A starting point for workshop participants will be goals assessment exercises that help participants explore how their professional goals and efforts have evolved over their careers and how those goals and efforts may no longer be in alignment. This exercise can also help participants identify what realignments could lead to greater professional satisfaction and impact, especially in the context of taking on leadership opportunities at their universities. The workshop will benefit from perspectives of members of our community who have completed various training programs (e.g., ELATE, HERS, Aldo Leopold, MBA) and moved into leadership positions at their universities. These people will provide testimonials of their experience, participate in a panel discussion, and facilitate breakout sessions in which workshop participants discuss leadership opportunities, challenges to taking on leadership positions, and pathways for gaining knowledge and skills to become effective leaders. This workshop will help empower mid-career professors to consider leadership opportunities as future department chairs, directors of research centers, and leaders at school and university levels.

Organizers: Keri Hornbuckle (Co-Chair), University of Iowa, keri-hornbuckle@uiowa.edu; Jay Turner (Co-Chair), Washington University in St. Louis, jrtturner@wustl.edu; Daniel Giammar (Co-Chair), Washington University in St. Louis, giammar@wustl.edu

Suggested Participants: Associate and Full Professors Interested in Developing Leadership Skills

11. Career Development; Boyer’s Model of Scholarship in Higher Ed
    1:30 PM – 4:30 PM, Room Location: Brauer Hall 3015

Description: This workshop is organized to obtain three objectives (O), namely: O1) raising awareness to Boyer’s model of scholarship in higher education; O2) applying Boyer’s model to evaluate our own work; and O3) leading institutional change by sharing Boyer’s model back home. To obtain these objectives, four workshop activities (A) will be completed, including: A1) pre-conference review of educational materials introducing Boyer’s model (view a video; take a quiz; and
share on a discussion board); A2) on-site expert testimony clarifying Boyer’s model (brief lectures by four speakers); A3) on-site hands-on, small-group work (employing career cartography to achieve Boyer’s model (Feetham and Doering, 2015)); and A4) post-conference sharing, expert-coaching, and peer-encouragement as workshop participants engage back home (moderated discussion board and one-on-one or small group discussion). The workshop organizers are experts in complimentary aspects of Boyer’s model, and collectively the workshop organizers commit to pre-conference, on-site, and post-conference activities such as coaching workshops participants when they engage back home. This workshop directly addresses the theme of the AEESP 2021 conference by providing a conceptual framework for the environmental engineering and science community to assign faculty “credit” when solving societal challenges using transdisciplinary teams (i.e., performing convergence research). And this workshop is responsive to discussions of how to evaluate faculty activities, which are ongoing in the environmental engineering and science literature (i.e., Sedlak (2016); Edwards and Roy (2017)).

Organizers: Daniel Oerther (Chair), Missouri S&T, oertherd@mst.edu; Angie Bielefeldt, University of Colorado, Boulder, Angela.Bielefeldt@colorado.edu; Danny Willis, Saint Louis University, danny.willins@slu.edu; Marshall Stewart, University of Missouri System, stewartmars@missouri.edu

Suggested participants: All

Convergent Research

12. Leveraging Microbiome Research in Environmental Engineering and Science
1:30 PM – 4:30 PM, Room Location: Hillman Hall 70

Description: Microbiome science has blossomed as a new interdisciplinary field of inquiry in large part due to the rapid developments in high throughput meta-omics methods. However, leveraging these developments to solve the challenges pertinent to the Environmental Engineering and Science (EES) community can be fraught with challenges. These challenges can range from how to choose a hypothesis-appropriate methodology for a given experiment to how to interpret generated data towards a clear practical application. The overall motivation of this workshop is to identify best practices for experimental design, methodological choice, and data interpretation to enable a robust and productive integration of microbiome sciences in EES research and practice. The workshop will include an overview of high-throughput meta-omic methods for microbiome structure and function characterization, hand-on exercises where the workshop participants will engage with interactive Systems Biology Knowledgebase (kbase) “narratives” (https://www.kbase.us/) crafted using example environmental engineering projects and a theme-driven facilitated round-table discussions.

The intended learning outcomes of the workshop are as follows: Participants should be able (1) pick the appropriate meta-omic method and data analyses for their research questions, and (2) incorporate a working knowledge of the state-of-the-art in microbiome sciences into their planned research.

Organizers: Ameet J Pinto (Chair), Georgia Tech, ameet.pinto@ce.gatech.edu; Fangqiong Ling, Washington University in St. Louis, fangqiong@wustl.edu; Juliet Johnston, Lawrence Livermore National Laboratory; johnston50@llnl.gov; Christopher Lawson, University of Toronto; chris.lawson@utoronto.ca
9:00AM-12:00 PM, Room Location: Lopata Hall 103

Description: The goal of this workshop is to facilitate the participation of aerosol and public health researchers for identifying multi-disciplinary gaps, and the research needed to address them. A major emphasis of this workshop will be on the role of aerosol science in understanding and preventing COVID-19 transmission. Original research and review contributions are solicited across a range of related sub-disciplines, including, but not limited to (i) detection and transmission modes of SARS-CoV-2 in air and interfaces; (ii) environmental determinants, such as temperature, humidity, atmospheric particulate matter exposure, sunlight, and bioaerosol, on virus transmission, survival and infection potential; (iii) effectiveness of personal protective equipment, such as face mask and respirators; and (iv) non-pharmaceutical prevention strategies and their effectiveness for future pandemic. Direct benefits to the AEESP community include:

- Learning about and contributing to the future direction of research and outreach aimed at addressing COVID-19 as an environmental problem;
- Building collaborative network in addressing airborne spread of COVID-19;
- Contributing to a white paper/perspectives piece to guide the direction and focus of research, investment, and outreach by the environmental science and engineering community.

Organizers: Rajan K. Chakrabarty (Co-Chair), Washington University in St. Louis, chakrabarty@wustl.edu; Pratim Biswas (Co-Chair), University of Miami, pbiswas@miami.edu; Yang Wang (Co-Chair), Missouri University of Science and Technology, yangwang@mst.edu

Suggested Participants: All

9:00AM-12:00 PM, Room Location: Lopata Hall 101

Description: In order to have maintained public health impact, both scientifically and for the communities and stakeholders that we serve, our field must strengthen and maintain a close connection to public health. These connections are particularly important given the interdisciplinary nature of current challenges and emerging issues such as those posed by climate change, urbanization, and water shortage. Environmental engineers & scientists have long played a critical role in protecting public health and welfare, but that role is not guaranteed as we look to the future. The goals of this workshop are threefold:
1. Familiarize attendees with successful translation of environmental engineering and science topics and with public health programs (past and present).

2. Discuss ways in which environmental engineers can extend their expertise to make impact in existing public health disciplines and emerging public health issues.

3. Describe mechanisms and strategies for research funding and stakeholder engagement as we look to translate fundamental research to actionable implementation for public health.

The workshop will look to familiarize younger academicians with successful researchers that link directly to public health topics, and also to agencies with fundamental public health programs and funding mechanisms. Researchers and NGO representatives will share their steps to be impactful in active programs, including steps in funding their efforts and engaging collaborators and communities to the benefit of public health.

**Organizers:** Joel Burken (Chair), Missouri University of Science and Technology, Burken@mst.edu and Heather Henry, NIH/NIEHS, henryh@niehs.nih.gov

**Suggested participants:** The intended audience is early - and mid-career academicians looking to advance their research program beyond the lab bench and connect with programs and opportunities to impact public health.

15. **Convergent Environmental Engineering Research and Education to Eliminate Disparities in Access to Safe, Affordable Water and Sanitation in the United States**

9:00AM-12:00 PM, Room Location: Whitaker Hall 100

**Description:** Tens of millions of Americans—primarily people of color and/or low-income communities—lack safe, affordable drinking water and sanitation systems. Approximately 21 million rely on water systems violating health-based standards. Another 24 million get their water from contaminated, unregulated private wells. Tens of millions dispose of their sewage through inadequate on-site systems or lack on-site sanitation systems altogether. Nearly 40 million cannot afford their water and sewer bills.

This workshop will convene AEESP members interested in educating the next generation about technical and institutional solutions to eliminate persistent disparities in access to safe, affordable water and sanitation in the United States. The workshop will begin with an overview of the different contexts in which these disparities exist (from rural to peri-urban and urban) and their causes. Case studies of affected communities will be presented as lightning talks. Then, attendees will divide into roundtable groups to outline needs for research and education in environmental engineering to contribute to eliminating these disparities. Groups will reconvene to discuss and prioritize these needs. The workshop organizers will use the results to write an action plan for environmental engineers to work toward achieving equitable access to water and sanitation in the United States.

**Organizers:** Jacqueline MacDonald Gibson (Chair), Indiana University, Bloomington, jacmgibs@iu.edu; David Weissbrodt, Delft University of Technology, D.G.Weissbrodt@tudelft.nl; Brown, Joe, University of North Carolina, Chapel Hill, joebrown@unc.edu;
Suggested participants: AEESP community who would like to engage global water and environmental education discussion.

16. Climate Change in Environmental Engineering Education
   1:30 PM – 4:30 PM, Room Location: Brauer Hall 12

Description: Climate change, climate change mitigation, climate change resilience, and climate change adaptation are among the most important and challenging environmental problems, and yet these topics are largely absent from environmental engineering curricula. Professors of environmental engineering have a responsibility to prepare graduates for a future in which they will be called upon to advance, lead and innovate to solve this grand challenge. Furthermore, a multi-billion $ industry has emerged seeking engineers to address these problems (Ramboll Environ, CH2M HILL, ICF International, Inc., and many more), and environmental engineering graduates should be prepared for these opportunities. This workshop will feature speakers and programs that are driving educational advancements at the confluence of climate change and environmental engineering. In addition to professors, industry leaders will speak about climate change work in engineering and consulting firms, and what are the skills needed for engineering graduates entering this job marketplace. Workshop topics will include: the convergence of climate change and public health; technologies for greenhouse gas mitigation; climate change adaptation for infrastructure; climate change as a vehicle for teaching critical thinking skills, collaboration and leadership; climate change in the context of ABET accreditation. The workshop will include presentations by invited speakers, pop-up presentations by workshop participants, break-out discussions, and round-table working groups. The goal of the workshop will be to catalog and document the best practices and strategies. The workshop summary will be published in AEESP’s journal Environmental Engineering Science. Also, a perspective/opinion piece will be written for submission to PRISM or other climate/engineering journal with broad readership.

Organizers: Catherine A. Peters (Chair), Princeton University, cap@princeton.edu;

Additional organizers, speakers, panelists: Jeff Cunningham, University of South Florida, cunning@usf.edu; Andres Clarens, University of Virginia, aclarens@virginia.edu; Brian Ellis, University of Michigan, brellis@umich.edu; Lauren Beckingham, Auburn University, leb0071@auburn.edu

Suggested participants: This workshop is a relevant topic for anyone who thinks about curriculum in environmental engineering and alignment with the NASEM grand challenges.
Convergent Education and Outreach

17. **Researching Together: How Do I Engage Secondary School Students in Authentic Environmental Engineering and Science Research?**
   
   **9:00AM-12:00 PM, Room Location: Whitaker Hall 318**

   **Description:** This workshop will provide AEESP members with background and methods needed to collaborate with secondary schools, and engage teachers and students in authentic Environmental Engineering and Science research. Participants will gain skills and knowledge needed to “research together” while educating secondary and university students about environmental issues and how to address them. The workshop will include presentations, hands-on activities, and brainstorming sessions.

   Workshop leaders from the University of South Florida and University of Texas Rio Grande Valley have significant experience engaging middle school (MS) and high school (HS) students in WASH research in the US and Ghana. Secondary students who engaged in authentic science and engineering research were more motivated to study STEM subjects and pursue STEM careers, gained greater understanding of the nature of STEM disciplines, environmental problems and what they can do to address them. In addition, university students gained useful research information, teaching and communication skills.

   The workshop is aligned with the conference theme of convergence of education and research. We will showcase some of our projects on algal biofuel production, point of use water treatment, biodigesters, and arsenic in the environment; discuss the logistics of collaborating with schools, including navigating the human subjects approval process; describe the methods for engaging MS and HS students in authentic research activities; and use role playing activities to help participants develop a plan to apply this model to their own research.

   **Organizers:** Sarina Ergas (Chair), University of South Florida, sergas@usf.edu; Allan Feldman, University of South Florida, afeldman@usf.edu; Angela Chapman, University of Texas Rio Grande Valley, angela.chapman@utrgv.edu; Kebreab Ghebremichael, University of South Florida, kebreab@usf.edu; Erica Dasi, University of South Florida, eadasi@usf.edu.

   **Suggested participants:** AEESP members who would like to engage in authentic research with schools would be interested in this workshop. New faculty preparing CAREER or other related proposals will learn about ways to collaborate with local schools and educational researchers. Participants will gain skills and knowledge needed to “research together” while educating secondary and university students about environmental issues and how to address them. The workshop will include presentations, hands-on activities, and brainstorming sessions.

18. **Teaching Sustainability at the Pre-College, Undergraduate, and Graduate Levels: Incorporating Research Findings**

   **1:30 PM – 4:30 PM, Room Location: Jubel Hall 121**
**Description:** In the first of three sessions, this workshop will present new educational methods developed by the organizers. Cliff Davidson will present a website showing real-time graphs of rainfall and runoff on a green roof for use in Syracuse middle schools that follow the national Next Generation Science Standards. Rebecca Hardin will present lessons learned using Open Educational Resources on the topic of sustainability with case-based learning modules at high school and early undergraduate levels. Jianpeng Zhou will discuss a project course in which graduate students of structural, transportation, geotechnical, and environmental/water resources engineering solve problems sustainably. Susan Powers will discuss research demonstration projects that emphasize sustainability in capstone classes. Qiong Zhang will discuss a design course for undergraduate and graduate students incorporating multiple disciplines, utility engagement, and student research. Treavor Boyer will discuss real-time sensing of water systems to attract freshmen into environmental engineering, and to illustrate sustainability in senior design courses. The workshop will divide into three breakout groups for the second session, and each group will discuss ways to incorporate ideas presented as well as new ideas into courses on sustainability at both undergraduate and graduate levels. Finally, in the third session the group will re-assemble to hear reports from each breakout group. This will be followed by open discussion.

**Organizers:** Cliff Davidson (Chair), Syracuse University, davidson@syr.edu
Treavor Boyer, Arizona State University, thboyer@asu.edu
Rebecca Hardin, University of Michigan, rdhardin@umich.edu
Susan Powers, Clarkson University, spowers@clarkson.edu
Qiong (Jane) Zhang, University of South Florida, qiongzhang@usf.edu
Jianpeng (Jim) Zhou, Southern Illinois University Edwardsville, jzhou@siue.edu

**Suggested participants:** Faculty members and graduate students are already teaching courses or are expecting to teach courses in sustainability.

**Data-enabled Research and Education**

   1:30 PM – 4:30 PM, Room Location: Crow Hall 201

**Description:** This workshop is designed to (1) introduce attendees to two water treatment technology analytical tools developed by NAWI and (2) discuss their applicability to environmental engineering practice. These tools are the Water Data and Management Systems (Water-DAMS), a data repository for water treatment technologies, and the Water Techno-economic Assessment and Pipe Parity Platform (Water-TAP3), an analytical tool that facilitates consistent techno-economic and performance analyses of water treatment processes across multiple sectors.

In this workshop, participants will take part in three activities demonstrating the use of these tools for evaluating the cost and performance of a new water treatment technology. The first activity will walk participants through how to search for and submit data to Water DAMS on a new water treatment process’ performance. Participants will then model this process in Water-TAP3 in isolation while
learning the Water-TAP3 model structure and features. Finally, participants will build a complete water treatment train in Water-TAP3 to evaluate the system-level benefits and tradeoffs of installing a new unit process on system performance and use Water-TAP3’s features to evaluate the impact of uncertainty around cost or technology performance. Before the workshop, participants will be provided with instructions on how to access the tools.

**Organizers:** Daniel B. Gingerich (Chair), The Ohio State University, gingerich.62@osu.edu; Meagan Mauter, Stanford University, mauter@stanford.edu; Amanda Quay, Stanford University, quay@stanford.edu; Jordan Macknick, National Renewable Energy Laboratory, Jordan.Macknick@nrel.gov

**Suggested participants:** Faculty and graduate students engaged in water-focused research. Faculty teaching water treatment courses may also find it useful to learn about tools they could implement in their classes.

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20. **Introducing Quantitative Sustainable Design (QSD) as a Structured Approach for Research and Education**

**Description:** When developing and designing environmental technologies, it is critical we elucidate (often uncertain) tradeoffs across multiple types of outcomes (e.g., economic, environmental, social, engineering), navigate them effectively, and align their trajectories for a more sustainable future. We strive toward these goals using a well-defined, quantitative sustainable design (QSD) process which applies concepts from sustainability science and sustainability transitions to technology development and engineering design. This approach is directly relevant to sustainability researchers but can also serve as an impactful skill set for anyone developing new materials, technologies, policies, etc., or educating engineers to think about the broader impacts of their decisions.

The workshop will familiarize participants with a structured approach to sustainable design (QSD) and provide experience in leveraging this approach to generate insight in their domains of interest. The half-day activities will use active learning techniques to guide attendees through the process of defining the problem, modeling a system, and tracking progress toward sustainability goals.

The QSD methodology will be introduced using examples from water and wastewater technology development. During breakout activities, attendees will apply the methodology to a technology of interest. Overview materials will be provided in advance to accelerate QSD application to attendees’ research and teaching.

**Organizers:** Jeremy S. Guest (Chair), University of Illinois at Urbana-Champaign, jsguest@illinois.edu; Diana M. Byrne, University of Kentucky, dianabryne@uky.edu; Sherri M. Cook, University of Colorado Boulder, sherri.cook@colorado.edu; Roland D. Cusick, University of Illinois at Urbana-Champaign, rcsick@illinois.edu; William A. Tarpeh, Stanford University, wtarpeh@stanford.edu

**Suggested participants:** Attendees could include any graduate students, postdocs, or faculty interested in characterizing the sustainability of materials, technologies, policies, etc., and teaching these skills.