

FINAL PROGRAM



WORLD ENVIRONMENTAL & WATER RESOURCES CONGRESS

Pittsburgh, Pennsylvania | May 19-23, 2019

RESILIENT
INFRASTRUCTURE
FOR A CHANGING

PLANET



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Welcome to the World Environmental & Water Resources

Schedule-at-a-Glance

(Subject to Change)

Saturday, May 18, 2019

- 8:00 a.m. – 5:00 p.m. Committee Meetings
- 12:00 – 5:30 p.m. AAWRE Board Meeting (*Traders Room*)

Sunday, May 19, 2019

- 8:00 a.m. – 5:00 p.m. Committee Meetings
- 8:30 a.m. – 12:30 p.m. AAWRE Board Meeting (*King's Terrace Room*)
- 8:30 a.m. – 5:30 p.m. Technical Workshop: How to Build Reliability in the Results of Numerical Modeling (*Grand Ballroom 3*)
- 12:00 – 6:15 p.m. Registration
- 1:00 – 5:00 p.m. AAWRE Panel Exams (*King's Terrace Room*)
- 6:30 – 8:00 p.m. EWRI 20th Anniversary Celebration (*King's Garden 5*) (ticketed event)
- 7:00 – 7:45 p.m. Professional Headshots

Monday, May 20, 2019

- 7:30 a.m. – 6:00 p.m. Registration (*Closed for lunch from 12:30 – 1:45 p.m.*)
- 7:30 a.m. – 6:00 p.m. ASCE Bookstore
- 8:30 – 10:00 a.m. Welcome & Keynote
- 10:00 – 10:30 a.m. Networking Break
- 10:30 a.m. – 12:00 p.m. Concurrent Technical Session I
- 10:30 a.m. – 12:00 p.m. Why Professional Ethics Matter – Presented by AAWRE (*King's Garden 5*)
- 12:15 – 1:45 p.m. Welcome & Awards Luncheon (*Grand Ballroom 1 & 2*) (ticketed event)
- 2:00 – 3:30 p.m. Concurrent Technical Session II
- 2:00 – 5:30 p.m. Technical Workshop: Misuse of HEC-RES for Bridge Scour Analyses & Other Bridge Scour (*King's Garden 4*)
- 3:30 – 4:00 p.m. Networking Break
- 4:00 – 5:30 p.m. Concurrent Technical Session III
- 5:45 – 7:00 pm. Paris to Pittsburgh – Movie Screening (*Grand Ballroom 1 & 2*)
- 6:00 – 6:45 p.m. AAWRE Diplomate Induction & Awards Ceremony (*King's Garden 5*)
- 6:00 – 10:00 p.m. Committee Meetings
- 6:00 p.m. Meet-Up: at Sienna Mercato

Tuesday, May 21, 2019

Student and New Professional's Day

- 8:00 a.m. – 4:15 p.m. Registration (*Closed for lunch from 12:30 – 1:45 p.m.*)
- 8:00 a.m. – 4:15 p.m. ASCE Bookstore
- 8:30 – 10:00 a.m. Concurrent Technical Session IV
- 8:30 – 10:00 a.m. Technical Workshop: Emerging Applications of Computational Fluid Dynamics in Water/Wastewater Treatment Industry (*Commonwealth 2*)
- 10:00 – 10:30 a.m. Networking Break
- 10:30 a.m. – 12:00 p.m. Concurrent Technical Session V
- 10:30 a.m. – 12:00 p.m. Why Board Certification is Important for your Engineering Career Path – Presented by AAWRE (*King's Garden 5*)
- 12:15 – 1:45 p.m. Watershed Council Luncheon (*Grand Ballroom 1*) (ticketed event)
- 12:15 – 1:45 p.m. Planning & Management Council Luncheon (*Grand Ballroom 2*) (ticketed event)
- 2:00 – 3:30 p.m. Concurrent Technical Session VI
- 2:00 – 5:30 p.m. Technical Workshop: The EFDC EXPLORER Modeling System: A Tool for Teaching Environmental Hydrodynamics In A Numerical Modeling Framework (*Birmingham Room*)
- 2:00 – 5:30 p.m. Technical Workshop: Riverbank Filtration (RBF) (*Commonwealth 2*)
- 2:30 – 4:30 p.m. History & Heritage Boat Tour: History of Waterways and Bridges in Pittsburgh (ticketed event)
*Boat leaves at 3:00 PM sharp
- 3:30 – 4:00 p.m. Networking Break
- 4:00 – 5:30 p.m. Concurrent Technical Session VII
- 6:00 – 10:00 p.m. Committee Meetings
- 6:30 – 10:00 p.m. Pittsburgh Pirates Baseball Game & Dinner (ticketed event)
- 6:00 p.m. Meet-Up: at Southern Tier Brewery

How will you CUSTOMIZE your Congress experience?

Download the 2019 EWRI Congress mobile app or browse the EWRI Congress Itinerary Planner at www.eventscribe.com/2019/ASCE-EWRI

Wednesday, May 22, 2019

Professional Practice Day

- 6:00 – 7:00 a.m. Morning Jumpstart in Point State Park
- 8:00 a.m. – 4:15 p.m. Registration
(Closed for lunch from 12:30 – 1:45 p.m.)
- 8:00 a.m. – 4:15 p.m. ASCE Bookstore
- 8:30 – 10:00 a.m. Concurrent Technical Sessions VIII
- 8:30 – 10:00 a.m. Technical Workshop: Next-Generation Wastewater Treatment Technologies with Bioelectrochemical Systems
(Smithfield Room)
- 10:00 – 10:30 a.m. Networking Break
- 10:30 a.m. – 12:00 p.m. Concurrent Technical Sessions IX
- 10:30 a.m. – 12:00 p.m. Are You Interested in Serving as an Expert Witness – Presented by AAWRE
(King's Garden 5)
- 10:30 a.m. – 12:00 p.m. Technical Workshop: Resource Efficient Desalination & Zero-Liquid Discharge Systems
(Smithfield Room)
- 12:15 – 1:45 p.m. Hydraulics & Waterways Council Luncheon
(Grand Ballroom 1) (ticketed event)
- 12:15 – 1:45 p.m. Irrigation and Drainage Council Luncheon
(Grand Ballroom 2) (ticketed event)
- 2:00 – 3:30 p.m. Concurrent Technical Sessions X
- 3:30 – 4:00 p.m. Networking Break
- 3:30 – 4:00 p.m. Professional Headshots
- 4:00 – 5:30 p.m. Concurrent Technical Sessions XI
- 4:00 – 5:30 p.m. Technical Workshop: Stormwater Management in a One Water Sustainability Framework
(Fort Pitt Room)
- 5:45 – 6:45 p.m. 2nd Annual Stormwater Quiz Show – Sponsored by AKRF, Inc. and WBCM
(Grand Ballroom 1)
- 6:00 – 10:00 p.m. Committee Meetings
- 6:00 p.m. Meet-Up: at The Grist House Craft Brewery

Thursday, May 23, 2019

- 8:15 a.m. – 12:15 p.m. Registration
- 8:15 a.m. – 12:15 p.m. ASCE Bookstore
- 8:30 – 10:00 a.m. Concurrent Technical Session XII
- 8:30 – 10:00 a.m. Technical Workshop: Introduction to the Hydrologic Modeling System (HEC-HMS)
(Sterlings 2 Room)
- 10:00 – 10:30 a.m. Networking Break
- 10:30 a.m. – 12:00 p.m. Concurrent Technical Session XIII
- 12:15 – 1:45 p.m. Environmental /Water, Wastewater, Stormwater Council Luncheon and Municipal Water Infrastructure Councils
(Grand Ballroom 1) (ticketed event)
- 12:15 – 1:45 p.m. Water Distribution Systems Analysis Luncheon
(Grand Ballroom 2) (ticketed event)
- 2:00 – 3:30 p.m. Concurrent Technical Sessions XIV
- 2:30 – 6:00 p.m. Triboro Ecodistricts (Etna/Millvale/Sharpsburgh) and Green Infrastructure Tour
(ticketed event)
- 2:30 – 6:00 p.m. Phipps Conservancy Center for Sustainable Landscapes & Frick Environmental Center & Panther Hollow Lake Storage Retrofit Project
(ticketed event)
- 2:30 – 6:00 p.m. ALCOSAN Plant Tour
(ticketed event)
- 
- 2:30 – 6:00 p.m. Chatham University - Eden Hall Campus Tour
(free event with advance registration)
- 3:30 – 4:00 p.m. Networking Break
- 4:00 – 5:30 p.m. Concurrent Technical Sessions XV



Maximize your Congress attendance by participating in a free technical workshop taught by a trusted subject matter expert. Technical workshops are listed in the technical program grid and are called-out in the listings of conference highlights on the following pages.

Conference Committee



General Chair
Kemal Niksic, P.E.



Technical Program Chair
Greg Scott, P.E.



Technical Program Chair
Bill Hamilton, Ph.D., P.E.



Local Arrangements Chair
**Jason Baguet, P.E.,
M.ASCE**



Local Arrangements Chair
Sarah Yeager, E.I.T



Sponsorship Chair
Saki Handa, ENV SP



Younger Member Chair
Maggie Chase



Member at Large
Ben Briston

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Technical Program Track Chairs

Education | **Angelica Huerta, EIT,
A.M.ASCE**

Emerging & Innovative Technologies | **Barak
Fishbain, A.M.ASCE**

Environmental | **Wendy Cohen, P.E.,
M.ASCE; Lisa Hayes, P.E., M.ASCE**

Groundwater Symposium | **Paul Mathisen,
P.E., M.ASCE; Amy B. Chan-Hilton, Ph.D.,
P.E., F.EWRI, M.ASCE**

History & Heritage | **Lawrence M Magura,
P.E., D.WRE (Ret.), F.ASCE; Jerry R. Rogers,
Ph.D., P.E., D.WRE, Dist.M.ASCE**

Hydraulics & Waterways | **Fabian
Bombardelli, A.M.ASCE**

Hydro-climate/Climate Change Symposium |
M. Levent Kavvas, Ph.D., Dist.M.ASCE

International Issues | **Erfan Goharian, Ph.D.,
A.M.ASCE, EIT; Ali Mirchi, A.M.ASCE**

Irrigation & Drainage | **Stuart W Styles,
Ph.D., P.E., D.WRE, M.ASCE**

New Professionals/Younger Members |
Erfaneh Sharifi, Ph.D., A.M.ASCE

Planning and Management | **Mashor
Housh, Ph.D., M.ASCE; Adriana Debora
Piemonti, A.M.ASCE**

Professional Practice | **Kristin White**

Standards | **Kathlie S. Jeng-Bulloch, Ph.D.,
P.E., D.WRE, CFM, M.ASCE**

Stormwater Symposium | **William F Hunt,
III, Ph.D., P.E., D.WRE, M.ASCE; Sarah
Waickowski, EIT, A.M.ASCE**

Student Competition | **John Wesley Lauer,
P.E., M.ASCE**

Sustainability | **Joshua Peschel, Ph.D.,
A.M.ASCE**

Water, Wastewater and Stormwater |
**Bridget Wadzuk, A.M.ASCE; Arnold
Strasser, P.E., M.ASCE**

Watershed | **Prof. M Levent Kavvas,
Ph.D., Dist.M.ASCE; Donald K Frevert,
Ph.D., P.E., D.WRE (Ret.), F.ASCE**

EWRI of ASCE Staff

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Brian Parsons, M.ASCE

Senior Manager
Gabrielle Dunkley

Technical Manager
Barbara Whitten

Manager of Member Services
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Mark Gable

Program Coordinator
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Registrars
**Susan Dunne
Erin Marks
Kelly Frere**

Sponsorship Sales Manager
Drew Caracciolo

The EWRI Congress 2019 features (13) concurrent technical sessions tracks for the duration of the EWRI Congress covering (20) unique technical areas. Authors will also be displaying their research and practice issues related to their areas of interest in the form of technical posters.

Sunday | May 19

EWRI 20th Anniversary Celebration

6:30 – 8:00 p.m., *King's Garden 5* (ticketed event)

We're throwing a party to celebrate EWRI's 20th Anniversary!

- Students can get an autographed copy of author Daniel "Pete" Loucks' new book, "Adventures in Managin Water: Real-World Engineering Experiences."
- Be a part of our history by bringing an item to be placed in the EWRI time-capsule. It will be locked away until 2029.
- Limited Edition Giveaways
- Raffle – Grand Prize will be 1 complimentary full registration to an upcoming EWRI Conference

Monday | May 20

Welcome & Keynote Session

8:30 – 10:00 a.m., *Grand Ballroom 1 & 2*



Keynote:

Michael E. Webber, Ph.D.

Acting Director of the Energy Institute, Josey Centennial Professor in Energy Resources, Author, and Professor of Mechanical Engineering

Welcome and Awards Luncheon

12:15 – 1:45 p.m., *Grand Ballroom 1 & 2* (ticketed event)



Keynote:

Eliza Griswold

Author and Distinguished Writer at New York University

Winner of the 2019 Pulitzer Prize in General Nonfiction for her book, "Amity and Prosperity: One Family and the Fracturing of America."

Paris to Pittsburgh Movie Screening

5:45 – 7:00 p.m., *Grand Ballroom 1*

Pittsburgh, led by Mayor Bill Peduto, who stood up to defy President Trump when he announced the U.S.'s withdrawal from the Paris Climate Agreement, is now a city committed to energy efficiency and is one of the many examples of bold economic and climate leadership in the film.

AAWRE Diplomate Induction & Awards Ceremony

6:00 – 6:45 p.m., *King's Garden 5*

Tuesday | May 21

WSP USA Student Design Competition

8:30 – 10:00 a.m., *Smithfield Room*

The WSP Student Design Competition aims to provide learning opportunities for undergraduate senior students in solving real-life infrastructure problems and developing practical yet innovative solutions prior to entering the industry.

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Watershed Council Luncheon & Awards Lecture

(ticketed event)

12:15 – 1:45 p.m., *Grand Ballroom 1*

Planning and Management Council Luncheon & Awards Lecture

(ticketed event)

12:15 – 1:45 p.m., *Grand Ballroom 2*

Technical Tour: History & Heritage Boat Tour: History of the Waterways and Bridges in Pittsburgh

(ticketed event)

2:30 – 4:30 p.m.

The best way to see Pittsburgh is from the river. Learn about Pittsburgh's past, present, and future from her most perfect point of view – the Three Rivers.

(The dock is located through the walking tunnel at Point State Park, across the street from the Wyndham Grand Hotel on the Allegheny River side of the park. The boat leaves at 3:00 p.m. sharp.)

Pittsburgh Pirates Baseball Game and Dinner

6:00 – 10:00 p.m.

(ticketed event)

Join us for a night of fellowship and baseball. Your ticket price includes entry to the game, a ballpark-style dinner and a post-game behind-the-scenes tour of the ballpark's sustainability features.

Meet Up:

Grab a friend.... Catch an Uber... We'll see you there!

Monday, May 20 | Sienna Mercato, 942 Penn Ave, Pittsburgh, PA 15222

Tuesday, May 21 | Southern Tier Brewery, 316 N Shore Dr, Pittsburgh, PA 15212

Wednesday, May 22 | Grist House Craft Brewery, 10 E Sherman St, Pittsburgh, PA 15209

All Meet-ups will begin at 6:00 pm.

Wednesday | May 22

Morning Jumpstart in Point State Park

6:00 – 7:00 a.m.

Set your own pace on the picturesque 1.25 mile route located just across the street from the conference venue. Complete as many laps as you wish; just be ready to join us for the 8:30 a.m. technical sessions!

Hydraulics & Waterways Council Luncheon & Awards Lecture *(ticketed event)*

12:15 – 1:45 p.m., *Grand Ballroom 1*

Irrigation & Drainage Council Luncheon & Awards Lecture *(ticketed event)*

12:15 – 1:45 p.m., *Grand Ballroom 2*

2nd Annual Stormwater Quiz Show

5:45 – 6:45 p.m.

Students & Younger Members: Come test your knowledge on stormwater, drinking water and wastewater! This is a social event to learn about the projects the Water, Wastewater, Stormwater Council is doing, how we integrate with other councils, and opportunities to get involved.

Teams can win gift cards: \$250 first prize (5x \$50), \$150 second prize (5x \$30), and \$100 third prize (5x \$20).

Prizes provided by Whitney Bailey Cox and Magnani, LLC (WBCM) and AKRF, Inc.

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Thursday | May 23

Environmental/Water, Wastewater & Stormwater Council Luncheon & Awards Lecture *(ticketed event)*

12:15 – 1:45 p.m., *Grand Ballroom 1*

Water Distribution System Analysis Luncheon *(ticketed event)*

(ticketed event)

12:15 – 1:45 p.m., *Grand Ballroom 2*

Technical Tour: Triboro Ecodistricts (Etna/Millvale/Sharpsburgh) and Green Infrastructure Tour *(ticketed event)*

2:30 – 6:00 p.m.

Tour attendees will visit green infrastructure sites throughout the Triboro Ecodistrict followed by a discussion with representatives from the boroughs and ecodistrict to learn about this important and impactful partnership.

(Buses for this tour will stage in front of the Wyndham at 2:15 p.m., and leave at 2:30 p.m. sharp.)



Technical Tour: Phipps Conservancy Center for Sustainable Landscapes & Frick Environmental Center & Panther Hollow Lake Storage Retrofit Project *(ticketed event)*

2:30 – 6:00 p.m.

Join us to explore the two Living Buildings in Pittsburgh as well as a retrofitted lake designed to reduce flooding.

(Buses for this tour will stage in front of the Wyndham at 2:15 p.m., and leave at 2:30 p.m. sharp.)

Technical Tour: ALCOSAN Plant Tour *(ticketed event)*

2:30 – 6:00 p.m.

The tour of the facility will provide attendees the opportunity to see how 250 million gallons of wastewater is processed into clean effluent each day at one of the largest wastewater treatment facilities in the Ohio River Valley.

(Buses for this tour will stage in front of the Wyndham at 2:15 p.m., and leave at 2:30 p.m. sharp.)

Technical Tour: Eden Hall Campus at Chatham University

2:30 – 6:00 p.m.

Join us on a free tour of the Eden Hall Campus, which is nestled on 388 acres of rolling woodlands and fields in Richland Township, PA. Here, you will find the world's first university campus designed to be a showcase for sustainable solutions. With the campus serving as an educational canvas, faculty, students, and the public engage in a collaborative, hands-on approach to learning to develop tomorrow's leaders in sustainability.

(Buses for this tour will stage in front of the Wyndham at 2:15 p.m., and leave at 2:30 p.m. sharp.)

Professional Headshots

Sunday, May 19 and Wednesday, May 22, 7:00 – 7:45 p.m., *Grand Ballroom Foyer*

Do you need a professional headshot to update your social media profile or resume? Stand in front of the AECOM photo wall and get a free headshot on Sunday from 7:00 p.m. to 7:45 p.m., or on Wednesday from 3:30 p.m. to 4:00 p.m.

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Monday | May 20

Welcome & Awards Ceremony

12:15 – 1:45 p.m.

Margaret S. Petersen Award

For an outstanding woman in environmental and water resources



Barbara E. Spang Minsker, Ph.D., M.ASCE

Barbara E. Minsker's research uses information technology and "Big Data" to improve understanding and management of coupled environmental and human systems, with a focus on water, sustainability, and resilience. She has received numerous awards for her research, including the National Science Foundation CAREER Award, Presidential Early Career Award for

Scientists and Engineers, the American Society of Civil Engineers (ASCE) Walter L. Huber Civil Engineering Research Prize, and Fellow in the ASCE Environmental and Water Resources Institute (EWRI).

Minsker has developed and taught courses on authentic leadership, environmental systems analysis, sustainability, and data literacy. She employs experiential and project-based learning, where students engage in highly interactive classroom and field experiences and learn from reflecting on those experiences. She has also written two books on work-life balance.

Minsker has extensive leadership experience, for which she received the EWRI Outstanding Achievement Award and Service to the Profession Award. She has led national research initiatives such as the WATERS Network and two successful EWRI task committees, served as Associate Provost Fellow for the University of Illinois sustainability initiative, and was founder and President of two start-up organizations.

Minsker is a licensed Professional Engineer in the State of Texas. Prior to joining SMU in 2016, Dr. Minsker was Professor and Arthur and Virginia Nauman Faculty Scholar in the Department of Civil and Environmental Engineering at the University of Illinois Urbana-Champaign. Minsker was previously a policy analyst consultant to the Environmental Protection Agency. She earned a B.S. in Operations Research and Industrial Engineering with Distinction and a Ph.D. in Civil and Environmental Engineering from Cornell University.

Professional Practice Ethics and Leadership Award

Recognizes civil engineering leadership in professional practice and ethics



Yvette E. Pearson, Ph.D., P.E., F.ASCE

Yvette E. Pearson is Associate Dean for Accreditation, Assessment, and Strategic Initiatives in the George R. Brown School of Engineering at Rice University. A Fellow of the American Society of Civil Engineers (ASCE), she is recognized for more than two decades of contributions to engineering education,

focused largely on research and practice to increase participation of students from excluded identities in STEM education and careers. Her vision is to help organizations achieve what she terms "ubiquitous inclusion" (UI) so that diversity, equity, and inclusion become a universal standard of practice.

Pearson chairs ASCE's Formal Engineering Education Committee, a subcommittee of the Committee on Sustainability and is vice chair of ASCE's Committee on Diversity and Inclusion. She was the 2018 recipient of ASCE's Professional Practice Ethics and Leadership Award "for her role in the development of Canon 8 of the ASCE Code of Ethics..." Among her other awards and honors are the University of Texas Regents' Outstanding Teaching Award, UT Arlington's Provost's Award for Excellence in Teaching (of which she is a two-time recipient),

Southern University College of Engineering's Teacher of the Year, and, in 2013, recognition as one of the Top 25 Women Professors in Texas. Prior to joining Rice, Pearson was a program director in the Division of Undergraduate Education at the National Science Foundation, where she managed a roughly \$70 million award portfolio.

Originally from Baton Rouge, Louisiana, Pearson holds a B.S. in Civil Engineering and an M.S. in Chemistry from Southern University, a Ph.D. in Engineering and Applied Science from The University of New Orleans, and a Graduate Certificate in Educational Research Methodology from the University of Illinois at Chicago. She is a registered Professional Engineer in Louisiana and Program Evaluator (PEV) for the Engineering Accreditation Commission (EAC) of ABET.

Lifetime Achievement Award

The Lifetime Achievement award is presented to members who are judged to have advanced the profession, exhibited technical competence, and significantly contributed to public service, research, or practice in the environmental and water resources profession.



Peggy A. Johnson, Ph.D., F.EWRI, M.ASCE

Peggy Johnson is currently the Dean of the Schreyer Honors College and a Professor of Civil Engineering at Penn State University, where she had been a faculty member since 1996. As the Dean of the Schreyer Honors College, she oversees Honors Scholars, representing the top 2 percent of Penn State students across all disciplines, and teaches courses on leadership. From 2006 to 2015, she was the Head of the Civil and Environmental Engineering Department at Penn State. Prior to coming to Penn State, she served on the faculty of the Civil and Environmental Engineering Department at the University of Maryland. Over her nearly three decades as a Professor in Civil Engineering, she has conducted research and taught classes in the areas of hydraulic engineering, bridge scour, stream restoration, reliability analyses, and river mechanics. She has published numerous papers on these topics and supervised the dissertations and theses of dozens of Ph.D., M.S., and B.S. students. She was the President of EWRI from 2012 to 2013 and is a Fellow of EWRI. She received the ASCE Hans Albert Einstein award in 2016 for her contributions in the use of sediment transport for the evaluation and design of in-stream control structures and stream restoration projects and the use of uncertainty and risk management for scour analyses. She also received the EWRI Outstanding Woman of the Year award in 2012. In addition to winning several teaching awards, Dr. Johnson won the National Science Foundation Young Investigator award and in 1995, she won the NSF Presidential Faculty Fellow award. She received a Master's degree in 1988 and a Ph.D. in 1990, both from the Civil and Environmental Engineering department at the University of Maryland.



Peter S. Eagleson, Ph.D., P.E., M.ASCE

Peter Eagleson is an American hydrologist, and author of *Dynamic Hydrology and Ecohydrology: Darwinian Expression of Vegetation Form and Function*. He has held professional positions including member of the National Academy of Engineering (since 1982) and President of the American Geophysical Union from 1986-1988. He has won many awards including the Stockholm International Water Institute's World Water Prize in 1997.

Eagleson's research interests include dynamic hydrology, hydroclimatology, and forest ecology. His early research was on sediment transport and wave theory. He published multiple articles and

book chapters about these subjects. It was not until 1964 that he significantly narrowed his focus to hydrology. In 1967 Eagleson along with some of his students, published six papers in Water Resources Research. These papers immediately impacted the field of hydrology.



Robert G. Traver, Ph.D., P.E., D.WRE, F.EWRI, F.ASCE

Robert Traver is a nationally and internationally recognized leader in water resources management, Traver is the founding director of the Villanova Center for the Advancement of Sustainability in Engineering (VCASE) and the Villanova Urban Stormwater Partnership (VUSP). He holds the distinctions of

Diplomate, Water Resources Engineer and Fellow in both the American Society of Civil Engineers (ASCE) and the Environmental and Water Resources Institute (EWRI). Widely published in highly respected journals, in 2010 Dr. Traver co-authored the National Resources Council report on Urban Stormwater in the United States.

A member of the ASCE's external panel charged with investigating the failure of New Orleans's levee system during Hurricane Katrina, Traver co-authored the follow-up report "What Went Wrong and Why." He also is cited for his work in spearheading "Flood Risk Management – Call for a National Strategy," a comprehensive report made available to the public in 2014. That same year, the ASCE honored Dr. Traver with its William H. Wisely American Civil Engineer Award, which recognizes individuals who have exhibited continuing efforts to better the technical and professional activities of the Society.

Though he spends time serving nationally on numerous committees and task forces, Traver's top priority is Villanova. At the University, he is recognized as a dedicated teacher who brings his research into his graduate and undergraduate classes. Throughout his career, he has successfully obtained external funding to support both his research and 40 graduate students who have come through the program. He also has been a mentor to several young faculty members.

Service to the Institute Award

The Service to the Institute Award is given in recognition of extensive and outstanding service to the Institute.



Jerry Rogers, Ph.D., P.E., D.WRE, Dist.M.ASCE

Jerry R. Rogers served on the EWRI Founding Task Committee under Chair Conrad G. Keyes, Jr., from 1997 to 1999 and was appointed by the ASCE President to the first two National EWRI Boards in 1999-2001. Besides inviting initial EWRI committee chairs, Dr. Rogers became EWRI nominations chair for confirming initial EWRI Board members. Also,

Dr. Jerry Rogers founded and chaired for many years the EWRI History and Heritage Committee in 1999 which has been the only ASCE Institute history committee. EWRI HHC coordinates EWRI history sessions at EWRI annual congresses and special EWRI history symposia and EWRI/ASCE publications. For the EWRI 20th Anniversary, Dr. Rogers chaired an EWRI Task Committee to plan the 20th Anniversary and Achievements Activities, including six EWRI history sessions and two posters with several history papers in a special EWRI 2019 Proceedings section.

Rogers co-authored with Augustine J. Fredrich two ASCE and EWRI history symposia publications: Houston (2001): International Engineering History and Heritage: Improving Bridges to ASCE's 150th Anniversary, ASCE, 2001, 508 pp. and Washington, DC (2002): Environmental and Water Resources History, ASCE, 2002, 301 pp., 24 papers. With Brown and Garbrecht, Rogers

coordinated in Salt Lake City (2004): Water Resources and Environmental History, ASCE, 2004, 296 pp., 31 papers. Dr. Rogers edited the Tampa (2007): Environmental and Water Resources History: Milestones in Engineering History, ASCE, 2007, 159 pp., 18 papers. Jerry Rogers edited the Kansas City (2008): Great Rivers History, ASCE, 135 pp., 18 papers. In Las Vegas (2009), Wiltshire, Gilbert and Rogers edited: Hoover Dam 75th Anniversary History Symposium, ASCE, 2009, 413 pp., 20 papers.

Rogers has received the EWRI Lifetime Achievement Award, the William H. Wisely American Civil Engineer Award, Distinguished Member ASCE, the National Civil Engineering History & Heritage Award.

Urban Water Resources Research Council Founders' Award

This award was established to honor the Founders of EWRI's Urban Water Resources Research Council, pioneers in the fields of urban water management and stormwater research.



Alexander Charles Rowney, P.Eng, D.WRE, F.EWRI, M.ASCE

Charles Rowney was a community-builder and a teacher at heart. In business, he exemplified the highest ethical and professional standards. He believed that water resources and sustainable urban infrastructure required diverse communities

from a wide-ranging set of expertise. Using his background in both biology and engineering, Charles helped unite these communities to create approaches to sustainable urban water infrastructure that were more well-rounded. The highlights of his career include helping to establish the National Center for Infrastructure Modeling and Management, serving as a member of the Board of Directors for the Urban Watershed Research Institute, teaching as a Senior Research Fellow at the University of Texas at Austin, and managing a private practice that was active across the United States, Canada, and internationally. He tirelessly served the Environmental and Water Resources Institute of ASCE in many roles including serving as Chair of the Technical Area Executive Committee (EXCOM), serving multiple years on the Urban Water Resources Research Council Control Group, serving as Chair of the Learning Council, and guiding the formation of the Municipal Water Infrastructure Council, among others.

As a model developer and user, Charles authored and contributed to the development of receiving water and groundwater simulation software in rural, urban, river, lake, and coastal systems. He also had extensive experience in assessing needs and solutions in enterprise data management, with a focus on multi-disciplinary linkages and interoperability.

Community and collaboration were the tenants Charles held most dear, and that ideal is representative of why so many of us feel the loss of Charles from our midst so acutely. Charles treated everyone he encountered with the same friendliness and respect and welcomed their contributions, regardless of position or title. For Charles it was never about his own successes, but whether his actions enabled others to accomplish more.

Visiting International Fellows

This fellowship is granted annually to increase the participation of water resources and environmental professionals from developing countries in EWRI conferences, and to promote sustained professional and cultural exchange.



Manish Kumar Goyal, Ph.D.
India



Sabita Aryal Khanna
Nepal



Wally Mutungwa
Rwanda

EWRI Fellows

EWRI Fellowship is granted to those who have been a member of EWRI for 10 or more years and have demonstrated accomplishments that have contributed significantly to the advancement or application of water resources or environmental engineering, science, and technology.



Michael Buechter, P.E., D.WRE, F.EWRI



Shirley E. Clark, Ph.D., P.E., D. WRE, F.EWRI



Jane Clary, M.S., LEED-AP, CPESC, F.EWRI



Scott Struck, Ph.D., ENV SP, PWS, F.EWRI

Tuesday | May 21

Watershed Council Luncheon and Awards

12:15 – 1:45 p.m.

Ven Te Chow Award | Keynote

The Ven Te Chow Award recognizes lifetime achievement in the field of hydrologic engineering.



Rao S. Govindaraju, Ph.D., P.E., P.H., F.ASCE, F.EWRI, D.WRE

Rao Govindaraju is the Bowen Engineering Head and the Christopher B. and Susan S. Burke Professor in the School of Civil Engineering at Purdue University. He earned his Ph.D. in civil engineering from the University of California, Davis, in 1989. His primary areas of research include surface and subsurface hydrology, contaminant transport, watershed hydrology, and climatic influences. He is interested in developing algorithms for analyzing and learning from hydrologic data. He specializes in problems dealing with uncertainty and spatial variability. His research work has been supported by various agencies such as NSF, EPA, DOD, and DOE. He has chaired national level committees and has served on the editorial boards of several journals. He is currently the Editor-in-Chief of the Journal of Hydrologic Engineering, American Society of Civil Engineers. His work has been recognized with numerous national and international awards, and keynote lectures.

Arid Lands Hydraulic Engineering Award

This award recognizes original contributions in hydraulics, hydrology, planning, irrigation and drainage, hydroelectric power development, navigation applicable to arid or semi-arid climates, or contributions to the understanding and development of new technology in river basins.



Jorge A. Ramirez, Ph.D.

Jorge Ramirez is professor of Civil and Environmental Engineering at Colorado State University (CSU) since 1990, with a focus on water resources, hydrologic, and environmental sciences and engineering. He received a Ph.D. in hydrometeorology from MIT in 1988, a M.S. in hydrology and water resources from MIT in 1982, and a B.S. in civil engineering from the School of Mines of the National University of Colombia in 1981. In addition to CSU, Dr. Ramirez has held academic and research positions with renowned international institutions such as the Swiss Federal Institute of Technology (ETH-Z) in Switzerland, the Center for Environmental Research and Monitoring (CIMA) in Italy, the National University of Colombia in Medellin, and the Water Resources University in Hanoi, Vietnam. Dr. Ramirez teaches both undergraduate and graduate courses in engineering and physical hydrology and in quantitative eco-hydrology. Dr. Ramirez has received numerous teaching and research awards including the University Honors Program Professor of the Year Award in 2012, the George T. Abell Research Excellence Award of the College of Engineering in 2011, the AGU - Water Resources Research Editor's Choice Award in 2014, the ASCE-EWRI Best Research Paper Award in 2004 and 1997, and the Colorado Governor's Recognition Award for High Impact Research for, "Quantifying the Current and Future Vulnerability of the United States Water Supply System." in 2011. Dr. Ramirez has served on many science and technology committee panels including for the National Science Foundation, and he has consulted for the United Nations Development Programme at the National Institute of Hydrology in India, the Korean Water Resources Corporation, and the hydroelectric power sector of Colombia.

Journal of Hydrologic Engineering

Best Case Study

**Chulsang Yoo
Jinwook Lee
Myungseob Lee**

(2017) "Parameter Estimation of the Muskingum Channel Flood-Routing Model in Ungauged Channel Reaches," *Journal of Hydrologic Engineering*, 22(7):05017005

Best Discussion

David C. Froehlich, Ph.D., P.E., D.WRE, M.ASCE

Discussion of "Improving Prediction of Dam Failure Peak Outflow Using Neuroevolution Combined with K-Means Clustering" by Amir Hossein Eghbali, Kouros Bezhadian, Farhad Hooshyaripor, Raziye Farmani, and Andrew P. Duncan', by David C. Froehlich, original in *Journal of Hydrologic Engineering*, 22(6), Discussion in *JHE* 23(5)

Best Technical Note

Glenn E. Moglen, F. ASCE

(2017) "Parsimonious Mathematical Characterization of Canal Shape and Size," *Journal of Hydrologic Engineering*, 22(12): 06017006

Best Associate Editor

For exemplary performance of his duties as an Associate Editor for the ASCE Journal of Hydrologic Engineering.

Tommaso Moramarco, Ph.D.

Best Technical Paper

Yilu Feng, Ph.D.

Kaye L. Brubaker, Ph.D., A.M.ASCE

Richard H. McCuen, Ph.D., M.ASCE

(2017) "New View of Flood Frequency Incorporating Duration," *Journal of Hydrologic Engineering*, 22(11): 04017051

Tuesday | May 21 *(continued)*

Planning & Management Council Luncheon & Awards

12:15 – 1:45 p.m.

Julian Hinds Award

The Julian Hinds Award recognizes the author or authors of a paper that is judged to make the most meritorious contribution to the field of water resources development. The award may also be made to an individual for notable performance, long years of distinguished service, or specific actions that advanced engineering in the field of planning, development, and management of water resources.



Thomas Walski, Ph.D., P.E., D.WRE, F.EMI, F.ASCE

Tom Walski is a Bentley Fellow at Bentley Systems and has over 40 years of experience as a researcher, engineer and manager at several water and wastewater organizations, university professor, trainer and software developer. He has written several hundred journal and conference papers

and is author or co-author of several books.

Service to the Profession

This award recognizes and honors a person for outstanding leadership, activities, and achievement in service to the profession in the field of water resources planning through the institute, councils, local sections, or other organizational units of the Society.



Eric Loucks, P.E., D.WRE, M.ASCE

Eric Loucks joined ASCE in 1988 when he took his first job as an engineering consultant in Itasca, Illinois. Within a few months, he was organizing dinner seminars and modeling short courses on behalf of the Environmental Engineering and Water Resources (EE&WR) Technical Committee of the ASCE Illinois Section. He would later chair the

Section's Finance Committee as well as EE&WR. He led the effort to host an ASCE specialty conference on Water Resources Planning and Management and Environmental Engineering in Chicago in 1998 and served as the Technical Program Chair for the WRPMD portion of the program.

Loucks has served on EWRI technical committees since the Institute's founding. His service includes chairing the Planning and Management Council from 2007 to 2009 and then representing the council on the Technical Area Coordination Executive Committee from 2009 to 2015. He served as EWRI treasurer during 2015 and 2016 and is currently chair of the Technical Executive Committee

and a member of the Governing Board. He has been involved in the planning and delivery of numerous EWRI congresses and served as the Technical Program Chair for the 2012 EWRI World Environmental and Water Resources Congress in Albuquerque as well as congress chair for the 2015 congress in Austin.

Loucks is a Registered Professional Engineer in Texas, Illinois, and Wisconsin and is a Diplomate in the American Academy of Water Resources Engineers. He currently employed by the Watershed Protection Department of the City of Austin Texas where he works as the supervising engineer of the Stream Restoration and Stormwater Treatment Section.

Journal of Water Resources Planning and Management

Best Research Oriented Paper

Riccardo Taormina

Stefano Galelli, M.ASCE

(2018) "Deep-Learning Approach to the Detection and Localization of Cyber-Physical Attacks on Water Distribution Systems," *Journal of Water Resources Planning and Management*, 144(10): 04018065.

Quentin Martin Best Practice Oriented Paper

(2018) "Assessment of Smart-Meter-Enabled Dynamic Pricing at Utility and River Basin Scale," *Journal of Water Resources Planning and Management*, 144(5): 04018019

Charles Rougé

Julien J. Harou

Manuel Pulido-Velazquez

Evgenii S. Matrosoy

Paola Garrone

Riccardo Marzano

Antonio Lopez-Nicolas

Andrea Castelletti

Andrea-Emilio Rizzoli

Best Policy Oriented Paper

Isabel Andrade

Carlos Oliveira Cruz, M.ASCE

Joaquim Miranda Sarmiento

(2018) "Renegotiations of Water Concessions: Empirical Analysis of Main Determinants," *Journal of Water Resources Planning and Management*, 144(11): 04018073

Best Seminal Paper Award

John W. Labadie, Ph.D., P.E., M.ASCE

(2004) "Optimal Operation of Multireservoir Systems: State-of-the-Art Review," *Journal of Water Resources Planning and Management*, 130(2), 93

Best Associate Editor Award for the Journal of Water Resources Planning and Management

Enrico Creaco, Ph.D.

Best Reviewer Award for the Journal of Water Resources Planning and Management

Bryan Karney, Ph.D., P.E., M.ASCE

Justin Delorit, Ph.D., P.E.

Wednesday | May 22

Irrigation & Drainage Council Luncheon and Awards

12:15 – 1:45 p.m.

Royce J. Tipton Award

The Royce J. Tipton Award recognizes outstanding contributions to the advancement of water and soil aspects of irrigation by software development, promoting application or new technologies, and through public and professional service.



James L. Fouss, Ph.D., P.E., M.ASCE

James Fouss is recognized as a world leader in agricultural drainage. From 1960 to 1972, he conducted original and pioneering research and development of 4-in. dia. polyethylene (PE) plastic corrugated-wall drainage tubing, and the laser-beam automatically controlled plow-type

equipment for rapid and accurate subsurface drain installation. From 1976 - 1982 as Vice President, Research and New Product Development for Hancor, he administered and technically directed all phases of research and new product development and/or improvement in drainage, agricultural water management and residential on-site waste disposal. He was lead inventor on 13 U.S. and foreign patents, and co-inventor on five additional patents for the products developed that included new types of plastic drain pipes, enhanced plow-type drain installation equipment, and a rotomolded plastic septic tank.

Fouss has been active in the American Society of Civil Engineers (ASCE) and the American Society of Agricultural and Biological Engineers (ASABE) during his career. He served on several committees of the old ASCE Irrigation and Drainage Division. He was co-chair of the ASABE Third National Drainage Symposium and general chair of the Sixth International Drainage Symposium and has served on numerous ASABE drainage committees.

Fouss has authored more than 160 technical journal articles, bulletins, conference proceedings, 10 book chapters, 16 U.S. & 2 foreign patents (while in industry), and many technical reports and private engineering consulting reports on corrugated plastic pipe design. He retired from USDA-ARS in 2011 after a distinguished 41 year career with as an agricultural engineer and research leader.

Journal of Irrigation and Drainage Engineering

Best Reviewer

Blake Tullis, Ph.D., M.ASCE
Ali R. Vatankhah, Ph.D.

Best Discussion

Mohammadali Ghavidel
Salah Kouchakzadeh, Ph.D.
Mohammad Bijankhan, Ph.D., Aff. M.ASCE
Gilles Belaud, Ph.D.

(2017) Discussion of "Numerical Modeling of Submerged Hydraulic Jump from a Sluice Gate" by Veysel Gumus, Oguz Simsek, Nazire Goksu Soydan, Mevlut Sami Akoz, and Mehmet Salih Kirkgoz," *Journal of Irrigation and Drainage Engineering*, 142(1), Discussion in 143(4)

Honorable Mention Paper Award

Yiyi Ma, Ph.D.
David Zhu, Ph.D., P.E., M.ASCE
Nallamuthu Rajaratnam, Ph.D., F.ASCE
Bert van Duin, P.E., M.ASCE

(2017) "Energy Dissipation in Circular Drop Manholes" *Journal of Irrigation and Drainage Engineering* Volume 143(12): 04017047

Honorable Mention Paper Award

Aghil Yari
Chandra A. Madramootoo, Ph.D.
Shelley A. Woods, Ph.D.
Viacheslav I. Adamchuk, Ph.D.
Hsin-Hui Huang

(2017) "Assessment of Field Spatial and Temporal Variabilities to Delineate Site-Specific Management Zones for Variable-Rate Irrigation," *Journal of Irrigation and Drainage Engineering*, 143(9): 04017037

Best Paper Award

Jie Zeng, Ph.D., P.E., M.ASCE
Liqiong Zhang, Ph.D., P.E., M.ASCE
Matahel Ansar, P.E.
Emile Damisse, P.E., M.ASCE
Juan A. González-Castro, Ph.D., P.E., M.ASCE

(2017) "Applications of Computational Fluid Dynamics to Flow Ratings at Prototype Spillways and Weirs. I: Data Generation and Validation," *Journal of Irrigation and Drainage Engineering*, 143(1): 04016072

Best Paper Award

Zhorab Samani, Ph.D.

(2017) "Three Simple Flumes for Flow Measurement in Open Channels," *Journal of Irrigation and Drainage Engineering*, 143(6): 04017010

Hydraulics & Waterways Council Luncheon & Awards Lecture

12:15 – 1:45 p.m.

Hunter Rouse Hydraulic Engineering Award

The Hunter Rouse Hydraulic Engineering Award is presented to a distinguished person in the field of hydraulic engineering.



Heidi M. Nepf, Ph.D., M.ASCE

Heidi Nepf is a Professor of Civil and Environmental Engineering at MIT. She earned a Ph.D. in Civil Engineering from Stanford University ('92), and was a Postdoctoral Fellow at the Woods Hole Oceanographic Institution before arriving at MIT in 1993. She is internationally known for her work on the impact of vegetation on flow and transport in

rivers, wetlands, lakes and coastal zones. In recognition for this work, she was awarded a US National Science Foundation Career Award. Dr. Nepf also served on the National Research Council panel charged with the review of the Army Corps plans for restoration and protection of the Louisiana coastline. She is a member of the Fluid Mechanics Steering Committee of IAHR and has served or is serving on the editorial boards of *Limnology and Oceanography*, *Water Resources Research*, *Environmental Fluid Mechanics*, and *Journal of Hydraulic Engineering*.

Karl Emil Hilgard Prize

The Karl Emil Hilgard Hydraulic Prize is presented to the author or authors of the paper that is judged to be of superior merit in dealing with a problem of flowing water, either in theory or in practice.

Anna Maria Ferreira da Silva, A.M.ASCE

Mohsen Ebrahimi

(2017) "Meandering Morphodynamics: Insights from Laboratory and Numerical Experiments and Beyond," *Journal of Hydraulic Engineering*, 143(9): 03117005

Hydraulic Structures Medal

The Hydraulic Structures Medal is awarded to an individual or individuals for significant contributions to the advancement of the art and science of hydraulic engineering as applied to hydraulic structures.



Tony L. Wahl, P.E., M.ASCE

Tony L. Wahl has worked 29 years in the Bureau of Reclamation Hydraulics Laboratory after earning B.S. and M.S. degrees at Colorado State University. Tony has done a wide variety of hydraulic structures-related work in his career and has specialized in providing useful software

tools to the profession. In the early 1990s he wrote the widely used WinADV program to post-process velocity data collected from the first ADVs, and a few years later he led the development of WinFlume, a program used to calibrate and design long throated flumes, the modern choice for critical-flow measurement structures.

Wahl conducted the first lab tests of Coanda-effect screens—high-efficiency, selfcleaning screens used at irrigation, hydropower, and water supply intakes. His 2001 journal paper and computer program are widely cited and he is now studying effects of surface tension on Coanda-effect screen capacity.

Wahl has been active for many years in embankment breach modeling, including lab studies and development of procedures for estimating canal breach outflow hydrographs based on canal hydraulic characteristics, embankment geometry, and soil erodibility. He has worked extensively with Dr. Greg Hanson's submerged jet erosion test for measuring erodibility of cohesive soils, comparing it to the Hole Erosion Test and leading Reclamation's use of both tests for dam safety applications.

Recently, Wahl has been studying hydraulic jacking due to uplift pressures at open joints in high-velocity spillway chutes. A new paper analyzes previous Reclamation testing, and new lab work is planned to evaluate boundary layer effects. Another notable project is SpillwayPro, a spreadsheet application developed recently with Henry Falvey, Ph.D., to upgrade Reclamation's tools for modeling cavitation potential and aerator improvements for spillway chutes.

Wahl frequently contributes to ASCE conferences and journals and has received Best Discussion and Outstanding Reviewer awards. He was the 2005 Bureau of Reclamation Federal Engineer of the Year.

Hans Albert Einstein Award

This award acknowledges significant contribution to the engineering profession in the area of erosion control, sedimentation, and/or waterway development either in teaching, research, planning, design, or management.



A. Jacob Odgaard, Ph.D., P.E., M.ASCE

A. Jacob Odgaard is Professor and Dean, School of Architecture and Design, Southwest Jiaotong University, Chengdu, China; and Professor Emeritus, Civil and Environmental Engineering, Research Engineer Emeritus, IHR-Hydrosience and Engineering, and formerly Associate Dean for

Research and Graduate Studies, College of Engineering, University of Iowa. After receiving his Ph.D. from the Technical University of Denmark in 1970, he served with the Danish Army Corps of Engineers, and was lecturer at the Technical University of Denmark. Following a Post-Doc at University of Cambridge, UK, from 1972 to 1973, he became Senior Research Engineer at the Danish Hydraulic Institute (DHI) in Copenhagen, Denmark. He came to Iowa in 1977, and China in 2017.

Odgaard's expertise includes environmental fluid mechanics, river mechanics, hydraulic structures, and hydraulic modeling. Recent accomplishments include design and patenting of double-curved sediment control structure for rivers, development of techniques for stabilizing rivers and mitigating streambank erosion, development of alternative fish diversion schemes for hydropower projects, and design optimization of drop structures for transfer of storm and wastewater to deep underground tunnels. In 2015, he received ASCE's Karl Emil Hilgard Hydraulic Prize; and in 2012, EWRI/ASCE's lifetime Achievement Award. Previous honors include ASCE's Hydraulic Structures Medal, ASCE's Karl Emil Hilgard Hydraulic Prize, and being Editor and Associate Editor of ASCE's *Journal of Hydraulic Engineering*. He has served on numerous ASCE and EWRI committees, on the Iowa Highway Research Board and on several NSF and NCHRP panels. In 2017 and 2009, he received the University of Iowa College of Engineering Award for Exceptional Service. His book *River Training and Sediment Management with Submerged Vanes* was published by the ASCE Press in 2009. He is an ASCE Fellow, AAVRE Diplomate (D.VVRE), and a member of EWRI and IAHR. He is licensed as a professional engineer in Iowa. His consulting activities span the globe.

Journal of Hydraulic Engineering

Best Paper

Anna Maria Ferreira da Silva, Ph.D., A.M.ASCE

Mohsen Ebrahimi, Ph.D., A.M.ASCE

(2017) "Meandering morphodynamics: Insights from laboratory and numerical experiments and beyond," *Journal of Hydraulic Engineering*, 143(9): 03117005

Thursday | May 23

Environmental Council/Water, Wastewater & Stormwater Lecture Luncheon & Awards

12:15 – 1:45 p.m.

Simon W. Freese Environmental Engineering Award

The Simon W. Freese Environmental Engineering Award and Lecture is awarded to a distinguished person in the field of environmental engineering.



Paul F. Boulos, Ph.D., BCEEM, Hon.D.WRE, Dist.D.NE, Dist.M.ASCE, NAE

Paul Boulos is the CEO of Digital Water Works, a global innovator of digital twin solutions for smart wet infrastructure. He previously served as a President and Director of MWH Global, one of the world's leading environmental engineering and construction firms, with more than 7,000

employees in 35 countries and annual revenues of \$1.6 billion, until its sale to Stantec in 2016. He also founded and served as Chairman, President and CEO of Innovyze, the world's leading provider of water infrastructure management software, and led its ownership transition and sale to a private equity firm in 2017.

Boulos is one of the world's foremost experts on water resources and navigation engineering and the author of ten authoritative books and over 200 technical articles on issues critical to the water and wastewater industry. He has received numerous awards and honors including notable technical awards for excellence in scholarship from ASCE, the American Water Works Association and the U.S. Environmental Protection Agency; the ASCE Parcel-Sverdrup Civil Engineering Management Award; the University of Kentucky Hall of Distinction; and the Lebanese American University Distinguished Alumni Award. He was awarded Honorary Diplomate status by the American Academy of Water Resources Engineers and Distinguished Diplomate status by the Academy of Coastal, Ocean, Port & Navigation Engineers, the top honors for both Academies. He was also elected to the grade of Distinguished Member of ASCE, the Society's highest honor; to the European Academy of Sciences and Arts, one of Europe's most prestigious scientific organizations; and to the National Academy of Engineering (NAE), the highest professional distinction accorded to an engineer. He was also recognized with the Pride of Heritage Award from the Lebanese American Foundation, the U.S. Ellis Island Medal of Honor, the RMF USA Distinguished Lifetime Achievement Award, and U.S. Congressional recognitions for outstanding service to the community.

Rudolph Hering Medal

This award recognizes outstanding papers that contribute to the advancement of the environmental branch of the engineering profession.

David W. Spelman, M.ASCE

John Joseph Sansalone, M.ASCE

(2018) "Is the treatment response of manufactured BMPs to urban drainage PM loads portable?," *Journal of Environmental Engineering*, 144(4): 04018013

Wesley W. Horner Award

The Wesley W. Horner Award recognizes papers that have contributed to the areas of hydrology, urban drainage, or sewerage.

L.L. Willard

T. Wynn-Thompson, A.M.ASCE

L. H. Krometis

T. P. Neher

B. D. Badgley

"Does It Pay to be Mature? Evaluation of Bioretention Cell Performance Seven Years Postconstruction," L. L. Willard; T. Wynn-Thompson, A.M.ASCE; L. H. Krometis; T. P. Neher; and B. D. Badgley, *Journal of Environmental Engineering*, 143(9), 2017, 10.1061/(ASCE)EE.1943-7870.0001232.

Samuel Arnold Greeley Award

The Samuel Arnold Greeley Award is presented for excellence in papers on the design, construction, operation, or financing of water supply pollution control, storm drainage, or refuse disposal projects.

Marc A. Santos, P.E., M.ASCE

Richard F. Carbonaro, Ph.D., P.E.

Robert R. Sharp, Ph.D., P.E.

"Control Strategies for the Mitigation and Removal of Attached Manganese Biofilms," *Journal of Environmental Engineering*, Jan 2018, Vol. 144(1): 04017089

Journal of Hazardous, Toxic and Radioactive Waste

Best Theoretical Oriented Paper

Krishna R. Reddy, F.ASCE

Girish Kumar, S.M.ASCE

Rajiv K. Giri, S.M.ASCE

System Effects on Bioreactor Landfill Performance Based on Coupled Hydro-Bio-Mechanical Modeling. Krishna R. Reddy, Girish Kumar and Rajiv K. Giri. *J. Hazard. Toxic Radioact. Waste* 22(1), 04017024 (2018)

Best Practice Oriented Paper

Prangya Ranjan Rout

Puspendu Bhunia

Rajesh Roshan Dash

Assessing Possible Applications of Waste Organic Solid Substances as Carbon Sources and Biofilm Substrates for Elimination of Nitrate Toxicity from Wastewater. Prangya Ranjan Rout, Puspendu Bhunia and Rajesh Roshan Dash; *J. Hazard. Toxic Radioact. Waste* 21(3), 04016027 (2017).

Journal of Sustainable Water in the Built Environment

Best Case Study

Alisha Y. Chan, S.M.ASCE

Kristina G. Hopkins, Ph.D.

(2017) "Associations between Sociodemographics and Green Infrastructure Placement in Portland, Oregon," *Journal of Sustainable Water in the Built Environment*. 3(3): 05017002

Best Paper

Mehran Niazi

Chris Nietch

Mahdi Maghrebi, A.M.ASCE

Nicole Jackson

Brittany R. Bennett

Michael Tryby

Arash Massoudieh, M.ASCE

(2017) "Storm Water Management Model: Performance Review and Gap Analysis," Journal of Sustainable Water in the Built Environment. 3(2): 04017002

Expressions of Appreciation

Service and Leadership on the Sustainable Sortwater Infrastructure Committee

Blaine Linkous P.E., P.H., LEED AP

ASCE Codes and Standards Committee (CSC) Merit Awards

Thomas P. DeFelice, Ph.D., M.ASCE

Thomas O'Connor, M.ASCE

S. David Graber, P.E., F.ASCE

Awards To Be Presented at the ASCE 2019 Annual Convention

The following awards will be presented at ASCE's 2019 Annual Convention in Miami, FL, October 10-13, 2019:

asceconvention.org

State-of-the-Art in Civil Engineering Award

Norman Medal

Walter L. Huber Civil Engineering Research Prize

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Sunday, May 19, 2019

Technical Workshop: How to Build Reliability in the Results of Numerical Modeling

8:30 a.m. – 5:30 p.m., *Grand Ballroom 3*

Instructors: Kaveh Zamani and Fabian Bombardelli

Monday, May 20, 2019

Technical Workshop: Misuse of HEC-RES for Bridge Scour Analyses & other Bridge Scour

2:00 – 5:30 p.m., *King's Garden 4*

Instructor: David T. Williams

Tuesday, May 21, 2019

Technical Workshop: Emerging Applications of Computational Fluid Dynamics in Water/Wastewater Treatment Industry

8:30 – 12:00 p.m., *Commonwealth 2*

Instructors: Kevin Nielsen, Xiaofeng Liu, Carrie Knatz, and Jie Zhang

Technical Workshop: The EFDC_EXPLORER Modeling System: A Tool for Teaching Environmental Hydrodynamics In A Numerical Modeling Framework

2:00 – 5:30 p.m., *Birmingham Room*

Instructors: Paul Craig and Tom Mathis

Technical Workshop: Riverbank Filtration (RBF)

2:00 – 5:30 p.m., *Commonwealth 2*

Instructors: Chittaranjan Ray and Matthew Reed

Wednesday, May 22, 2019

Technical Workshop: Next-Generation Wastewater Treatment Technologies with Bioelectrochemical Systems

8:30 – 10:00 a.m., *Smithfield Room*

Instructors: Veera Gnanaswar Gude and Venkata Gadhamshetty

Technical Workshop: Resource Efficient Desalination & Zero-Liquid Discharge Systems

10:30 – 12:00 p.m., *Smithfield Room*

Instructor: Veera Gnanaswar Gude

Technical Workshop: Stormwater Management in a One Water Sustainability Framework

4:00 – 5:30 p.m., *Fort Pitt Room*

Instructors: Shirley Clark, Ruth Hocker, and Christopher Homer

Thursday, May 23, 2019

Technical Workshop: Introduction to the Hydrologic Modeling System (HEC-HMS)

8:30 – 10:00 a.m., *Sterlings 2*

Instructors: Matthew Fleming



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General Information

ASCE Bookstore

ASCE will operate its popular bookstore at the EWRI Congress. The bookstore is a great opportunity to browse through the many new and classic titles on display covering all topics in civil engineering.

Badge Policy and Ribbons

Your EWRI Congress registration name badge is your admission to the educational sessions. Please wear your badge at all times while in the Wyndham Grand Pittsburgh Downtown Hotel. Tickets are required for all EWRI Congress events, meals, and special events. Where tickets are required, please be sure to bring your tickets with you to each event as you will not be admitted without a ticket. Ribbons will be available at the registration desk. ASCE recommends you remove your badge when leaving the hotel.

Cancellations/Refunds

The deadline to request a refund was Friday, April 12, 2019. Written refund requests were to be received by ASCE Headquarters, and were subject to a \$100 processing fee. Speaker and author registration fees are also nonrefundable after Friday, March 1, 2019, due to necessary advance production of the proceedings and the program.

Please visit www.ewricongress.org/registration for complete refund policies.

City Information

For more information on Pittsburgh, or the surrounding area, please visit the location page on the EWRI Congress website at www.ewricongress.org/location.

EWRI Sustainable Congress Policy Statement

ASCE-EWRI is committed to sustainable Congresses in accord with the ASCE policy on The Role of the Civil Engineer in Sustainable Development.

ASCE defines sustainability as a set of economic, environmental, and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely, without degrading the quantity, quality, or availability of natural resources and ecosystems.

Sustainable development is the process of converting natural resources into products and services that are more profitable, productive, and useful, while maintaining or enhancing the quantity, quality, availability, and productivity of the remaining natural resource base and the ecological systems on which they depend.

To that end, ASCE-EWRI works with hotels and convention centers that strive to make our events green and include amenities such as reusable pitchers and water coolers rather than plastic bottles.

Visiting International Fellowship

Each year, EWRI's International Council (IC) invites applications for Visiting International Fellows from faculty, professionals, and student researchers from developing countries. The fellowships are intended to increase the participation of water resources and environmental professionals from developing countries in EWRI Congress, and promote sustained professional and cultural exchange.

Visit www.ewricongress.org/program/visiting-international-fellowship for more information about the Visiting International Fellowship.

No Smoking Policy

ASCE supports a "No Smoking" policy. Smoking is prohibited in the Wyndham Grand Pittsburgh Downtown Hotel, and at all indoor venues hosting EWRI events.

On-Site Registration Hours

Sunday, May 19	12:00 – 6:15 p.m.
Monday, May 20	7:30 a.m. – 6:00 p.m. (closed for lunch 12:30 – 1:45 p.m.)
Tuesday, May 21	8:00 a.m. – 4:15 p.m. (closed for lunch 12:30 – 1:45 p.m.)
Wednesday, May 22	8:00 a.m. – 4:15 p.m. (closed for lunch 12:30 – 1:45 p.m.)
Thursday, May 23	8:15 a.m. – 12:15 p.m.

Proceedings

All full registrants will receive a link to the online conference proceedings.

Professional Development Hours (PDHs)

You may earn 34.5 PDHs, which are nationally recognized units of record, by attending the EWRI Congress concurrent sessions and other programmed sessions. Please note there are differences from state to state in continuing education requirements for professional engineering licensure. ASCE follows NCEES guidelines on continuing professional competency. Because continuing education requirements for P.E. license renewal vary from state to state, ASCE strongly recommends that individuals regularly check with their state requirements that affect P.E. licensure and the ability to renew licensure. For details on your state's requirements, please go to www.ncees.org/Licensing_boards.php.

Make sure to scan your bar code badge before each session to ensure you receive PDHs. The scanner will acknowledge a successful recording of your name for the specific session. An email will be sent to registrants within 30 days after the conference with information on how to claim your PDH credits.

Program Changes

ASCE reserves the right to cancel programs and/or sessions because of low registration. In the unlikely event of a cancellation, all registrants will be notified and will receive a full refund, if applicable. Programs and sessions are subject to change and ASCE reserves the right to substitute a program, session, and/or speaker of equal caliber to fulfill educational requirements.

Recording of Sessions

Video or audio recording of any educational session is strictly prohibited without prior written permission from both ASCE and the session presenter(s).

Child Care

If you require child care during the conference, please check with the hotel concierge for recommendations.

Committee Meeting Schedule

Saturday, May 18, 2019

8:00 a.m. - 5:00 p.m.	Second Floor
EWRI Governing Board	Brigade Room
12:00 p.m. - 5:30 p.m.	
AAWRE Board of Trustees	Traders Room

Sunday, May 19, 2019

8:00 a.m. - 12:00 p.m.	First Floor
Environmental and Water Resources Systems	Benedum Room
Manual of Practice No. 77 Update	Stanwix Room
Comprehensive Costs of Maintaining Green Infrastructure	Fort Pitt Room
Desalination and Water Reuse Committee	Smithfield Room
Emerging and Innovative Technologies Committee	Birmingham Room
Hydraulic Structures Committee	Sterlings 2 Room
Journal of Sustainable Water in the Built Environment	Commonwealth 2 Room

8:00 a.m. - 12:00 p.m.	Second Floor
2020 Organizing Committee/Congress Steering Committee	Grand Ballroom 4
Urban Drainage Standards Committee	Chartiers Room
Watershed Conference Planning Committee	Rivers Room
Evapotranspiration in Irrigation and Hydrology Committee	Traders Room
EWRI Communications Council/Currents Newsletter Committee	Brigade Room

8:00 a.m. - 12:30 p.m.	Second Floor
AAWRE Board of Trustees	King's Terrace Room

1:00 p.m. - 5:00 p.m.	First Floor
Use of Recycled Water for Irrigation of Turf and Landscape Plants	Boardroom

Local Activities Council	Forbes Room
Awards Committee	Duquesne Room
Renewable Energy Technologies Task Committee	Benedum Room
International Participation Committee	Fort Pitt Room
Evaluation of Professional Development Programs Task Committee	Smithfield Room
Management Practices for Controlling Erosion and Sediment Standards	Birmingham Room
Students Council	Sterlings 1 Room
Task Committee on Two Phase Flows in Urban Water System	Sterlings 2 Room
GW Symposia Continuing Education	Sterlings 3 Room
Residuals Management Committee	Commonwealth 1 Room
World Water Council Activities Committee	Commonwealth 2 Room

1:00 p.m. - 5:00 p.m.	Second Floor
Groundwater Management Technical Committee	Grand Ballroom 4
History & Heritage Council	Chartiers Room
New Professionals Council	Traders Room
Professional Practice Council	Rivers Room
Education Council	Brigade Room

Hydro, Environmental and Water Resources, Informatics Committee	King's Plaza Room
Journal of Irrigation and Drainage Engineering Editorial Board	King's Garden 1 Room
Urban Water Resources Research Council	King's Garden 2 Room
Hydraulic Fracturing Committee	King's Garden 3 Room

8:00 p.m. - 10:00 p.m.	First Floor
Stormwater Strategy Committee	Sterlings 3 Room

Monday May 20, 2019

6:00 p.m. - 10:00 p.m.	First Floor
Task Committee on Adaptation to a Changing Climate	Duquesne Room
Surface Water Hydrology Technical Committee	Benedum Room
Stochastic Methods for Analyzing Nonstationary Extreme Hydrologic Events	Fort Pitt Room
Sustainable Stormwater Infrastructure Committee/Watershed Approach for Stormwater	Smithfield Room
Environmental Permitting Committee	Birmingham Room
Risk Uncertainty and Probabilistic Approaches Committee	Sterlings 1 Room
Stormwater Media Filtration Committee	Sterlings 2 Room
Civil Engineering Perspectives on F-E-W Nexus	Sterlings 3 Room
Task Committee on Remote Sensing of Evapotranspiration	Commonwealth 2 Room

6:00 p.m. - 10:00 p.m.	Second Floor
Water Supply, Treatment and Distribution Engineering Committee	Grand Ballroom 3
Water Quality & Drainage Committee	Grand Ballroom 4
Urban Drainage Definitions Task Committee	Chartiers Room
Environmental Health and Water Quality	Traders Room
Journal of Hydraulic Engineering	Rivers Room
Groundwater Quality Committee	Brigade Room
Computational Hydraulics Committee	King's Plaza Room
Groundwater Hydrology	King's Garden 1 Room
Watershed Management Technical Committee	King's Garden 2 Room
Cyber-Physical Security of Water Distribution Systems	King's Garden 3 Room
Visiting International Fellowship	King's Garden 4 Room

Tuesday, May 21, 2019

6:00 p.m. - 10:00 p.m.	First Floor
Women-Water Nexus	Duquesne Room
Journal of Water Resources Planning & Management	Sterlings 2 Room
Technical Committee on Groundwater Optimization Case Studies	Commonwealth 1 Room
River Basin Planning, Policy and Operations Standing Committee	Commonwealth 2 Room

6:00 p.m. - 10:00 p.m.	Second Floor
On-Farm Irrigation Systems Committee	Grand Ballroom 4
TMDL Analysis and Modeling Task Committee	Chartiers Room
Hydro-Climate Technical Committee	Traders Room
Wetlands Hydrology Technical Committee	Rivers Room
Task Committee on Calibration/Validation of Hydraulic Models	Brigade Room
Sedimentation Committee	King's Garden 1 Room
CFD Task Committee	King's Garden 2 Room
Scour at In-Stream Hydraulic Structures	King's Garden 4 Room
River Restoration Technical Committee	King's Garden 5 Room

Wednesday, May 22, 2019

6:00 p.m. - 10:00 p.m.	First Floor
Chinese American Water Resources Association	Duquesne Room
Sustainability Committee	Benedum Room
Water Distribution Systems Analysis	Fort Pitt Room
UWVRC Stormwater Modeling Committee	Smithfield Room
Hazardous, Toxic, and Radioactive Engineering Committee	Birmingham Room
Water Pollution Engineering Committee	Sterlings 1 Room



WORLD ENVIRONMENTAL & WATER RESOURCES CONGRESS

Pittsburgh, Pennsylvania | May 19-23, 2019

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