

WATER ENVIRONMENT FEDERATION

Disinfection & Reuse Symposium

July 29–31, 2018 | Portland, OR

CONFERENCE PROGRAM



The symposium is held by the Water Environment Federation in cooperation with the Pacific Northwest Clean Water Association and The Water Research Foundation.



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Disinfection and Reuse Symposium 2018

Linking Water Quality and Public Health

**July 29-31, 2018
Portland Crowne Plaza
Portland, Oregon**



The symposium is held by the Water Environment Federation in cooperation with the Pacific Northwest Clean Water Association and The Water Research Foundation.

July 29, 2018

Dear Colleagues,

Welcome to Portland, Oregon. The Water Environment Federation in cooperation with Pacific Northwest Clean Water Association and the Water Research Foundation are honored to have you join us for the Disinfection and Reuse Symposium 2018. On their behalf, we invite you to fully participate in this exceptional opportunity for education, collaboration and networking opportunity with industry experts!

This symposium will bring together environmental professionals from around North America for a showcase on reuse and disinfection. This exciting symposium is designed to educate practitioners, facility owners, operators, researchers, and public administrators about current reuse and disinfection issues, including regulatory requirements and methods for analyzing problems and finding innovative solutions. With rapid development of Potable Reuse we believe that this Symposium is a timely event to share experience, exchange findings, information and lessons learned in this area.

The focus for this event will be on research, practical implementation and collaboration to promote the rapid application of new innovative solutions for water reuse and disinfection. This Symposium will provide valuable information for researchers, students, regulators, designers, technology developers, operators, municipal agencies, industrial dischargers, and others seeking to understand the full picture of the latest developments and practical experiences on these important topics, water reuse and disinfection.


The speakers and attendees for this event come from a wide variety of backgrounds including regulatory, research, design, implementation, and utility operations. The conference program is composed of 30 minute presentations in the following topics:

- Disinfection Fundamentals
- Wet Weather Disinfection – Current and Emerging Practices
- Innovative Disinfection Methods and Technology Trends
- Potable Reuse (DPR and IPR) - Safety, Water Quality Control, Demonstration
- Expanding Reuse Strategies and Markets
- Disinfection Optimization and Control of Disinfection Byproducts (DBPs)
- New Water Reuse Approaches to Manage Tomorrow's Challenges
- Supporting Public Health with Water, Sanitation and Hygiene (WaSH) Projects
- Residuals, Sanitation and Hygiene: Concerns, Design and Application for Low Technology Processing
- Optimizing a Future for DPR – Design, Implementation and Operation of Robust Solutions
- Disinfection of WRRF Effluents for Surface Water Discharges

While you network with other attendees and presenters, make a point to share your experiences. We look forward to interacting with each of you and to the many interesting exchanges that will take place in the next few days – and beyond.

We hope you enjoy this informative event and find many fruitful interactions.

Sincerely,



Robert English
Palintest
Co-Chair



Val Frenkel
Greeley and Hansen
Co-Chair

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SYMPOSIUM COMMITTEE



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Symposium Co-Chair



Val Frenkel
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Arizona State University

Christine Yi
Hazen and Sawyer

REGISTRATION

All events are held in the Portland Crowne Plaza Hotel.

The Registration Desk is located in the Windsor Foyer and will be open during the following times:

Hours:

Sunday, July 29	12:00 PM – 4:30 PM
Monday, July 30	7:30 AM – 4:45 PM
Tuesday, July 31	8:00 AM – 5:00 PM

PRESENTER AND MODERATOR INFORMATION

All presenters, alternates, and moderators should pick up their badge from the Registration Desk and attend their assigned briefing.

Presenters, alternates, and session moderators, participating Monday and Tuesday should attend their assigned briefing. Presenters should attend only once unless they are speaking on different days.

Volunteer Room Monitors are also encouraged to attend.

The Speaker Briefing and room schedule is as follows:

****Sessions 1 through 5***

Monday, July 30
7:45 AM – 8:15 AM
Room: Windsor C

****Sessions 6 through 11***

Tuesday, July 31
8:00 AM – 8:15 AM
Room: Windsor C

RECEPTIONS AND MEAL FUNCTIONS

Networking Reception

Bellmont Foyer

Get the chance to try beer and wine made from recycled water! Join us in the exhibit hall to mingle with your fellow attendees while you view the exhibits, renew acquaintances, and make new contacts. Light hors d'oeuvres and refreshments will be served. Beer will be available first come, first served with a cash bar to follow. Don't miss out!

Monday, July 30

4:45 PM – 6:15 PM

Sponsored by: Xylem

Luncheons

Bellmont C

Lunch will be provided for all full symposium, daily registrants, exhibitors, and students. Please advise staff as soon as possible if you have any special dietary requirements.

Monday, July 30

11:45 AM – 1:30 PM

Tuesday, July 31

11:45 AM – 1:30 PM

Networking Breaks

The Networking Breaks will be held:

Monday, July 30

Bellmont Foyer

10:00 AM – 10:45 AM and 3:00 PM – 3:45 PM

Tuesday, July 31

Bellmont Foyer

10:00 AM – 10:45 AM and 3:00 PM – 3:45 PM

CONTINUING EDUCATION

How Do I Receive Credit For this Symposium?

To receive credit for all technical sessions and pre-Symposium workshop, please fill out a Continuing Education Request Form and be sure to have a room monitor initial for verification.

Attendees will have to submit their CE Request Form to the Registration Desk at the end of the Symposium. Please request a continuing education form when you check-in and ask WEF staff at the Registration Desk if you have further questions.

Pre-Symposium Workshop:

WEF offers Continuing Education Units (CEUs) for participation in workshop. **One CEU is the equivalent to 10 hours** of training or formal instruction. These are distributed for structured, relevant professional training above and beyond that of initial certification or employment in a particular field.

Technical Sessions:

WEF offers Professional Development Hours (PDHs) for participation in technical sessions. **A PDH is defined as one hour** spent engaged in an activity that contributes to the advancement or enhancement of professional skills or scientific knowledge of a professional engineer or operator.

When Will I Receive Credits For this Symposium?

Certificates and transcripts for this event will be mailed within 8 weeks of the Symposium.

Please keep in mind that although WEF does provide these files, most states will require the individual licensee to report continuing education credits.

Note: *Educational Credits will not be recorded and documentation will not be distributed unless the attendee is a confirmed registrant of this event and the proper steps are completed as indicated in the directions provided.*

Are WEF Continuing Education Credits Approved in My State?

WEF applies for approval in many states and will be happy to work with individuals and Member Associations for additional state or agency approvals upon request. In addition, WEF has been approved as a Training Provider through the following:

The Florida Board of Professional Engineers, the New York State Department of Education, and the Ohio EPA. Many other states accept WEF PDH credits and WEF CEU credits as long as subjects and content meets with state requirements. For example: California (CWEA), Nevada, and New Jersey.

CONTINUING EDUCATION

What Else Do I Need to Know?

WEF follows the International Association of Continuing Education and Training (IACET) guidelines along with state-specific regulations to achieve strict policies and procedures regarding its Continuing Education Program. WEF calculates education credits following a standardized method that is the most widely accepted by certification and licensing agencies. However, many states differ in the type and/or number of credits they will approve for educational events. Because of this, participants are responsible for exploring their state requirements and for ensuring that WEF Symposium credits are accepted.

Service and Support...

In keeping with IACET guidelines, WEF maintains a database of all continuing education files for a minimum of 7 years. You may contact WEF's Customer Service Team between the hours of 8:30am and 5:00pm EST, Monday through Friday to request these files. Please call 1-800-666-0206 or submit an email request to csc@wef.org.

State Credit Calculations:

*Some state licensing boards will accept CEUs for session under 3 hours in length. Some use different acronyms for training credits. In most instances the credits issued by WEF can be converted to meet state specific requirements that vary from the system used by WEF. This is usually managed at the state level using the following conversion method:

1.0 CEU = 10 Hours of session time

1.0 PDH = 1 Hour of session time

1.0 Contact Hour = 1 Hour of session time

For example: **1.2 CEU Credits = 12.0 PDH Credits** or **17.0 PDH Credits** could equate to **1.7 CEU Credits** depending on individual state regulations.

**CEU & PDH credits are available for Workshops to Professional Engineers licensed in the state of New York (NYSED).*

For more information regarding WEF's Continuing Education Program, please visit <http://www.wef.org/DisinfectionReuse>.

ONLINE PROCEEDINGS

Symposium proceedings, consisting of manuscripts for each presentation, have been made available through an online portal. Advance registrants within Full Symposium, Daily, and Student categories will receive access to the Disinfection and Reuse 2018 online proceedings on the day prior to the Symposium. Onsite registrants will receive an access link following the event's conclusion.

Copies of proceedings may be ordered after the Symposium at the member rate of \$100 USD/nonmember rate of \$150 USD. All orders will be processed after conclusion of the Symposium. You may call 1-800-666-0206 or visit www.wef.org/ShopWEF and ask for Stock Number – CPDF1806.

TECHNICAL PUBLICATION

Disinfection and Reuse

The Water Reuse Roadmap

Member: \$67.20

Non-member: \$84.00

The Water Reuse Roadmap is an overview of all the opportunities and issues faced by water reuse projects. Developed to help water managers facilitate successful water reuse programs, from concept development through implementation and maintenance, the guidance in this book enables water managers to determine the feasibility of water reuse options in their specific situation, initiate a water reuse program and expand an existing reuse program based on new approaches and opportunities for innovation.

***Symposium attendees save 20%

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WEF POLICIES & POSITIONS

WEF's Vision

A community of empowered professionals creating a healthy global water environment.

Core Values

Leadership, Passion, Scholarship, and Collaboration, and Service

WEF Policies

WEF respects and takes the broadest view of human diversity and inclusion and is committed to providing a professional, safe, and welcoming environment at its events for all water professionals and their guests. WEF expects all sponsors, speakers, attendees, media, exhibitors and other participants to uphold our commitment to diversity and inclusion by helping us provide a positive Symposium environment for everyone.

For more information, please see WEF's Diversity and Inclusivity Policy, as well as WEF's Non-Discrimination and Harassment Policy at www.wef.org/about/about-wef.

Reporting Concerns

If you have any concerns during this Symposium, please stop by the Symposium registration desk in the Grand Ballroom Foyer of the Hilton North Raleigh Midtown Hotel or you may email the WEF Executive Director Dr. Eileen O'Neill at oneill@wef.org.

WEF SOCIAL MEDIA POLICY

WEF strongly encourages the use of social media to share your experiences at our event. This includes sharing interesting quotes or information, taking pictures with colleagues, and using the event hashtag. However, to protect intellectual property, videotaping, filming, or live-streaming of any workshop or technical session presentation, or exhibit booth is prohibited. Any participant violating this policy must relinquish the media and may be removed from the Symposium. Also, promotional or commercial use of photographs taken at WEFTEC and other WEF Symposiums is strictly prohibited. If you are interested in content, materials, or products, please consider talking to the speaker or exhibitor, who may provide the information or grant permission.

SYMPOSIUM SAFETY AND SECURITY

WEF works hard to provide a comfortable and safe environment during our meetings and events, including contracting with private security firms and off-duty police officers when required. Your help also is needed to provide a safe and secure environment.

WEF recommends that you follow these safety guidelines:

- 1. Share your plans.** Advise a family member or friend of your travel plans, including the dates you will be gone, how you will travel to the meeting or event, and where you are staying;
- 2. Protect your identity.** Wear your name badge only inside the meeting or event venue; remove and secure your name badge when going to and from the venue; when disposing of your name badge, scratch out or destroy your name and/or the QR code to protect your personal information;
- 3. Plan for an emergency.** Be aware of your surroundings. Know where the nearest exits are located. Use the buddy system. Exchange contact information with another event attendee. In case of a venue evacuation, agree where you will meet up. Call for help if your buddy doesn't meet up at the agreed location within a reasonable amount of time.
- 4. See something, say something.** If you see something that raises a safety or security concern, please follow the instructions printed on the back of your name badge to alert security personnel.

Portland Crowne Plaza Emergency Plan:

Portland Crowne Plaza
1441 NE 2nd Avenue
Portland, OR 97232
Phone: (503) 233-2401

To report a medical emergency, fire, safety or security concern, call the hotel main phone number at 503-233-2401 or pick up any house phone in the meeting room area which will automatically call the hotel operations department for assistance.

PRE-SYMPOSIUM WORKSHOP

Workshop A: Emerging Issues with Pathogens and CECs in Recycled Water and Discharges to Surface Water

Sunday, July 29th 1:00 PM – 4:30 PM

Room: Windsor A

(Additional Fees Apply)

Moderators: Matt Noesen, Jenny Reina, Jacobs; Jay Swift, Gray and Osborne

Description: Emerging chemical and biological constituents in water and wastewater are a concern for the public and regulators alike. It is fundamental for our wastewater and water reuse industry to increase the scientific understanding of the risks of constituents of concern (CECs) and prioritize their assessment, as well as to become familiar with treatment alternatives that can mitigate a range of these emerging compounds. This workshop will examine hormones, pharmaceuticals, personal care products, per- and poly-fluorinated alkyl compounds (PFAS) (including fire-fighting foams), pathogens, and antibiotic resistant bacteria in wastewater, non-potable reclaimed water, and purified reclaimed water for potable water reuse. The workshop team will share the latest research from pilot and full-scale treatment and monitoring approaches and provide attendees with the necessary tools to protect public health and water quality.

- | | |
|----------------|--|
| 1:00 PM | Welcome and Introductions |
| 1:05 PM | USEPA Regulatory Considerations and Research on Contaminants of Emerging Concern (CECs) during De Facto Water Reuse
<u>Dr. Susan Glassmeyer</u> , U.S. EPA |
| 1:30 PM | Removal of Pathogen and CECs with Advanced Membrane Technologies
<u>Jim Lozier</u> , Jacobs |
| 1:55 PM | PFAS Analytical Challenges: Remedial Insights
<u>Dr. Jennifer Field</u> , Oregon State University |
| 2:20 PM | Coffee Break in Room |
| 2:35 PM | Antibiotic Resistance in Municipal Wastewater
<u>Dr. Daniel Gerrity</u> , University of Nevada |
| 3:00 PM | Emerging Pollutants Monitoring for Direct Potable Reuse
<u>Andrew Salveson</u> , Carollo |
| 3:25 PM | PURE WATER BREW: Telling the story of ONE WATER a pint at a time
<u>Ting Lu</u> and <u>Mark Jockers</u> , Clean Water Services |
| 3:50 PM | Q&A and Interactive Discussion of Future Research Needs |
| 4:30 PM | Workshop Adjourns |

TECHNICAL PROGRAM

Opening General Session

Monday, July 30

8:30 AM – 10:00 AM

Room: Bellmont A

- 8:30 AM** **Welcome to the 2018 Symposium!**
Bob English, *Palintest*, *2018 Symposium Co-Chair*
Val Frenkel, *Greeley and Hansen*, *2018 Symposium Co-Chair*
- 8:40 AM** **WEF Welcome**
Mark Poling, *Clean Water Services*, *WEF Board of Trustees*
- 8:45 AM** **Welcome from Pacific Northwest Clean Water Association**
Adam McClymont, *PNCWA Vice President*
- 8:50 AM** **Dealing with Clean Water and Sanitation in Underserved
Communities around the Globe**
Catherine Leslie, *Engineers Without Borders - USA*
- 9:15 AM** **The Emergence of On Site Reuse**
Jay Garland, *Environmental Protection Agency*
- 9:40 AM** **The Evolution of the World's largest Advanced Water
Purification
Project for Potable Reuse**
Denis Bilodeau, *Orange County Water District*
- 10:00 AM** **Networking Break in Exhibit Floor**

TECHNICAL PROGRAM

Session 01: Disinfection Fundamentals

Monday, July 30

10:45 AM – 11:45 AM

Room: Belmont B

Moderators: Jay Swift, Gray and Osborne
Bob English, Palintest

10:45 AM **Intro to Disinfection, including recent WEF Disinfection Practices Survey**
Scott Schaefer, AE2S

11:00 AM **Chlorination**
Stan Shmia, DeNora Water Technologies

11:15 AM **Ultra Violet**
Bill Sotirakos, Carollo

11:30 AM **Peracetic acid**
Josh Goldman, CDM Smith

11:45 AM **Session Adjourns for Luncheon**

TECHNICAL PROGRAM

Session 02: Wet Weather Disinfection – Current and Emerging Practices

Monday, July 30

10:45 AM – 11:45 AM

Room: Bellmont A

Moderators: Matt Noesen, CH2M
Ajit Ghorpade, Veolia

- 10:45 AM** **Evaluation of Disinfection Alternatives to Meet Main Plant and CSO Permit Criteria**
Robert Sharp, Manhattan College; Maria Grieco, Keith Mahoney, New York City Department of Environmental Protection (NYCDEP); Xiao Lin, Sarah Galst, Hazen and Sawyer
- 11:15 AM** **Bayonne, NJ Combined Sewer Overflow Treatment Demonstration Project: Disinfection Results**
Jurek Patoczka, Mott MacDonald; John Dening
- 11:45 AM** **Session Adjourns for Luncheon**

TECHNICAL PROGRAM

Session 03: Innovative Disinfection Methods and Technology Trends

Monday, July 30

1:30 PM – 4:45 PM

Room: Bellmont B

Moderators: Bertrand Dussert, Xylem, Inc.
Erica Marti, University of Nevada

- 1:30 PM** **Can MBR Reduce or Eliminate the Need for Disinfection in Water Reuse Projects**
Ufuk Erdal, Zeynep Erdal, Beverley Stinson, AECOM
- 2:00 PM** **PAA, UV, and PAA/UV: Finding the Right "Bowl of Porridge" For Texas Type I Reuse Disinfection**
Kaylee Dusek, Michael Watts, Garver; Matthew Jalbert, Trinity River Authority
- 2:30 PM** **Disinfection of Wastewater with PAA And UV Combined Treatment: A Pilot Study**
Achal Garg, Metropolitan Sewer District, City of Cincinnati; Vasudevan Namboodiri, EPA; Bruce Smith, Abdulaziz Al-Anazi, Brindha Murugesan, Tyler Bowman, Metropolitan Sewer District, City of Cincinnati
- 3:00 PM** **Networking Break**
- 3:45 PM** **Advanced Dose Control Strategy for Disinfection of Wastewater By Peracetic Acid: Pilot-Scale Validation And Performance**
Kyriakos Manoli, Siva Sarathy, Western University - Trojan Technologies; Paris Neofotistos, USP Technologies; Domenico Santoro, Western University - Trojan Technologies
- 4:15 PM** **UV-C LED – Advances in Technology Foster Implementation**
Oliver Lawal, AquiSense Technologies; Gary Hunter, Black & Veatch; Raymond Ehrhard, Wahington University

Session 03 Continues on following page

TECHNICAL PROGRAM

Session 03 Continues from the previous page

- Alternate 1** **Re-Birth of Ozone Based IPR Treatment Trains and the Resulting Integrated Controls for an Efficient Process**
Steve Green, Kevin Flis, Xylem; Charles Bott, Chris Wilson, Germano Salazar Benites, Lauren Zuravnsky, Matt Poe, HRSD
- Alternate 2** **Peracetic Acid Disinfection**
Christopher Jepson, Van Cleef Engineering Associates
- 4:45 PM** **Session Adjourns for Networking Reception in Belmont Foyer**

TECHNICAL PROGRAM

Session 04: Potable Reuse (DPR and IPR) - Safety, Water Quality Control, Demonstration

Monday, July 30

1:30 PM – 3:00 PM

Room: Bellmont A

Moderators: Val Frenkel, Greeley and Hansen
Stuart F. Humphries, Orthos Liquid Systems, Inc.

- 1:30 PM** **Are TOC and COD Limits Appropriate for Regulating Potable Reuse? Analyzing Organics through the Domestic Water Cycle: Results from WE&RF Project-15-04**
Larry Schimmoller, James Lozier, James Rosenblum, CH2MHill
- 2:00 PM** **Using Large Data Sets and Statistical Tools to Define "Failure" and Demonstrate the Safety of DPR**
Austa Parker, Carollo Engineers; Yan Qu, David Hokanson, Trussell Technologies; Jeff Soller, Soller Environmental; Eric Dickenson, Southern Nevada Water Authority; Robert Angelotti, Upper Occoquan Service Authority; Julian Inoue, Carollo Engineers; Shane Trussell, Trussell Technologies; Andrew Salvesson, Carollo Engineers
- 2:30 PM** **A Framework for Regulating Raw Water Augmentation - Results from a Pathogen Benchmarking Study**
Dave MacNevin, Matt Azarian, Andrea Netcher, Tetra Tech
- 3:00 PM** **Session Adjourns for Networking Break**

TECHNICAL PROGRAM

Session 05: Expanding Reuse Strategies and Markets

Monday, July 30

3:45 PM – 4:45 PM

Room: Belmont A

Moderators: Patrick Regan, Evoqua Water Technologies
Matt Noesen, CH2M

- 3:45 PM** **Stormwater Reuse: Aquifer Storage and Recovery Evaluation Using Municipal Residential Stormwater in the Pacific Northwest**
Jason Melady, GSI Water Solutions, Inc.; Jadene Stensland, Clean Water Services, OR; Andrew Davidson, GSI Water Solutions, Inc.; David Winship, City of Beaverton, OR
- 4:15 PM** **Telling the Story of ONE WATER A Pint At A Time: What Four Years Of Drinking Beer Made From Wastewater Has Taught Us About The Language Of Water**
Mark Jockers, Mark Poling, Clean Water Services, OR
- 4:45 PM** **Session Adjourns for Networking Reception**

TECHNICAL PROGRAM

Session 06: Disinfection Optimization and Control of Disinfection Byproducts (DBPs)

Tuesday, July 31

8:30 AM – 11:45 AM

Room: Bellmont A

Moderators: Scott Schaefer, AE2S
Val Frenkel, Greeley and Hansen

- 8:30 AM** **Disinfection By-Product (DBP) Formation and Control in Potable Reuse Applications**
Caroline Russell, Carollo Engineers
- 9:00 AM** **Evaluation of Over 100 Disinfection Reactor Tracer Studies in Washington State**
Keith Stewart, Russ Porter, Gray & Osborne
- 9:30 AM** **Ranitidine – A Potential Significant NDMA Precursor for Potable Reuse**
Erica Marti, University of Nevada, Las Vegas; Caitlin Glover; Eric Dickenson, Southern Nevada Water Authority
- 10:00 AM** **Networking Break**
- 10:45 AM** **Getting a Jump on Disinfection Byproducts: A Pro-Active Approach for Optimizing Reclaimed Water Disinfection**
Andrea Netcher, Tetra Tech; Gary Revoir, Reiss Environmental Consulting Engineers
- 11:15 AM** **Experiences and Successful Strategies for Reuse Water Chlorine Residual Control**
Bing Lin, Alfredo Suarez, EPCOR Water Services
- 11:45 AM** **Session Adjourns for Luncheon**

TECHNICAL PROGRAM

Session 07: New Water Reuse Approaches to Manage Tomorrow's Challenges

Tuesday, July 31

8:30 AM – 10:00 AM

Room: Bellmont B

Moderators: Jenny Reina, CH2M

Justin Mattingly, Water Research Foundation

8:30 AM **PureWaterSF: Direct Potable Reuse Demonstration in San Francisco**

Manisha Kothari, Paula Kehoe, San Francisco Public Utilities Commission; Andrea Corral, Carollo Engineers; Nicola Fontaine; Mark Millan; Andrew Salveson, Carollo Engineers

9:00 AM **Quantification and Prediction of Degradation and Deactivation Kinetics of Antibiotic Resistance Genes During Disinfection/Oxidation Processes: From Bench-scale to Full-scale**

Huan He, Peiran Zhou, Kyle Shimabuku, Xuzhi Fang, University of Washington; Annika Anderson, Washington University in St. Louis; Michael Dodd, University of Washington

9:30 AM **Assessing Chemical Disinfectant Alternatives Using I-CT Dose-Response Kinetics for Multiple Microorganisms**

Roberta Maffettone, Siva Sarathy, Western University - Trojan Technologies; Ronald Gehr, McGill University Dept of Civil Engineering; Paris Neofotistos, USP Technologies; Domenico Santoro, Trojan Technologies

10:00 AM **Session Adjourns for Networking Break**

TECHNICAL PROGRAM

Session 08: Supporting Public Health with Water, Sanitation and Hygiene (WaSH) Projects

Tuesday, July 31

10:45 AM – 11:45 AM

Room: Bellmont B

Moderators: Michael Watts, Garver

- 10:45 AM** **Managing Chlorinated Water for Ebola Disinfection**
Lee Gary, Robert Reimers, Tulane University; Kari Brisolaro, LSUHSC
- 11:15 AM** **Increasing In-Home Water Availability in Remote Alaska's Homes with Water Reuse**
Aaron Dotson, University of Alaska Anchorage
- 11:45 AM** **Session Adjourns for Luncheon**

TECHNICAL PROGRAM

Session 09: Residuals, Sanitation and Hygiene: Concerns, Design and Application for Low Technology Processing

Tuesday, July 31

1:30 PM – 4:45 PM

Room: Bellmont B

Moderator: Leonard Casson, University of Pittsburgh

- 1:30 PM** **Sampling and Disinfection of Wastewater relative to Parasites and the Role of associated Surrogates, Indicators and Non-Vital Models**
Dwight Bowman, Cornell University
- 2:00 PM** **Effective Treatment of Biosolids and Manures – Multiple Additives/Factors for Disinfection, Stabilization and Product Quality**
Robert Reimers, Tulane University
- 2:30 PM** **Low-Cost, Low-Tech Biosolids Treatment via combined Long-Term Storage (Lagoon) and Air Drying: A Comparison of Two Pilot-Scale Studies**
Jennifer Becker, Michigan Tech University
- 3:00 PM** **Networking Break**
- 3:45 PM** **Effectiveness of Tropical Lagoon Treatment for Disinfection of Domestic Septage**
Joel Nkiama Konde, Kinshasa School of Public Health, University of Kinshasa
- 4:15 PM** **Usage of Low-Cost Bio Electro Technology to convert Class B Biosolids Processes (aerobic and anaerobic digestion) to Class A Disinfected and Stabilized Biosolids**
Adam Faschan, Ardurra Group
- 4:45 PM** **Symposium Adjourns**

TECHNICAL PROGRAM

Session 10: Optimizing a Future for DPR – Design, Implementation and Operation of Robust Solutions

Tuesday, July 31

1:30 PM – 3:00 PM

Room: Bellmont A

Moderators: Andrew Salveson, Carollo
Melanie Mann, Hazen and Sawyer

- 1:30 PM** **Accounting for Future Potable Reuse When Implementing Disinfection Solutions Today**
June Leng, Jacobs
- 2:00 PM** **From Collection Systems to Tap: Resilience of Treatment Processes for Potable Reuse**
Justin Mattingly, Water Research Foundation; Sharon Waller, Sustainable Systems, LLC – Consulting; Patti Craddock, Short Elliott Hendrickson, Inc.; Stuart Khan, University of New South Wales
- 2:30 PM** **Design of a Managed Aquifer Recharge and Advanced Treatment Facility**
Andrew Newbold, Hazen and Sawyer; Lauren Zuravnsky, Charles Bott, Germano Salazar-Benites, Chris Wilson, HRSD; Dwayne Amos, David Briley, Hazen and Sawyer
- Alternate** **Planning for a Potable Reuse Future While Maximizing Recycled Water Today**
Jasmine Diaz, Water Systems Consulting, Inc.; Michael Falk, HDR Inc
- 3:00 PM** **Session Adjourns for Networking Break**

TECHNICAL PROGRAM

Session 11: Disinfection of WRRF Effluents for Surface Water Discharges

Tuesday, July 31

3:45 PM – 4:45 PM

Room: Bellmont A

Moderator: Cyndy Bratz, Tetra Tech

- 3:45 PM** **Aberdeen, WA Water Resource Recovery Facility Disinfection System Evaluation**
Jay Swift, Gray and Osborne
- 4:15 PM** **Using Dynamic Dilution Methods to Derive More Accurate Effluent Total Residual Chlorine Limits for WWRFs**
Robert Sharp, Manhattan College; Xiao Lin, Sarah Galst Hazen and Sawyer; Kathy Ammari, Manhattan College; Laura Grieco, New York City Department of Environmental Protection (NYCDEP)
- 4:45 PM** **Symposium Adjourns**

TECHNICAL PROGRAM AT-A-GLANCE

Session Number	Session Title	Time	CE Credit Total/Type	Room
Sunday, July 29				
Workshop	Emerging Issues with Pathogens and Constituents of Emerging Concern (CECs) in Water Reuse and Surface Water Discharge	1:00pm-4:30pm	0.3 CEUs	Windsor A
Monday, July 30				
OGS	Opening General Session	8:30am-10:00pm	1.5 GCHs	Bellmont A
Session 1	Disinfection Fundamentals	10:45am-11:45am	1.0 PDHs	Bellmont B
Session 2	Wet Weather Disinfection – Current and Emerging Practices	10:45am-11:45am	1.0 PDHs	Bellmont A
Session 3	Innovative Disinfection Methods and Technology Trends	1:30pm-4:45pm	2.5 PDHs	Bellmont B
Session 4	Potable Reuse (DPR and IPR) - Safety, Water Quality Control, Demonstration	1:30pm-3:00pm	1.5 PDHs	Bellmont A
Session 5	Expanding Reuse Strategies and Markets	3:45pm-4:45pm	1.0 PDHs	Bellmont A
Tuesday, July 31				
Session 6	Disinfection Optimization and Control of Disinfection Byproducts (DBPs)	8:30am-11:45am	2.5 PDHs	Bellmont A
Session 7	New Water Reuse Approaches to Manage Tomorrow's Challenges	8:30am-10:00am	1.5 PDHs	Bellmont B
Session 8	Supporting Public Health with Water, Sanitation and Hygiene (WaSH) Projects	10:45am-11:45am	1.0 PDHs	Bellmont B
Session 9	Residuals, Sanitation and Hygiene: Concerns, Design and Application for Low Technology Processing	1:30pm-4:45pm	2.5 PDHs	Bellmont B
Session 10	Optimizing a Future for DPR – Design, Implementation and Operation of Robust Solutions	1:30pm-3:00pm	1.5 PDHs	Bellmont A
Session 11	Disinfection of WRRF Effluents for Surface Water Discharges	3:45pm-4:45pm	1.0 PDHs	Bellmont A

PRESENTATIONS AT-A-GLANCE

We encourage attendees to participate in presentations from among all sessions. To better plan your learning, see below and on the following pages a list of presentations offered during each time block.

Key:

Disinfection
Reuse
Both

Monday, July 30 - Morning		
	Bellmont B	Bellmont A
Session	Session 01: Disinfection Fundamentals	Session 02: Sustainability as a Driver for Planning and Decision Making
10:45 AM	Evaluation of Disinfection Alternatives to Meet Main Plant and CSO Permit Criteria	Intro to Disinfection, including recent WEF Disinfection Practices Survey
11:00 AM		Chlorination
11:15 AM	Bayonne, NJ Combined Sewer Overflow Treatment Demonstration Project: Disinfection Results	Ultra Violet
11:30 AM		Peracetic acid

Monday, July 30 - Afternoon		
Room	Bellmont B	Bellmont A
Session	Session 03: Innovative Disinfection Methods and Technology Trends	Session 04: Potable Reuse (DPR and IPR) - Safety, Water Quality Control, Demonstration
1:30 PM	Can MBR Reduce or Eliminate the Need for Disinfection in Water Reuse Projects	Are TOC and COD Limits Appropriate for Regulating Potable Reuse? Analyzing Organics through the Domestic Water Cycle: Results from WE&RF Project-15-04
2:00 PM	PAA, UV, and PAA/UV: Finding the Right "Bowl of Porridge" For Texas Type I Reuse Disinfection	Using Large Data Sets and Statistical Tools to Define "Failure" and Demonstrate the Safety of DPR
2:30 PM	Disinfection of Wastewater with PAA And UV Combined Treatment: A Pilot Study	A Framework for Regulating Raw Water Augmentation - Results from a Pathogen Benchmarking Study
Session	Session 03, continued	Session 05: Expanding Reuse Strategies and Markets
3:45 PM	Advanced Dose Control Strategy for Disinfection of Wastewater By Peracetic Acid: Pilot-Scale Validation And Performance	Stormwater Reuse: Aquifer Storage and Recovery Evaluation Using Municipal Residential Stormwater in the Pacific Northwest
4:15 PM	UV-C LED – Advances in Technology Foster Implementation	Telling the Story Of ONE WATER A Pint At A Time: What Four Years Of Drinking Beer Made From Wastewater Has Taught Us About The Language Of Water
Alternate 1	Re-Birth of Ozone Based IPR Treatment Trains and the Resulting Integrated Controls for an Efficient Process	
Alternate 2	Peracetic Acid Disinfection	

PRESENTATIONS AT-A-GLANCE

Tuesday, July 31 - Morning		
Room	Bellmont A	Bellmont B
Session	Session 06: Disinfection Optimization and Control of Disinfection Byproducts (DBPs)	Session 07: New Water Reuse Approaches to Manage Tomorrow's Challenges
8:30 AM	Disinfection By-Product (DBP) Formation and Control in Potable Reuse Applications	PureWaterSF: Direct Potable Reuse Demonstration in San Francisco
9:00 AM	Evaluation of Over 100 Disinfection Reactor Tracer Studies in Washington State	Quantification and Prediction of Degradation and Deactivation Kinetics of Antibiotic Resistance Genes During Disinfection/Oxidation Processes: From Bench-scale to Full-scale
9:30 AM	Ranitidine – A Potential Significant NDMA Precursor for Potable Reuse	Assessing Chemical Disinfectant Alternatives Using I-CT Dose-Response Kinetics for Multiple Microorganisms
Session	<i>Session 06 continued</i>	Session 08: Supporting Public Health with Water, Sanitation and Hygiene (WaSH) Projects
10:45 AM	Getting a Jump on Disinfection Byproducts: A Pro-Active Approach for Optimizing Reclaimed Water Disinfection	Managing Chlorinated Water for Ebola Disinfection
11:15 AM	Experiences and Successful Strategies for Reuse Water Chlorine Residual Control	Increasing In-Home Water Availability in Remote Alaska's Homes with Water Reuse

PRESENTATIONS AT-A-GLANCE

Tuesday, July 31 - Afternoon		
Room	Bellmont B	Bellmont A
Session	Session 09: Residuals, Sanitation and Hygiene: Concerns, Design and Application for Low Technology Processing	Session 10: Optimizing a Future for DPR – Design, Implementation and Operation of Robust Solutions
1:30 PM	Sampling and Disinfection of Wastewater relative to Parasites and the Role of associated Surrogates, Indicators and Non-Vital Models	Accounting for Future Potable Reuse When Implementing Disinfection Solutions Today
2:00 PM	Effective Treatment of Biosolids and Manures – Multiple Additives/Factors for Disinfection, Stabilization and Product Quality	From Collection Systems to Tap: Resilience of Treatment Processes for Potable Reuse
2:30 PM	Low-Cost, Low-Tech Biosolids Treatment via combined Long-Term Storage (Lagoon) and Air Drying: A Comparison of Two Pilot-Scale Studies	Design of a Managed Aquifer Recharge and Advanced Treatment Facility of a Managed Aquifer Recharge and Advanced Treatment Research Center
Alternate 1		Planning for a Potable Reuse Future While Maximizing Recycled Water Today
Session	Session 09, continued	Session 11: Disinfection of WRRF Effluents for Surface Water Discharges
3:45 PM	Effectiveness of Tropical Lagoon Treatment for Disinfection of Domestic Septage	Aberdeen, WA Water Resource Recovery Facility Disinfection System Evaluation
4:15 PM	Usage of Low-Cost Bio Electro Technology to convert Class B Biosolids Processes (aerobic and anaerobic digestion) to Class A Disinfected and Stabilized Biosolids	Using Dynamic Dilution Methods to Derive More Accurate Effluent Total Residual Chlorine Limits for WRRFs

THE EXHIBITION

Exhibition Schedule

Networking events listed below are dedicated show hours.
Technical sessions will not take place during these times.

Monday, July 30	10:00 am – 6:15 pm Exhibits Open
	10:00 am – 10:45 am Networking Break
	11:45 am – 1:30 pm Networking Luncheon
	3:00 pm – 3:45 pm Networking Break
	4:45 pm – 6:15 pm Networking Reception

Due to the proprietary nature of the displays, photography of displays and materials is forbidden without exhibitors' express permission.

EXHIBITORS

As of 7/11/2018

Canopus Water Technologies..... **Booth 104**

www.canopuswatertechnologies.com

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7 Jenny's Hill Rd

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Developer and manufacturer of non-chemical water disinfection products. UV, Ozone, and Plasma products with best in class sanitation performance for residential, industrial and commercial applications. Recently introduced – C-UV100, the best UV disinfection offering in the market based on state of the art UVC-LEDs and a unique reactor design.

CHEMetrics, Inc..... **Booth 105**

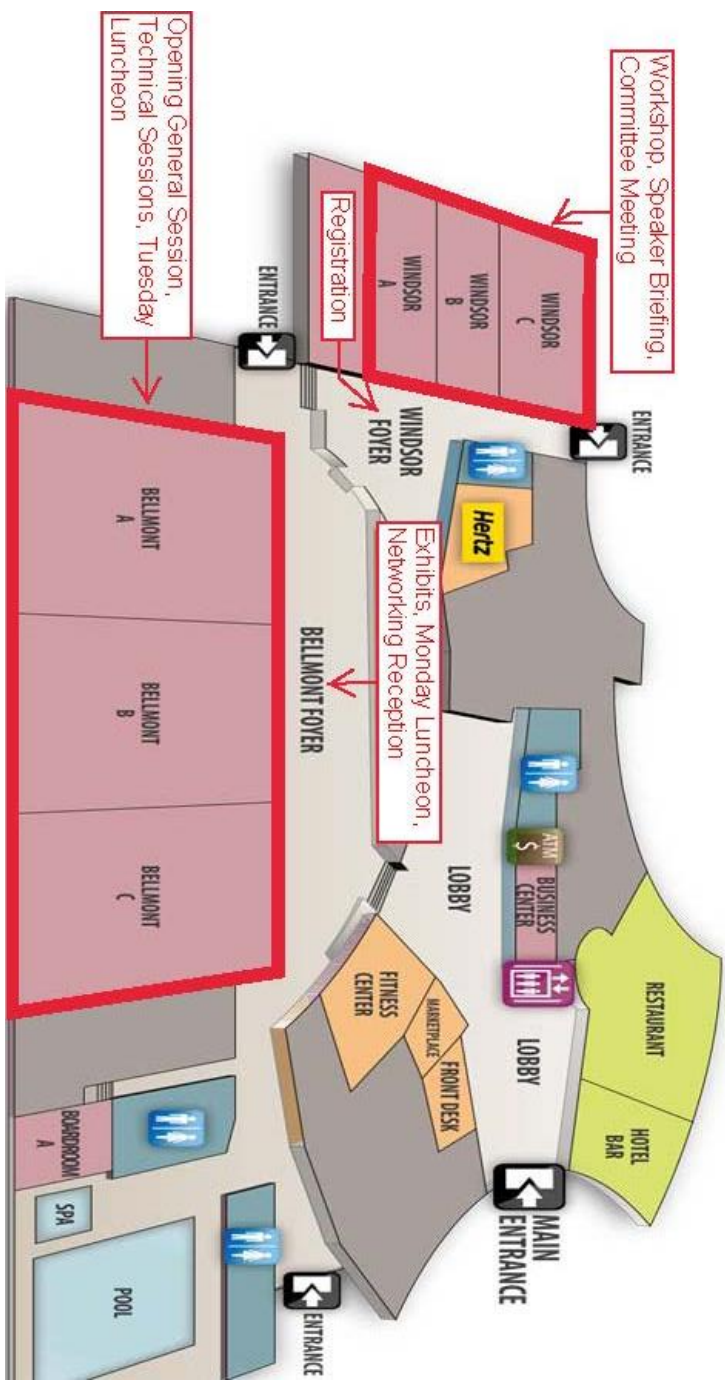
www.chemetrics.com

Phone: 800-356-3072

4295 Catlett Rd

Midland, VA 22728

CHEMetrics, Inc. manufactures water analysis test kits for testing impurities in process and product water and monitoring the efficacy of sterilization solutions. Test kits available for Peracetic Acid, Hydrogen Peroxide, Ozone and Chlorine.



PRESENTER AND MODERATOR DIRECTORY

Jennifer Becker, Michigan Tech University, **Presenter, 09**

Dwight Bowman, Cornell University Dept Of Micro & Imm, **Presenter, 09**

Cyndy Bratz, Tetra Tech, **Moderator, 11**

Leonard Casson, University of Pittsburgh, **Moderator, 09**

Jasmine Diaz, Water Systems Consulting, Inc., **Presenter, 10**

Aaron Dotson, University of Alaska Anchorage, **Presenter, 08**

Kaylee Dusek, Garver, **Presenter, 03**

Bertrand Dussert, Xylem, **Moderator, 03**

Robert English, Palintest, **Moderator, 01**

Ufuk Erdal, AECOM, **Presenter, 03**

Adam Faschan, Ardurra Group, **Presenter, 09**

Jennifer Field, Oregon State University, **Presenter, Workshop**

Val Frenkel, Greeley and Hansen, **Moderator, 06, 04**

Achal Garg, Metropolitan Sewer District, City Of Cincinnati, **Presenter, 03**

Daniel Gerrity, University of Nevada, **Presenter, Workshop**

Ajit Ghorpade, 980, **Moderator, 02**

Susan Glassmeyer, EPA, **Presenter, Workshop**

Josh Goldman-Torres, CDM Smith Inc, **Presenter, 01**
Steve Green, Xylem, **Presenter, 03**

Huan He, University of Washington, **Presenter, 07**

Stuart Humphries, Orthos Liquid Systems, Inc., **Moderator, 04**

Gary Hunter, Black & Veatch, **Presenter, 03**

Christopher Jepson, Van Cleef Engineering Associates, **Presenter, 03**

Mark Jockers, Clean Water Services, OR, **Presenter, 05**

Joel Nkiama Konde, Kinshasa School of Public Health, University of Kinshasa, **Presenter, 09**

June Leng, Jacobs, **Presenter, 10**

Bing Lin, EPCOR Water Services, **Presenter, 06**

James Lozier, CH2MHill, **Presenter, Workshop, 04**

Ting Lu, Clean Water Services, **Presenter, Workshop**

Dave MacNevin, Tetra Tech, **Presenter, 04**

Melanie Mann, Hazen and Sawyer, **Moderator, 10**

Erica Marti, University of Nevada, Las Vegas, **Moderator, 03, Presenter, 06**

Justin Mattingly, Water Research Foundation, **Moderator, 07, Presenter, 10**

PRESENTER AND MODERATOR DIRECTORY

Jason Melady, GSI Water Solutions, Inc., **Presenter, 05**

Andrea Netcher, Tetra Tech, **Presenter, 06**

Andrew Newbold, Hazen and Sawyer, **Presenter, 10**

Matthew Noesen, CH2M, **Moderator, Workshop, 02, 05**

Austa Parker, Carollo Engineers, **Presenter, 04**

Jurek Patoczka, Mott MacDonald, **Presenter, 02**

Patrick Regan, Evoqua Water Technologies, **Moderator, 05**

Robert Reimers, Tulane University, **Presenter, 08, 09**

Jenny Reina, CH2M, **Moderator, Workshop, 07**

Caroline Russell, Carollo Engineers, **Presenter, 06**

Andrew Salveson, Carollo Engineers, **Presenter, Workshop, 07, Moderator, 10**

Siva Sarathy, Western University - Trojan Technologies, **Presenter, 03, 07**

Scott Schaefer, AE2S, **Moderator, 06, Presenter, 01**

Robert Sharp, Manhattan College, **Presenter, 02, 11**

Stanley Shmia, De Nora Water Technologies, **Presenter, 01**

Bill Sotirakos, Carollo Engineers, **Presenter, 01**

Keith Stewart, Gray & Osborne, Inc., **Presenter, 06**

Jay Swift, Gray and Osborne, **Moderator, Workshop, 01, Presenter, 11**

Michael Watts, Garver, **Moderator, 08**

CONFERENCE SCHEDULE AT-A-GLANCE

Sunday, July 29

12:00 PM – 4:30 PM
1:00 PM – 4:30 PM

Registration
Workshops A

Monday, July 30

7:30 AM – 4:45 PM
8:30 AM – 10:00 AM
10:00 AM – 6:15 PM
10:45 AM – 11:45 PM
11:45 AM – 1:30 PM
1:30 PM - 4:45 PM
1:30 PM - 3:00 PM
3:45 PM - 4:45 PM
4:45 PM – 6:15 PM

Registration
Opening General Session
Exhibit Hall Open
Technical Sessions 1, 2
Luncheon in Belmont C
Technical Session 3
Technical Session 4
Technical Session 5
Networking Reception

Tuesday, July 31

8:00 AM – 5:00 PM
8:30 AM – 11:45 PM
8:30 AM – 10:00 AM
10:45 AM – 11:45 AM
11:45 AM – 1:30 PM
1:30 PM – 4:45 PM
1:30 PM – 3:00 PM
3:45 PM – 4:45 PM

Registration
Technical Session 6
Technical Sessions 7
Technical Sessions 8
Luncheon in Belmont C
Technical Session 9
Technical Session 10
Technical Sessions 11

UPCOMING EDUCATION AND TRAINING EVENTS

WEFTEC 2018

September 29 - October 3, 2018
New Orleans, Louisiana
www.weftec.org

WEF Education and Training 2019 Events

*Mark your calendars for our upcoming events.
More information coming shortly.*

**Forum 2019: James Barnard Research Conference
on Emerging Themes in Biological Phosphorus Removal**
January 2019, Austin, Texas

AWWA/WEF The Utility Management Conference 2019
March 5-8, 2019
Nashville, Tennessee
<https://www.wef.org/utilitymanagement>

Residuals and Biosolids 2019 Conference
May 7-10, 2019, Ft Lauderdale, Florida

Stormwater and Green Infrastructure 2019 Symposium
May 2019, Ft Lauderdale, Florida

Collection Systems 2019 Conference
June 4-7, 2019, Indianapolis, Indiana

Nutrient Removal and Recovery 2019 Symposium
July 2019, Midwest

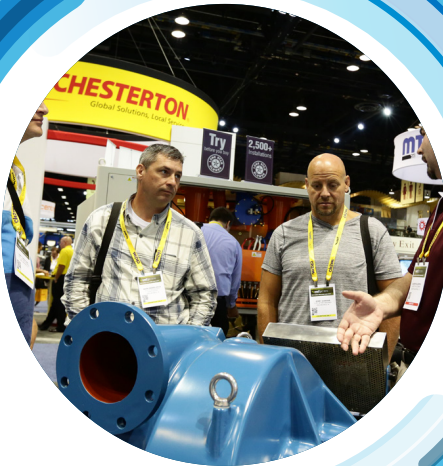
WEF/AWWA Transformative Issues 2019 Symposium
August 2019, Washington, D.C.

NOTES

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October 1 – 3, 2018

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