LEADING THE FUTURE OF WATER

WEFTEC 2024
NEW ORLEANS, LOUISIANA, USA
CONFERENCE: Oct. 5–9, 2024
EXHIBITION: Oct. 7–9, 2024
New Orleans Morial Convention Center

The must-attend annual meeting of the worldwide water community
WEF Innovations in Treatment Technology Conference

May 21-24, 2024
Virginia Beach Convention Center
Virginia Beach, Virginia

www.wef.org/TreatmentTech
Dear Colleagues,

Welcome to Virginia Beach! The Water Environment Federation in cooperation with the Virginia Water Environment Association are honored to have you join us for the WEF Innovations in Treatment Technology Conference (ITT). On their behalf, we enthusiastically invite you to participate in this exceptional opportunity for education and collaboration!

WEF is committed to providing learning and information transfer opportunities for our design, operations, and research communities. This conference focuses on the most innovative emerging technologies in greater detail. Therefore, this conference, presents a unique opportunity to share ideas, which is critical for the continued advancement, acceptance, and implementation of sustainable process strategies into practice and the identification of knowledge gaps and future needs in this crucial field.

The Opening General Session will feature keynotes by Thor Young on past drivers for technological advancement in the Chesapeake Bay area and by Art Umble on the wastewater utility of the future. Over the next several days there will be 27 sessions within the technical program featuring speakers from various backgrounds, including regulatory, research, design, implementation, and utility operations. These interactive sessions consist of 15-minute presentations, short technical briefings, and facilitated discussions. Some of the session topics include:

- Process fundamentals and modeling
- Nutrient removal and recovery
- Sedimentation and separation processes
- Water reuse
- Balancing and optimizing carbon management
- Enhancing secondary treatment, including densification, ballasted processes, and membranes
- Contaminants of emerging concern and associated treatment means
- Process aeration and mixing systems
- Digestion

We would like to bring your attention to two special sessions: A session organized by Young Professionals (YPs) where both experienced professionals and YPs will have a chance to exchange ideas on careers and the future of our industry, and Journey into Innovative Practices which will feature perspectives from consulting, academia, government, and utilities on bringing innovation into practice.
This conference also features several pre-conference workshops for those who are able to participate on Tuesday:

- **On Sedimentation** featuring live settling demonstrations (full day)
- **Biofarming: A New Approach to Wastewater Process Intensification** (full day)
- **Exploring the Application and Interpretation of ’omics Data in Biological Nutrient Removal (BNR)** (half day)
- **Evolution of Treatment Process Optimization Utilizing Advanced Data Analytics and Machine Learning** (half day)

These pre-conference workshops are always popular and well attended, offering fantastic opportunities to meet your peers and hear current ideas for tackling the issues we face as an industry in the most interactive and hands-on setting we offer.

We encourage you to network with fellow attendees and presenters throughout the conference, sharing your experiences and learning from one another. Facilitated discussions have been incorporated into each session to promote collaboration and idea exchange. In addition, please be sure to join us for the networking reception on Wednesday evening to continue the conversation from the day’s technical sessions.

We hope you enjoy this informative event and have many productive interactions.

Sincerely,

2024 ITT Conference Co-Chairs

Joe Husband, Arcadis

Stephanie Klaus, HRSD

Nerea Uri Carreño, VandCenterSyd

George Wells, Northwestern University
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CONFERENCE COMMITTEES

Joe Husband
Arcadis
Conference Co-Chair

Stephanie Klaus
Hampton Roads Sanitation District
Conference Co-Chair

Nerea Uri Carreño
VCS Denmark
Conference Co-Chair

George Wells
Northwestern University
Conference Co-Chair
## CONFERENCE STEERING COMMITTEE

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<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Title/Role</th>
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<tbody>
<tr>
<td>Phil Ackman</td>
<td>Los Angeles County Sanitation Districts</td>
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<td>Mehran Andalib</td>
<td>Stantec</td>
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<td>Isaac Avila</td>
<td>Black &amp; Veatch</td>
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<td>Charles Bott</td>
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<td>Anna Cleaver</td>
<td>AECOM</td>
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<td>Erik Coats</td>
<td>University of Idaho</td>
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<td>Martha Dagnew</td>
<td>Western University</td>
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<td>Haydee De Clippeleir</td>
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<td>Jeseth Delgado-Vela</td>
<td>Duke University</td>
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<td>Ashwin Dhanasekar</td>
<td>HDR</td>
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<td>Mike Falk</td>
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<td>Dan Freedman</td>
<td>Metro Water Recovery</td>
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<td>Arvind Kannan</td>
<td>Carollo Engineers</td>
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<td>Wendell Khunjar</td>
<td>Hazen and Sawyer</td>
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<td>Demi Ladipo-Obasa</td>
<td>The George Washington University/DC Water</td>
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<td>Jacek Makinia</td>
<td>Gdansk University of Technology</td>
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<td>Adrienne Menniti</td>
<td>Clean Water Services</td>
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<td>Arif Rahman</td>
<td>Jacobs</td>
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<td>Tanja Rauch-Williams</td>
<td>Metro Water Recovery</td>
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<td>Brown and Caldwell</td>
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<td>Matt Seib</td>
<td>Madison Metropolitan Sewerage District</td>
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<td>Robert Sharp</td>
<td>Manhattan College</td>
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<td>Peter Vanrolleghem</td>
<td>modelEAU - Université Laval</td>
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<td>Paul Wood</td>
<td>Lockwood, Andrews &amp; Newnam, Inc.</td>
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Ahmed Al-Omari  
Brown and Caldwell

Jeanette Brown  
Manhattan College

Raj Chavan  
AtkinsRealis

Willow Crites  
University of Idaho

Chris deBarbadillo  
Black & Veatch

Ashwin Dhanasekar  
The Water Research Foundation

Don Esping  
Brown and Caldwell

Stephanie Fevig  
The Water Research Foundation

Rahil Fofana  
DC Water

Alexandria Gagnon  
HRSD

Mark Gockowski  
Baxter & Woodman

Liping Han  
ExxonMobil

Mahmudul Hasan  
Baltimore City Department of Public Works

Thomas Johnson  
Jacobs

Murthy Kasi  
Olsson

John Koch  
EnviroMix

Jonathan Kolweier  
Baxter & Woodman, Inc.

Erik Larson  
Vaughan Company, Inc.

Guangbin Li  
University of Maryland

Jim Li  
AECOM

Zhongtian Li  
Carollo Engineers

Michael Liu  
Los Angeles County Sanitation Districts

Yanjin Liu  
American Water

Jim McQuarrie  
AECOM

Mark Miller  
Brown and Caldwell

Patrick O'Donnell  
INVENT Environmental

Monica Oristian  
AlexRenew

Marija Peric  
AECOM

Gayathri Ram Mohan  
Hazen and Sawyer

Jenny Reina  
Jacobs

Shawn Rodier  
American Water

Elizabeth Schrandt  
Metropolitan Council, MN

Joe Schuler  
Kiewit Engineering Group Inc.

Heather Stewart  
Jacobs

Hannah Stohr  
HRSD
CONFERENCE COMMITTEES

TECHNICAL REVIEW COMMITTEE

Anne Sun
Hazen and Sawyer

David Wankmuller
Hazen and Sawyer

Michelle Young
Carollo Engineers, Inc.

Brett Wagner
AECOM

Blair Wisdom
Hazen and Sawyer

COMMUNITY MEETINGS

Research and Innovation (RISE) Community Meeting
Wednesday, May 22, 12:00-1:00 p.m.
Room: 1-BC

WRF/DOE Process Controls Project Meeting
Thursday, May 23, 11:30 a.m. – 1:30 p.m.
Room: Tower Cafe

Municipal Resource Recovery Design Community Meeting
Thursday, May 23, 12:00 p.m. – 1:00 p.m.
Room: 1-D
REGISTRATION

All events are held in the Virginia Beach Convention Center.

The Registration Desk is in the Pre-Function Area in Hall D on Level 1 and will be open at the following times:

- Tuesday, May 21: 7:30 a.m. – 5:00 p.m.
- Wednesday, May 22: 7:30 a.m. – 5:00 p.m.
- Thursday, May 23: 8:00 a.m. – 5:00 p.m.
- Friday, May 24: 8:00 a.m. – 11:45 a.m.

WIFI

Wi-Fi is available in meeting rooms, lobbies, and public areas via the Complimentary WiFi network. Once connected, you will need to create an account for access. No Password is required. Service is intended for casual internet access such as light browsing, email, text-based social media, etc.

PRESENTER AND FACILITATOR INFO

All presenters and facilitators should pick up their conference badge at the Registration Desk and attend their assigned Speaker Briefing.

Presenters participating Wednesday, Thursday, and Friday should attend their assigned Speaker Briefing. Please attend only once unless speaking on multiple days.

The Speaker Briefing and room schedule is as follows:

- Wednesday, May 22 – Suite 5: 7:45 a.m. - 8:15 a.m. *Sessions 1 through 8
- Thursday, May 23 – Suite 5: 7:45 a.m. - 8:15 a.m. *Sessions 9 through 26
WEF is committed to providing a professional, safe, and welcoming environment during its in-person and virtual events for all participants. WEF expects all attendees, moderators, panelists, and speakers to uphold our commitment to diversity and inclusion by helping us provide a positive environment for everyone.

As a participant you agree to the following:

- To treat all individuals with respect and create a collegial, inclusive, and professional environment.
- To value a diversity of views and opinions by communicating openly with respect for others.
- Not to verbally abuse any individual or to discriminate, harass, or intimidate on the basis of gender, race, gender identity and expression, sexual orientation, physical or mental disability, physical appearance, age, religion, national origin, veteran status, citizenship, or professional rank.

Anyone requested to stop unacceptable behavior is expected to comply immediately. WEF management may take any action deemed necessary and appropriate, including removal from the event (and any remaining portions thereof) without warning and without refund of the registration fee.

Additionally, if you are a WEF member, you agree to uphold the WEF Member Code of Conduct while attending WEF events.

**Reporting Concerns**

To report a Code of Conduct violation, you may email the WEF Executive Director, at: executivedirector@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: #CSSWConf. However, to protect intellectual property, videotaping, filming, or live-streaming of any technical session is prohibited. Any participant violating this policy must relinquish the media and may be removed from the conference. Also, promotional or commercial use of photographs taken at WEFTEC and other WEF conferences is strictly prohibited. If you are interested in content, materials, or products, please consider talking to the speaker who may provide the information or grant permission.

CONFERENCE SAFETY AND SECURITY

Virginia Beach Convention Center
1000 19th Street, Virginia Beach, VA 23451

- CALL 911 for life-threatening situations and fire (smoke, flames).
- For non-life-threatening first-aid occurrences there will be a First Aid station in Atrium 1/2 on the second level for the duration of the conference.
- The VBCC full-time staff have been trained in CPR, the use of our AEDs, and Stop the Bleed.
- The official evacuation assembly area is the 19th Street sidewalk opposite the Convention Center. Virginia Beach Convention Center staff will keep you informed of the evacuation status and notify you when the facility has been cleared for re-entry.
- To contact the security department directly for security emergencies or concerns, call 757-385-2152.

DoubleTree by Hilton Virginia Beach
1900 Pavilion Drive, Virginia Beach, VA 23451

- CALL 911 if the situation is an emergency.
- If the matter is NOT an emergency, dial “0” from any Hotel phone or call 757-422-8900 then press 0 from your mobile phone, ask to speak to the Manager on Duty, and report the matter accordingly.
Staff have arranged to have a variety of food options to accommodate vegan, vegetarian and other noted dietary restrictions/preferences. Please advise staff if you have additional special dietary requirements.

**Networking Luncheons**
Lunch will be provided for all registered attendees on both full days of the conference. Use this opportunity to meet your fellow participants from across the country and abroad while enjoying a luncheon.

**Wednesday, May 22 and Thursday, May 23**
Suite 5 on Level 2  
12:00 p.m. - 1:30 p.m.

**WEF Networking Reception**
Join fellow attendees, speakers, and exhibitors in the Exhibit Hall to network and relax while enjoying a complimentary beverage and light hors d’oeuvres.

**Wednesday, May 22**
Outside Exhibit Hall B/C on Level 1  
5:00 p.m. - 6:30 p.m.

**VWEA Reception**
VWEA would like to invite ITT conference attendees to an evening of networking, food, beverages, and entertainment. Register online while tickets last at [https://www.vwea.org/event/WEFITTReception24](https://www.vwea.org/event/WEFITTReception24).

**Thursday, May 23**
Back Bay Brew House’s Beach House  
6:30 p.m. - 8:30 p.m.

**Networking Breaks**
Take the opportunity to network with peers between technical sessions while enjoying a cup of coffee or tea.

**Wednesday, May 22 and Thursday, May 23**
Atrium 4/5  
10:00 a.m. - 10:30 a.m. and 3:00 p.m. - 3:30 p.m.

**Friday, May 24**
Atrium 4/5  
10:00 a.m. - 10:15 a.m.
Continuing Education credit files will be made available online after the conference. Participating attendees will receive an email within 4 weeks after each event informing them when CE Credit documentation becomes available. Attendees will be able to view and download a certificate and transcript detailing their event participation using the link provided in the event follow up messaging. These details are also posted under the Events & Education tab of www.WEF.org.

How Do I Receive Credit For this Conference?
In order to receive credit for participation in any of the event sessions attendees will be required to properly fill out and track session times using the CE Credit Request Form. This requires obtaining a room monitor or WEF staff member initial for each session which you’d like to claim CE credit hours. These forms will be made available at the registration counter. Credits obtained during this event will be available after the conference using the link provided above. Please ask a WEF staff member if you have any questions or if you need to locate a CE Credit Request Form.

Pre-Conference Workshops:
WEF offers Continuing Education Units (CEUs) for participation in workshops. 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 Conference?
Certificates and transcripts are available for download after each event. WEF will send an email after the conference to inform attendees where they can obtain their credits. Please keep in mind that most state licensing boards require the individual licensees 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 here and on the CE Request Forms.
Are WEF Continuing Education Credits Approved in My State?
Most state engineering boards will accept WEF event credits as issued by WEF. WEF applies for approval in many states for operators 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.

Please visit [www.wef.org](http://www.wef.org) for specific state approval information for each event.

What Else Do I Need to Know?
WEF follows the International Association of Continuing Education and Training (IACET) guidelines along with strict state-specific CE Credit regulations. We strive to maintain these policies and procedures regarding our Continuing Education Program to meet with and receive state recognition of our events. WEF calculates education credits following a standardized method that is 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 conference credits are accepted.

Service and Support...
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 8:30 a.m. and 5:00 p.m. EST, Monday through Friday for questions related to WEF Programs - 1-800-666-0206 or csc@wef.org.

State Credit Calculations:
Each state has its own set of CE credit requirements. Some licensing boards use different acronyms for approved 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:

1.0 CEU = 10 Hours of session time
1.0 PDH = 1 Hour of session time
1.0 General Contact Hour = 1 Hour of session time

For example: 1.7 CEU Credits = 17.0 PDH depending on individual state regulations.

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

Please note: courses that are not related to professional practice, such as accounting/financial planning, basic Auto CAD, general office management, insurance, marketing, real estate, risk management, DE&I, etc. are not approved for continuing education credits by some state licensing boards, including the NYSED.

For more information regarding WEF’s Continuing Education Program, please visit the Events & Education tab at [www.WEF.org](http://www.WEF.org).
We would like to thank the following sponsoring companies for their contributions to the conference and program.

https://www.hdrinc.com/
BRONZE ELITE

https://invent-uv.com/
OPENING GENERAL SESSION
<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Start Time</th>
<th>End Time</th>
<th>CE Credits</th>
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<tbody>
<tr>
<td></td>
<td><strong>Monday, May 20</strong></td>
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<td></td>
<td>Tour A HRSD’s Nansemond Treatment Plant and SWIFT Research Center</td>
<td>12:30 p.m.</td>
<td>5:00 p.m.</td>
<td>4.5 GCHs</td>
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<td></td>
<td><strong>Tuesday, May 21</strong></td>
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<tr>
<td>Workshop A</td>
<td>On Suspension Separation</td>
<td>8:30 a.m.</td>
<td>5:00 p.m.</td>
<td>0.6 CEUs</td>
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<td>Workshop B</td>
<td>Applying Old and New Tools to Intensify the Future of WW Biofarms</td>
<td>8:30 a.m.</td>
<td>5:00 p.m.</td>
<td>0.6 CEUs</td>
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<td>Workshop C</td>
<td>Exploring the Application and Interpretation of ‘omics Data in Biological Nutrient Removal (BNR)</td>
<td>8:30 a.m.</td>
<td>12:00 p.m.</td>
<td>0.3 CEUs</td>
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<td>Workshop D</td>
<td>Evolution of Treatment Process Optimization Utilizing Advanced Data Analytics and Machine Learning</td>
<td>1:30 p.m.</td>
<td>5:00 p.m.</td>
<td>0.3 CEUs</td>
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<td><strong>Wednesday, May 22</strong></td>
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<td>OGS</td>
<td>Opening General Session</td>
<td>8:30 a.m.</td>
<td>10:00 a.m.</td>
<td>1.5 GCHs</td>
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<td>Session 01</td>
<td>Mainstream PNA</td>
<td>10:30 a.m.</td>
<td>12:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 02</td>
<td>Contaminants of Emerging Concern and PFAS</td>
<td>10:30 a.m.</td>
<td>12:00 p.m.</td>
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<td>Session 03</td>
<td>Low Dissolved Oxygen Processes</td>
<td>10:30 a.m.</td>
<td>12:00 p.m.</td>
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<td>Session 04</td>
<td>PdNA Fundamentals</td>
<td>1:30 p.m.</td>
<td>3:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 05</td>
<td>Understanding &amp; Optimizing Water Reuse: Advanced Techniques and Case Studies</td>
<td>1:30 p.m.</td>
<td>5:00 p.m.</td>
<td>3.0 PDHs</td>
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<td>Session 06</td>
<td>Young Professionals Program</td>
<td>1:30 p.m.</td>
<td>3:00 p.m.</td>
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<td>Session 07</td>
<td>PdNA Implementation</td>
<td>3:30 p.m.</td>
<td>5:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 08</td>
<td>Membrane Aerated Biofilm Reactor - From Theory to Modeling to Practice &amp; Emerging Applications</td>
<td>3:30 p.m.</td>
<td>5:00 p.m.</td>
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<td>Session 09</td>
<td>Full Scale Optimization Strategies</td>
<td>8:30 a.m.</td>
<td>10:00 a.m.</td>
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<td>Session 10</td>
<td>Source-Separation of Toilet Waste as a Viable Option for Resource Recovery in the Water Industry</td>
<td>8:30 a.m.</td>
<td>10:00 a.m.</td>
<td>1.5 PDHs</td>
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<td>Session 11</td>
<td>Greenhouse Gases</td>
<td>8:30 a.m.</td>
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<td>Session 12</td>
<td>Carbon Management for P Removal</td>
<td>10:30 a.m.</td>
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<td>Session 13</td>
<td>Biosolids and Resource Recovery</td>
<td>10:30 a.m.</td>
<td>12:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 14</td>
<td>GHG: Emerging Processes and Mitigation Strategies</td>
<td>10:30 a.m.</td>
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<td>Session 15</td>
<td>Carbon Management for N Removal</td>
<td>1:30 p.m.</td>
<td>3:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 16</td>
<td>Digestion</td>
<td>1:30 p.m.</td>
<td>3:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 17</td>
<td>Data-Driven Models</td>
<td>1:30 p.m.</td>
<td>3:00 p.m.</td>
<td>1.5 PDHs</td>
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<td>Session 18</td>
<td>Primary Treatment &amp; Process Intensification</td>
<td>3:30 p.m.</td>
<td>5:00 p.m.</td>
<td>1.5 PDHs</td>
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<tr>
<td>Session 19</td>
<td>Thermal Hydrolysis Process</td>
<td>3:30 p.m.</td>
<td>5:00 p.m.</td>
<td>1.5 PDHs</td>
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<tr>
<td>Session 20</td>
<td>Transforming Wastewater Utilities: A Journey into Innovative Practices</td>
<td>3:30 p.m.</td>
<td>5:00 p.m.</td>
<td>1.5 PDHs</td>
</tr>
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</table>

**Thursday, May 23**

**Friday, May 24**

| Session 21 | Modeling for Process Optimization                                       | 8:30 a.m.  | 10:00 a.m. | 1.5 PDHs  |
| Session 22 | Anammox Technologies                                                    | 8:30 a.m.  | 10:00 a.m. | 1.5 PDHs  |
| Session 23 | Hydrocyclone Applications at Full-Scale Facilities                      | 8:30 a.m.  | 10:00 a.m. | 1.5 PDHs  |
| Session 24 | Digital Twins                                                           | 10:15 a.m. | 11:45 a.m. | 1.5 PDHs  |
| Session 25 | Optimizing High Purity Oxygen Processes for Nutrient Removal           | 10:15 a.m. | 11:45 a.m. | 1.5 PDHs  |
| Session 26 | Densification                                                           | 10:15 a.m. | 11:45 a.m. | 1.5 PDHs  |
Tour A: HRSD’s Nansemond Treatment Plant and SWIFT Research Center

Monday, May 20
12:30 p.m. - 5:00 p.m.

Join us for a tour of the HRSD SWIFT Research Center, a 1 MGD indirect water reuse demonstration at the Nansemond Treatment Plant. The education and research center houses the advanced water treatment process which consists of flocculation, sedimentation, ozonation, biologically active filtration, granular activated carbon, UV, and then aquifer recharge. We will also tour the Nansemond Treatment Plant, a 5-stage ABAC process with anaerobic digestion and sidestream phosphorus recovery already implemented. WASSTRIP, Partial Denitrification/Anammox, and sidestream partial nitritation/anammox are in construction. Presentations by HRSD will cover current and future work.

Note: Lunch is not included, so please eat ahead of time.
Workshop A: On Suspension Separation
Tuesday, May 21
8:30 a.m. - 5:00 p.m.  Room: 1-A
0.6 CEUs

8:30 a.m.  Introduction  
Charles Bott, HRSD; Paul Wood, Lockwood, Andrews & Newnam, Inc

8:45 a.m.  Purpose and History  
Peter Vanrolleghem, Université Laval

9:15 a.m.  Fundamentals: Demonstration Introduction and Instructions  
Dave Kinnear, Kinnear Engineering

10:00 a.m.  Networking and Coffee Break

10:30 a.m.  Quantifying Design and Operating Parameters  
Nam Ngo, DC Water; Peter Vanrolleghem, Université Laval

11:00 a.m.  Design and Operation Folklore  
Dave Kinnear, Kinnear Engineering

11:30 a.m.  Panel: Intensification Pathways

12:00 p.m.  Break for Lunch

1:30 p.m.  Intensification Systems  
Sudhir Murthy, NEWhub Corp

2:00 p.m.  Activated Sludge SRT Decoupling  
Pusker Regmi, Brown and Caldwell

2:30 p.m.  Suspension Separation Utilizing a Hydrogravitational Trap  
Dave Kinnear, Kinnear Engineering

3:00 p.m.  Networking and Coffee Break

Workshop A agenda continues on following page
Workshop A: On Suspension Separation
Tuesday, May 21
8:30 a.m. - 5:00 p.m.
Room: 1-A
0.6 CEUs

Workshop A agenda continued from previous page

3:30 p.m.  Flocs and Granules: Optimizing Activated Sludge Systems
Belinda Sturm, University of Kansas

3:00 p.m.  Intensification: Alternatives and Economics
Tom Johnson, Jacobs; Mark Miller, Brown and Caldwell

4:30 p.m.  Panel: Unit Processes Integration
Chris DeBarbadillo, DC Water; Jim McQuarrie, AECOM, and all afternoon speakers

5:00 p.m.  Workshop Adjourns
Workshop B: Applying Old and New Tools to Intensify the Future of WW Biofarms

Tuesday, May 21
8:30 a.m. - 5:00 p.m.
Room: 1-BC
0.6 CEUs

8:30 a.m. Welcome: Utility Needs and Drivers
Nerea Uri, VCS Denmark; Rudy Maltos, Metro Water Recovery

8:50 a.m. Old Applications: Settleability, BNR, Fixed Media (Co-diffusion), Mobile Media
Jim McQuarrie, AECOM

9:10 a.m. New Ways of Applying Old Tools: Physical Selectors - Fundamentals
Tom Johnson, Jacobs

9:30 a.m. Discussion

10:00 a.m. Networking and Coffee Break

10:30 a.m. New Ways of Applying Old Tools: Physical Selectors - Case Study (DAS)
Pusker Regmi, Brown and Caldwell

10:50 a.m. New Ways of Applying Old Tools: Modeling Physical Selectors And Hybrid Granule/Floc Systems
Dwight Houweling, Dynamita

11:10 a.m. New Ways of Applying Old Tools: Physical Selectors - Impact on N, P and Microbial Community
Belinda Sturm, University of Kansas

11:30 a.m. Discussion

12:00 p.m. Break for Lunch

Workshop B agenda continues on following page
Conference Workshops

Workshop B: Applying Old and New Tools to Intensify the Future of WW Biofarms

Tuesday, May 21
8:30 a.m. - 5:00 p.m.  Room: 1-BC

0.6 CEUs

Workshop B agenda continued from previous page

1:30 p.m. New Ways of Applying Old Tools: Internal Carbon Storage - Fundamentals
Erik Coats, University of Idaho

1:50 p.m. New Ways of Applying Old Tools: Internal Carbon Storage - Case Study
Ali Gagnon, HRSD

2:10 p.m. New Ways of Applying Old Tools: Internal Carbon Storage - Relationship to N, P and More
George Wells, Northwestern University

2:30 p.m. Discussion

3:00 p.m. Networking and Coffee Break

3:30 p.m. New Tools: Counter Diffusion
Rob Nerenberg, University of Notre Dame

3:50 p.m. New Tools: Synergies Between DAS and MABR
Sylvain Donnaz, Veolia

4:10 p.m. New Tools: DAMO
Jianhua Guo, The University of Queensland

4:30 p.m. Discussion

5:00 p.m. Workshop Adjourns
Workshop C: Exploring the Application and Interpretation of ‘omics Data in Biological Nutrient Removal (BNR)

Tuesday, May 21
8:30 a.m. - 12:00 p.m.  
Room: 1-D  
0.3 CEUs

8:30 a.m.  
Introduction to 'omic Methods  
Jeseth Delgado Vela, Duke University

8:50 a.m.  
Utility Perspectives on Potential Process Insights from 'omic Methods  
Riley Doyle, HRSD; Blythe Layton, Clean Water Services

9:30 a.m.  
Q&A

9:40 a.m.  
Small Group Break Out Activity  
Participants will identify needs and opportunities to apply 'omics to enhance process operations and discuss challenges and roadblocks to implementation. Organizers will go around the room to help facilitate discussion.

10:00 a.m.  
Networking and Coffee Break

10:30 a.m.  
Small Groups Report Out - Facilitated Discussion

10:50 a.m.  
Available Resources: MiDAS  
Nerea Uri Carreño, VCS Denmark

11:05 a.m.  
Lessons Learned and Future Directions
  - GAOs aren't the bad guys after all  
  - George Wells, Northwestern University  
  - Process modeling and ‘omics  
  - Fabrizio Sabba, Black and Veatch; Mckenna Farmer, Northwestern University  
  - Metabolomics and transcriptomics  
  - Erik Coats, University of Idaho  
  - Process Control via Molecular Methods  
  - Eric Redmond, Black and Veatch

11:45 a.m.  
Wrap Up and Q&A

12:00 p.m.  
Workshop Adjourns

(Additional fees apply)
Workshop D: Evolution of Treatment Process Optimization Utilizing Advanced Data Analytics and Machine Learning

Tuesday, May 21
1:30 p.m. - 5:00 p.m.   0.3 CEUs

1:30 p.m. Data Analytics and Data Sources
Alex Fuentes, WSSC Water

1:50 p.m. Applied Machine Learning Digital Platform Applications
Dan Freedman, MWR

2:10 p.m. Data Science Applications for Intelligent Process O&M
John Rickermann, Jacobs

2:30 p.m. Facilitator lead Breakout Activity - Data Usage Roadblocks
Alex Fuentes, WSSC Water; Dan Freedman, MWR; Jeff Prevatt, Pima County; John Rickermann, Jacobs; Tanja Rauch-Williams, MWR

3:00 p.m. Networking and Coffee Break

3:30 p.m. Pima County Case Studies
Jeff Prevatt, Pima County; John Rickermann, Jacobs

4:00 p.m. Metro Water Recoveries Case Study
Tanja Rauch-Williams, Metro Water Recovery

4:30 p.m. Discussion and Q&A
Jeff Prevatt, WSSC Water; John Rickermann, Jacobs; Tanja Rauch-Williams, MWR

5:00 p.m. Workshop Adjourns
OPENING GENERAL SESSION

Opening General Session
Wednesday, May 22, 2024  Room: 2
8:30 a.m. - 10:00 a.m.  1.5 GCHs

8:30 a.m.  Welcome and Introductions - Co-Chairs of ITT
Joe Husband, Arcadis, Conference Co-Chair
Stephanie Klaus, HRSD, Conference Co-Chair
Nerea Uri Carreño, VandCenterSyd, Conference Co-Chair
George Wells, Northwestern University, Conference Co-Chair

8:40 a.m.  WEF Welcome
Rasha Maal-Bared, WEF Community Leadership Council (CLC)

8:50 a.m.  VWEA Welcome

8:55 a.m.  How Regulation (and Money) Drove Technological Advancement in the Chesapeake Bay
Thor Young, GHD

9:25 a.m.  The 2040 Wastewater Utility: Will Decentralization have a Role?
Art Umble, Stantec

9:55 a.m.  Closing Remarks

10:00 a.m.  Session Adjourns for Networking Break
Session 01: Mainstream PNA
Wednesday, May 22, 2024
10:30 a.m. - 12:00 p.m.

10:30 a.m. Facilitator Introduction
Robert Sharp, Hazen and Sawyer; Michael Liu, LACSD

10:35 a.m. A New Strategy to control Nitrite Oxidizing Bacteria (NOB) in the Main Stream Anammox Process using Supernatant from Anaerobic Digester.
Daehwan Rhu; Umesh Ghimire; Amit Kaldate, Tomorrow Water; Shin Joh Kang; Victory Filfi Dsane, Tomorrow Water

10:50 a.m. Nitrification At Elevated Temperatures - Feasibility of Achieving Mainstream Partial Nitrification (PN) By Heat Shocks
Mehran Andalib, Stantec; George Nakhla, University of Western Ontario; Niema Afroze; Art Umble, Stantec

11:05 a.m. Integrating Ion Exchange And Direct/Indirect Bioregeneration via Partial Nitritation/Anammox for Deammonification of Mainstream Wastewater
Sheldon Tarre, Technion; Sheyla Chero-Osorio, University of South Florida; Lin Gao, Samah Abasi, Michal Green, Technion; John Kuhn, Sarina Ergas, University of South Florida

11:20 a.m. Comprehensive Microbial Community Analysis and Mechanistic Insights in Hybrid Ion Exchange and Partial Nitritation/Anammox (IX-PN/A) Process for Mainstream Wastewater Treatment
Leiyu He; Meng Wang, Penn State University

11:35 a.m. Facilitated Discussion

12:00 p.m. Session Adjourns for Luncheon
Session 02: Contaminants of Emerging Concern and PFAS
Wednesday, May 22, 2024
10:30 a.m. - 12:00 p.m.
Room: 1-BC
1.5 PDHs

10:30 a.m. Facilitator Introduction
Guangbin Li, University of Maryland

10:35 a.m. Deep Diving into PFAS Foam Fractionation: A Comparison of Four Technologies to Remove PFAS from Leachate
Fabrizio Sabba, Christian Kassar, Gary Hunter, Leon Downing, Black & Veatch

10:50 a.m. Innovation and Resurgence of Sub and Supercritical Water Oxidation Processes for the Destruction of Contaminants of Emerging Concern
Sudhakar Viswanathan, 374Water; Marc Deshusses, Duke University; Kobe Nagar, 374Water Inc.; Naomi Senehi, University Of California Irvine

11:05 a.m. Optimizing PFAS Removal in Carbon-Based Advanced Water Treatment for Indirect Potable Reuse
Christopher Waller, Erin Bereyso, Germano Salazar-Benites, Christopher Wilson, Charles Bott, HRSD

11:20 a.m. Effective PFAS Removal and Waste Reduction using a Novel Micro-adsorbent Slurry and Separations Technology
Terry Reid, John Dyson, Aqua Aerobic Systems Inc

11:35 a.m. Facilitated Discussion

12:00 p.m. Session Adjourns for Luncheon
Session 03: Low Dissolved Oxygen Processes
Wednesday, May 22, 2024
10:30 a.m. - 12:00 p.m.  1.5 PDHs
Room: 1-D

10:30 a.m. Facilitator Introduction
Erik Coats, University of Idaho; Dana Gonzalez, Carollo Engineers

10:35 a.m. Advancing Low-Energy Biological Nutrient Removal Using Low Dissolved Oxygen Operation
Jose Jimenez, Kayla Bauhs, Mark Miller, Brown and Caldwell; Belinda Sturm, University of Kansas; Megan Wittman; Stephanie Fevig, The Water Research Foundation

10:50 a.m. Testing a Systematic Process and Aeration Control Approach for Transitioning from High to Suboxic DO Operation at the Pomona WRF
Tanja Rauch-Williams, Carollo Engineers; Michelle Young; Thomas Weiland, Philip Ackman, LACSD; Alex Ekster, Ekster & Associates; Steven Kestel, APG Neuros; Sam Reifsnyder, Carollo Engineers

11:05 a.m. Microbial Adaptation to Low DO Biological Nutrient Removal
Lilian McIntosh, Kester McCullough, HRSD; Haley Morgan, Old Dominion University; Alexandria Gagnon, Stephanie Klaus, HRSD; Tanja Rauch-Williams, Carollo Engineers; Peter Vanrolleghem, Université Laval; Charles Bott, HRSD

11:20 a.m. Novel Methods for Determination of Nitrifier Kinetics During Adaptation to Low DO
Kester McCullough, Lilian McIntosh, HRSD; Haley Morgan, Old Dominion University; Alexandria Gagnon, Christopher Wilson, Stephanie Klaus, HRSD; Peter Vanrolleghem, Université Laval; Charles Bott, HRSD

11:35 a.m. Facilitated Discussion

12:00 p.m. Session Adjourns for Luncheon
### TECHNICAL SESSIONS

**Session 04: PdNA Fundamentals**  
Wednesday, May 22, 2024  
1:30 p.m. - 3:00 p.m.  
1.5 PDHs

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 p.m.</td>
<td>Facilitator Introduction</td>
<td>Jacek Makinia, Gdansk University of Technology; Lin Sun, Western University</td>
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<tr>
<td>1:35 p.m.</td>
<td>An Evaluation of Dual Carbon Source Strategies For Denitrification</td>
<td>Chengpeng Lee, Northwestern University; Nam Ngo, DC Water; M.A. Sadikul Islam, University of the District of Columbia; Jacob Hatcher, Rumana Riffat, George Washington University; Hossain Azam, University of the District of Columbia; George Wells, Northwestern University; Haydee De Clippeleir, DC Water</td>
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<tr>
<td>1:50 p.m.</td>
<td>Primary Sludge Fermentate Use for N Removal in Chemical P Removal Plants: Investigation of Side Impacts</td>
<td>Shafkat Islam, The George Washington University; Nam Ngo, DC Water; David Lapidus, Sara Mesa Mendoza, University of the District of Columbia; Bipin Pathak, DC Water; Emilia Kozeracki, The Catholic University of America; Rumana Riffat, George Washington University; Hossain Azam, University of the District of Columbia; Arash Massoudieh, Catholic University of America; Haydee De Clippeleir, DC Water</td>
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<tr>
<td>2:05 p.m.</td>
<td>Cracking The Code of Nitrite Accumulation: Insights into Partial Denitrification Fundamentals</td>
<td>Parin Izadi, Mehran Andalib, Parnian Izadi, Art Umble, Stantec; Rania Hamza, Toronto Metropolitan University</td>
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<td>2:20 p.m.</td>
<td>Mechanistic Understanding of the Kinetic Difference Between the Methanol and Glycerol-Driven Partial Denitrification Anammox in Low Nitrogen Polishing Moving Bed Biofilm Reactors</td>
<td>Jiefu Wang, Virginia Tech; Yewei Sun, Wendell Khunjar, Gregory Pace, Hazen and Sawyer; Michael McGrath, Fairfax County Government; Mujahid Ali; Zhiwu Wang</td>
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<td>2:35 p.m.</td>
<td>Facilitated Discussion</td>
<td></td>
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<tr>
<td>3:00 p.m.</td>
<td>Session Adjourns for Networking Break</td>
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Session 05: Understanding & Optimizing Water Reuse: Advanced Techniques and Case Studies

Wednesday, May 22, 2024
1:30 p.m. - 5:00 p.m.

Room: 1-BC
3 PDHs

Speakers: Raj Chavan, AtkinsRealis; Tanush Wadhawan, Dynamita North America; Edmund Kobylnski; Germano Salazar-Benites, Hannah Stohr, HRSD; Qigang Chang, Advanced Engineering & Environmental Services Inc; Sreerama Murthy Kasi; Gayathri Ram Mohan, Hazen and Sawyer; Wim Audenaert, A.M.-Team

1:30 p.m. Welcome and Introduction

1:40 p.m. SWIFT’s Experiences with Ozone-Biofiltration for Municipal Indirect Reuse

1:55 p.m. Does the Addition of Propan Gas Degrade Contaminants of Emerging Concern in Biofiltration?

2:10 p.m. Triple Bullseye Triumph: One Innovative Barrier “Ozone/Two-Stage Biofiltration” for Organics, Nutrients and CEC Removal in Advanced Water Treatment

2:25 p.m. Design and Optimization of Advanced Oxidation Processes for Drinking Water Production with the AMOZONE Model

2:40 p.m. Panel Discussion

3:00 p.m. Networking and Coffee Break

3:30 p.m. Pretreatment Processes

3:40 p.m. City of Fargo’s Design and Operational Experiences for Industrial Reuse of Secondary Treated Wastewater Using Advanced Filtration

Session 05 agenda continues on following page
Session 05: Understanding & Optimizing Water Reuse: Advanced Techniques and Case Studies

Wednesday, May 22, 2024
Room: 1-BC
1:30 p.m. - 5:00 p.m.   3 PDHs

Session 05 agenda continued from previous page

4:00 p.m. Mass Balancing Tools for Reused Applications and Brine Management

4:20 p.m. Role of Process Modeling in Simulating Reuse Applications

4:40 p.m. Panel Discussion

4:55 p.m. Closing Remarks

5:00 p.m. Session Adjourns for Networking Reception
Session 06: Young Professionals Program
Wednesday, May 22, 2024
1:30 p.m. - 3:00 p.m.
Room: 1-D
1.5 PDHs

Moderators: Mojolaoluwa Ladipo-Obasa, DC Water, Lilian McIntosh, Caitlyn Harris, HRSD; Brett Wagner, AECOM

Speakers: Erik Coats, University of Idaho; Jim McQuarrie, AECOM; Sudhir Murthy, NewHUB; Belinda Strum, Kansas University; Alexandria Gagnon, HRSD; Erik Larson, Vaughan Company; Brett Wagner, AECOM; Naomi Guo, Brown and Cadwell

This session will be a panel discussion focused on professional development and the future of wastewater treatment featuring academic, consultant, and utility perspectives as well as varying levels of expertise and career length.

1:30 p.m. Panel Discussion: Early Career
2:00 p.m. Panel Discussion: Future of Wastewater Treatment
2:30 p.m. Guided Networking
3:00 p.m. Session Adjourns for Networking Break
Session 07:  PdNA Implementation
Wednesday, May 22, 2024
3:30 p.m. - 5:00 p.m.    1.5 PDHs
Room: 1-A

3:30 p.m.  Facilitator Introduction
Mehran Andalib, Stantec; Rahil Fofana, DC Water

3:35 p.m.  HRSD’s Journey to the Full-Scale Implementation of Mainstream Partial Denitrification/Anammox (PdNA) IFAS
Megan Bachmann, HRSD; Nathan Wieczorek, Virginia Tech; Lawrence Cornelius, Stephanie Klaus, Michael Parsons, Charles Bott, HRSD

3:50 p.m.  Insights into the Success of PdN Selection in a Methanol Driven PdNA System
Mojolaoluwa Ladipo-Obasa, The George Washington University; Alexander Seidel, Brown and Caldwell; Chenghua Long, Columbia University; Halil Kurt; Kartik Chandran; Rumana Riffat, George Washington University; Charles Bott, HRSD; Haydee De Clippeleir, DC Water

4:05 p.m.  Insights from 1+ Year of Full-scale Mainstream Deammonification via Partial Nitrification- Denitrification- Anammox
Gregory Pace, Yewei Sun, Hazen and Sawyer; Sajana Chitrakar, Noman M Cole Jr Pollution Control Center; Munshi Rasel, Fairfax County; Wendell Khunjar, Hazen & Sawyer; Michael McGrath, Fairfax County Government

4:20 p.m.  Leveraging Glycerol-Driven and Primary Effluent-Driven Partial Nitrification/Denitrification/Anammox within an Integrated Advanced Water Treatment Facility for Large-Scale Potable Reuse
Yewei Sun, Hazen and Sawyer; Bruce Mansell, Michael Liu, Ariana Coracero, Mojtaba Farrokh Shad, Raymond Tsai, LA County Sanitation Districts; Paul Pitt, Wendell Khunjar, Ron Latimer, Bryce Danker, Yian Sun, Hazen and Sawyer

4:35 p.m.  Facilitated Discussion

5:00 p.m.  Session Adjourns for Networking Reception
MABR is experiencing accelerated adoption due to its ability to offer process intensification in combination with energy savings and potential $N_2O$ mitigation. At the same time, researchers continue to study the fundamentals and new potential applications for this technology. This session will explore these areas in two parts: From theory to modeling to practice, and Emerging applications.

3:30 p.m. **Facilitator Introduction**  
Nerea Uri Carreño, VCS Denmark; Rob Nerenberg, University of Notre Dame

3:35 p.m. **MABRs and their Unique Microbial Communities**  
Alejandro Martin Linares, University of Notre Dame

3:50 p.m. **MABR Modeling Framework**  
Dwight Houweling, Dynamita

4:05 p.m. **MABR for Sidestream Treatment**  
Neri Nathan, Fluence

4:20 p.m. **MABR Integration with Hydrocyclones**  
Jeff Peeters, Veolia

4:35 p.m. **Simultaneous Dissolved Methane and Nitrogen Removal in MABRs**  
Jianhua Guo, University of Queensland

4:40 p.m. **Facilitated Discussion**

5:00 p.m. **Session Adjourns for Networking Reception**
Session 09: Full Scale Optimization Strategies
Thursday, May 23, 2024
8:30 a.m. - 10:00 a.m. 
Room: 1-A
1.5 PDHs

8:30 a.m. Facilitator Introduction
Chris deBarbadillo, Black & Veatch; Thor Young, GHD

8:35 a.m. A Journey of Upgrades and Innovations to Achieve Capacity Improvements at Metro Water Services’ Central WRF
Mark Miller, Jose Jimenez, Kayla Bauhs, Brown and Caldwell; Douglas Yarosz

8:50 a.m. Key Control Concepts to Enable Low Energy, Densified Biological Nutrient Removal
Leon Downing, Black and Veatch

9:05 a.m. Full-scale Application of a Reduced-Order Model to Tune Ammonia-Based Aeration Control
Alexandria Gagnon, Kester McCullough, Jeffrey Nicholson, Charles Bott, HRSD

9:20 a.m. The Next Generation of BNR: A Radical Shift in Operational and Design Strategies
Pusker Regmi, Kayla Bauhs, Brown and Caldwell

9:35 a.m. Technical Brief: Advanced Sand and Grit Mapping and Quantification
Megan Ross, SediVision, LLC

9:40 a.m. Facilitated Discussion

10:00 a.m. Session Adjourns for Networking Break
Session 10: Source-Separation of Toilet Waste as a Viable Option for Resource Recovery in the Water Industry

Thursday, May 23, 2024
8:30 a.m. - 10:00 a.m.  Room: 1-BC  1.5 PDHs

8:30 a.m.  Source Separation to Achieve Resource Efficiency and Demonstration Projects
Nancy Love, University of Michigan

8:50 a.m.  Practical Implementation of Urine Separation at the Community Scale in Brattleboro, Vermont
Jamina Shupack, RichEarth Institute

9:10 a.m.  Technologies that can Facilitate Distributed Wastewater Treatment, Nutrient Recovery, and Onsite Water Reuse
Kim Nace, BrightWater Tools

9:30 a.m.  Facilitated Discussion
Session 11: Greenhouse Gases  
Thursday, May 23, 2024  
Room: 1-D  
8:30 a.m. - 10:00 a.m.  
1.5 PDHs

8:30 a.m. Facilitator Introduction  
Anna Cleaver, AECOM; Nerea Uri Carreño, VCS Denmark

8:35 a.m. Development of a Tiered Approach for Cost-Effectively Measuring Real-time Direct Greenhouse Gas Emissions from Wastewater Treatment  
Ke Du, Seyed Mostafa Mehrdad, Sheng Li, University of Calgary; Bo Zhang, Ardurra

8:50 a.m. Fugitive Methane the Next Frontier in the Fight Against Climate Change  
Trung Le, Brown and Caldwell

9:05 a.m. Hot Spots, Hot Moments: Identifying Key Factors for N₂O Production from Pilot-Scale Testing  
Bishav Bhattarai, Fabrizio Sabba, Francesca Cecconi, Leon Downing, Black & Veatch; Eric Redmond

9:20 a.m. Modeling-Based Development of N₂O Mitigation Strategies in Two Full-Scale Wastewater Treatment Plants  
Jacek Makinia, Mohanad Awad, Politechnika Gdańska/Gdańsk University of Technology; Ewa Zaborowska; Paulina Szulc, Zbyslaw Dymaczewski, Poznan University of Technology

9:35 a.m. Facilitated Discussion

10:00 a.m. Session Adjourns for Networking Break
Session 12: Carbon Management for P Removal  
Thursday, May 23, 2024  
10:30 a.m. - 12:00 p.m.  
Room: 1-A  
1.5 PDHs

10:30 a.m.  Facilitator Introduction  
Mark Miller, Brown and Caldwell; Guangbin Li, University of Maryland

10:35 a.m.  Optimization of EBPR at Full-Scale: Lowering Costs and Improving Effluent Quality  
Riley Doyle, Alexandria Gagnon, Charles Bott, HRSD

10:50 a.m.  Sensitivity Analysis of Anaerobic Zone Mass Fraction and Hydrolysis/Fermentation Rate  
Parnian Izadi, Mehran Andalib, Yuan Fang, Stantec

11:05 a.m.  From Small to Full-Scale: Lessons Learned from S2EBPR Operation in a C-Limited Facility  
Fabrizio Sabba, Black & Veatch; McKenna Farmer, Northwestern University; Zhen Jia; George Wells, Northwestern University; Leon Downing, Black & Veatch

11:20 a.m.  Pilot Testing Algae Treatment for Nutrient Removal and Carbon Capture  
Daniel Rizzuti, GHD Limited; Ian Summerscales; George Godin, GHD, Inc.; Susan Hansler; Ewelina Chojecka, Anna Lacourt, Josh Zhang, Regional Municipality of York; Martin Gross; Paul Simpson, Gross Wen Technologies; Jens Dancer

11:35 a.m.  Facilitated Discussion

12:00 p.m.  Session Adjourns for Luncheon
Session 13: Biosolids and Resource Recovery
Thursday, May 23, 2024
10:30 a.m. - 12:00 p.m.

10:30 a.m. Facilitator Introduction
Raj Chavan, AtkinsRealis

10:35 a.m. Assessment of Diverse End-Products of Innovate Biosolids Management Technologies: Is the Market Ready for New Products?
Christian Evans, SYLVIS Environmental Services; Mark Teshima; Yian Sun, Derya Dursun, Micah Blate, Hazen and Sawyer

10:50 a.m. Phosphorus Sequestration in Biosolids, Nuisance Struvite Control via Aerobic Digestion and Chemical Addition to TH-AD Digestate, and Downstream Effects
Caitlyn Harris, Maya Garcia, Dana Gonzalez, Jeffrey Nicholson, Christopher Wilson, Charles Bott, HRSD

11:05 a.m. Evaluating the Potential for Improving Class A Biosolids Nutrients Ratio and Applications through Vivianite Recovery
Peibo Guo, Brown and Caldwell; Yuan Yan, Cornell University; Nam Ngo, DC Water; April Gu, Cornell University; Haydee De Clippeleir, DC Water; Matthew Reid, Melissa Bollmeyer, Cornell University; Chris Peot, DC Water; Jillian Goldfarb, Cornell University

11:20 a.m. Biomineralisation - Harnessing Novel Microorganisms to Remove Phosphorus from Wastewater whilst Simultaneously Producing Biostruvite
Ajay Nair, Microvi

Alexander Kraemer, Harvest Technology; Steffen Ritterbusch, engineering4environment GmbH

11:40 a.m. Facilitated Discussion

12:00 p.m. Session Adjourns for Luncheon
Session 14: GHG: Emerging Processes and Mitigation Strategies
Thursday, May 23, 2024
10:30 a.m. - 12:00 p.m.
Room: 1-D
1.5 PDHs

10:30 a.m. Facilitator Introduction
Martha Dagnew, Western University; Rasha Maal-Bared, CDM Smith

10:35 a.m. Quantifying Nitrogenous Greenhouse Gas from Emerging Biological Nutrient Removal (BNR) Processes
Gnanaraj Augustine, Ezekiel Johnson, Columbia University; Kartik Chandran

10:50 a.m. Understanding and Mitigating N₂O Emissions in a Sidestream Anammox Reactor, Including Novel Catalyst-Mediated Abatement
Nerea Uri Carreño, Per Nielsen, VCS Denmark; Anna Katrine Vangsgaard, Envidan; Janus Münster-Swendsen, Haldor Topsoe

11:05 a.m. Monitoring N₂O Emissions in the Partial Denitrification Processes in Rope-Type Media Biofilm Reactors
Lin Sun, Western University Canada; Wudneh Shewa; Kevin Bossy; Martha Dagnew, Western University

11:20 a.m. Connecting Greenhouse Gas Emissions to Microbial Community Selection in Low Energy BNR
Megan Wittman, Belinda Sturm, University of Kansas; Kayla Bauhs, Brown and Caldwell; Yasawanth Hiripitiyage, University of Kansas; Mark Miller, Jose Jimenez, Brown and Caldwell

11:35 a.m. Facilitated Discussion

12:00 p.m. Session adjourns for luncheon
Session 15: Carbon Management for N Removal
Thursday, May 23, 2024
1:30 p.m. - 3:00 p.m.

1:30 p.m. Facilitator Introduction
Jeseth Delgado Vela, Duke University; Demi Ladipo-Obasa, DC Water

1:35 p.m. Shedding Light on the Complexities of Internal Carbon Driven Denitrifiers in Biofilm & Floc
Yuan Yan, Cornell University; Megan Bachmann, HRSD; Mathew Baldwin, Cornell University; Stephanie Klaus, Charles Bott, HRSD; April Gu, Cornell University

1:50 p.m. Comparative Strategies in Managing Internal Carbon for Stringent Nutrient Limits: A Study of Two WRRFs
Pusker Regmi, Brown and Caldwell; Caroline Nguyen, Washington Suburban Sanitary Commision; Kayla Bauhs, Brown and Caldwell

2:05 p.m. Post-Anoxic Denitrification via Respiration of Stored Material to Achieve Low TN Discharge Limits
David Wankmuller, Wendell Khunjar, Hazen & Sawyer; Brian Merritt, City of Durham

2:20 p.m. Facilitated Discussion

3:00 p.m. Session adjourns for networking break
Session 16: Digestion
Thursday, May 23, 2024
1:30 p.m. - 3:00 p.m.

Room: 1-BC
1.5 PDHs

1:30 p.m. Facilitator Introduction
Tanja Rauch-Williams, Metro Water Recovery; Jacob Williams, Jacobs

1:35 p.m. Advancing IntensiCarb™ Technology for Anaerobic Digestion Enhancement and Intensification via Scale-Up Piloting
Amr Abdelrahman, Ali Khadir, Western University; Ferenc Házi, Dynamita; Domenico Santoro, USP Technologies; Chris Sheculski, Trojan Technologies; Eunkyung Jang; Ahmed Al-Omari; Katherine Bell, Brown and Caldwell; John Walton, UPS Technologies; Christopher Muller, Brown and Caldwell; George Nakhla, University of Western Ontario; Max Armenta, Brown and Caldwell

1:50 p.m. Anaerobic Digestion Sizing: Venturing Beyond Conventional Organic Loading Rates
Roman Moscoviz, Mathieu Haddad, Maxime Rouez, Delphine Conteau, SUEZ

2:05 p.m. In-house Evaluation of High Strength Wastes for Co-digestion which Strengthen Relationships with Local Contributors
Ornella Sosa-Hernandez, Peter Schauer, Kevin Wegener, Clean Water Services

2:20 p.m. Innovation and the Practical Application of Innovative Technology in Biosolids
Stephanie Fevig, The Water Research Foundation

2:35 p.m. Facilitated Discussion

3:00 p.m. Session Adjourns for Networking Break
### TECHNICAL SESSIONS

**Session 17: Data-Driven Models**  
**Thursday, May 23, 2024**  
**1:30 p.m. - 3:00 p.m.**  
**Room: 1-D**  
**1.5 PDHs**

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<tr>
<td>1:30 p.m.</td>
<td>Facilitator Introduction</td>
<td>Jeffrey Moeller, The Water Research Foundation; Alex Doody, CDM Smith</td>
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<tr>
<td>1:35 p.m.</td>
<td>State of Advanced Process Control and Machine Learning in Wastewater Treatment for Situational Awareness and Optimization</td>
<td>Prabhushankar Chandrasekeran, Arcadis; Ashwin Dhanasekar, The Water Research Foundation</td>
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<td>1:50 p.m.</td>
<td>Challenges of Developing Data-Driven Tools on Controlled Full-Scale Processes: A Case Study on Acoustic Sensor Development for TS Measurement</td>
<td>Nam Ngo, DC Water; Gina Kittleson, University of Michigan Dept of Civil &amp; Env Eng; Shafkat Islam, The George Washington University; Tu Duong, DC Water; Arash Massoudieh, Catholic University of America; Rumana Riffat, George Washington University; Branko Kerkez; Haydee De Clippeleir, DC Water</td>
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<td>2:05 p.m.</td>
<td>Confronting Process Complexity and Data Sparsity: Machine Learning for Modelling a Full-Scale A-Stage process</td>
<td>Ahmed Alsayed, Northwestern University; Nam Ngo, Haydee De Clippeleir, DC Water; Usman Khan; George Wells, Northwestern University</td>
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<td>2:20 p.m.</td>
<td>Data Pipeline</td>
<td>Peter Vanrolleghem, Université Laval</td>
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<td>2:35 p.m.</td>
<td>Facilitated Discussion</td>
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<td>3:00 p.m.</td>
<td>Session Adjourns for Networking Break</td>
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Session 18: Primary Treatment & Process Intensification
Thursday, May 23, 2024
3:30 p.m. - 5:00 p.m.
Room: 1-A
1.5 PDHs

3:30 p.m. Facilitator Introduction
Jim McQuarrie, AECOM; Tom Johnson, Jacobs

3:35 p.m. Evaluation of Advanced Primary Treatment Technologies at Water Resource Recovery Facilities for Carbon Diversion and Management
Onder Caliskaner, Yuanbin Wu, Secil Omeroglu Karabiyik, Evan Martinez, Caliskaner Water Technologies, Inc.; George Tchobanoglous; Brian Davis, Linda County Water District

3:50 p.m. Thickening the Plot - Enhanced Primary Treatment Residuals Handling
Eric Redmond; Caitlin Ruff; Crystal Harness; Robert Williams, Leon Downing, Black & Veatch

4:05 p.m. Intensification of Water Resource Recovery Facilities via Advanced Primary Treatment and Advanced Secondary Treatment Processes
Onder Caliskaner, Yuanbin Wu, Secil Omeroglu Karabiyik, Caliskaner Water Technologies; George Tchobanoglous; Ajay Nair, Microvi; Brian Davis, Linda County Water District; Evan Martinez, Caliskaner Water Technologies, Inc.; Felipe Munoz, Microvi

4:20 p.m. Early Adopters Prove Effectiveness and Resiliency of Latest-Generation Multi-Purpose Filtration
James Fitzpatrick, Black & Veatch; Alexander Szerwinski, Johnson County Wastewater; Walter Collins, Little Rock Water Reclamation Authority; John Dyson, Aqua Aerobic Systems Inc; Nathan White, Black & Veatch

4:35 p.m. Facilitated Discussion

5:00 p.m. Session Adjourns
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<tr>
<td>3:30 p.m.</td>
<td>Facilitator Introduction</td>
<td>Erik Larson, Vaughan Company</td>
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<td>3:35 p.m.</td>
<td>Biological Treatment of Hydrothermal Liquefaction Wastewater from Sewage Sludge with Municipal Wastewater Activated Sludge</td>
<td>Jiefu Wang, Virginia Tech; Zhiwu Wang; Sandeep Kumar; Yi Zheng, Meicen Liu, Kansas State University; Isamu Umeda, Old Dominion University</td>
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<tr>
<td>3:50 p.m.</td>
<td>Effect of Thermal Hydrolysis Pretreatment on the Friability of Thermally-Dried Digested Biosolid Pellets</td>
<td>Dian Zhang, Stantec; Yitao Li, Virginia Tech; Rafael Iboleon; Robin Burch, Louisville &amp; Jefferson County MSD; Zhiwu Wang; Alex Novak, Louisville &amp; Jefferson County MSD</td>
</tr>
<tr>
<td>4:05 p.m.</td>
<td>Filtrate rDON and Ortho-P Control through Coagulant Addition During Dewatering of Thermal Hydrolysis Pretreatment-Enhanced Anaerobic Digester Sludge</td>
<td>Yitao Li, Virginia Tech; Malcolm Taylor, Caroline Nguyen, Washington Suburban Sanitary Commision; John Novak, Virginia Tech; Zhiwu Wang</td>
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<tr>
<td>4:20 p.m.</td>
<td>Aerobic Curing of Thermally Hydrolyzed Sludge at HRSD’s Atlantic Treatment Plant to Create a Low-Odor, High-Value Product and Reduce Truck Traffic</td>
<td>Dana Gonzalez, Jeffrey Nicholson, Christopher Wilson, Charles Bott, HRSD</td>
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<td>4:35 p.m.</td>
<td>Facilitated Discussion</td>
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Environmental and financial challenges, including stricter effluent permits, aging infrastructure, or an aging workforce, are pushing utilities to adopt innovative practices and technologies. Moreover, technological advances, including those made possible by new digital tools, are making their way into the wastewater industry faster than ever before.

In this session, we will explore the challenges and opportunities brought by innovation and how water utilities make the most of it. Participants will hear from an array of experts ranging from academia to industry and utilities.

- Introduction - status, drivers, and challenges
- Innovation in wastewater - what does the future hold?
- Bringing innovation to practice - how technology suppliers/consulting firms bring innovations from ideas to products
- Bringing innovation to practice - how progressive utilities have adopted and implemented innovation in their organizations perspectives: trends, drivers, challenges, opportunities and examples from our industry.

3:30 p.m. Facilitator Introduction
Joe Husband, Arcadis, George Wells, Northwestern University

3:35 p.m. Academic Perspective
Nancy Love, University of Michigan

3:50 p.m. Sponsor/DOE Perspective
Mark Philbrick, US Department of Energy

4:05 p.m. Company/Technology Vendor Perspective
Wim Audenaert, AM-Team

4:20 p.m. Utility Perspective
Nerea Uri Carreño, VCS Denmark; Shelby Creeley, HRSD

4:35 p.m. Facilitated Discussion

5:00 p.m. Session Adjourns
Session 21: Modeling for Process Optimization
Friday, May 24, 2024
8:30 a.m. - 10:00 a.m. 1.5 PDHs
Room: 1-A

8:30 a.m. Facilitator Introduction
Phil Ackman, Los Angeles Co. Sanitation District; Brett Wagner, AECOM

8:35 a.m. Innovative Design and Optimization Tool – Applying CFD to Achieve Optimal Design
Arthur Xu, Hany Gerges, HDR Inc

8:50 a.m. Biofilm Carrier Migration Model using Diffusional Resistance Impact on Half Saturation Constants - Conceptual Improvement Needs
Eugenio Giraldo; Sudhir Murthy, NEWhub Corp

9:05 a.m. Predicting Primary Clarifier Performance with Empirical and Machine Learning Models
Nicholas Guho, Carollo

9:20 a.m. Utilizing Model Predictive Control to Maximize Aeration System Efficiency
Steven Kestel, APG Neuros

9:35 a.m. Facilitated Discussion

10:00 a.m. Session Adjourns for Networking Break
Session 22: Anammox Technologies
Friday, May 24, 2024
8:30 a.m. - 10:00 a.m.  Room: 1-BC  1.5 PDHs

8:30 a.m.  Facilitator Introduction
Wendell Khunjar, Hazen and Sawyer; George Wells, Northwestern University

8:35 a.m.  Full-Scale Side by Side Evaluation of DEMON 1.0 vs DEMON 2.0 Design and Operation
Bipin Pathak, Miguel Miranda, Shawna Martinelli, Nam Ngo, Nicholas Passarelli, DC Water; Bernhard Wett; Haydee De Clippeleir, DC Water

8:50 a.m.  Nitritation over Nitrification in Sidestream Treatment with MABR — A Starting Point to Complete TN Removal Process
Neri Nathan, Yuval Nevo, Ronen Shechter, Fluence

9:05 a.m.  New Strategy for Integration of Anaerobic Side-stream Reactor with Mainstream B-stage Nitritation for Short-cut Nitrogen Removal with Granulation
Zijun Meng, Yuan Yan, Yuang Li, Kenneth Wu, April Gu, Cornell University

9:20 a.m.  Removal of Total Nitrogen by Innovative Anammox Biocatalyst
Savanna Smith, NC State University; Nikolaus Hlavacek; Ajay Nair, Microvi; Ameen Razavi; Fatemeh Shirazi

Soklida Hong, Hazen and Sawyer; Mari Winkler, University of Washington; Zhiwu Wang; Ramesh Goel, University of Utah

9:40 a.m.  Facilitated Discussion

10:00 a.m.  Session Adjourns for Networking Break
Session 23: Hydrocyclone Applications at Full-Scale Facilities
Friday, May 24, 2024
8:30 a.m. - 10:00 a.m.

8:30 a.m. Facilitator Introduction
Patrick O’Donnell, INVENT Environmental; Alex Doody, CDM Smith

8:35 a.m. Elucidating the Influence of Activated Sludge Particle Size Distribution on Settling and Nutrient Removal Properties of Full-scale DAS
Rudy Maltos, Metro Water Recovery; Anna Scopp; Wendell Khunjar, Hazen & Sawyer; Tanja Rauch-Williams, Daniel Freedman, Liam Cavanaugh, Metro Water Recovery; Ryan Priest, Alonso Griborio, Alyssa Mayer, Haley Noteboom, Ron Latimer, Hazen and Sawyer

8:50 a.m. Fishing for Nitrification and Excess Biological Phosphorus Removal in Cold Weather with Densification Process-Controlling Densified Sludge Functionality
Mike Hunter, Stantec; Julian Xheko; Esmond Tang, Opyr Lukian, Parnian Izadi, Mehran Andalib, Stantec; Dagny Sanche, EPCOR Water Services; Ranveer Katyal, Stantec; Saif Molla, EPCOR Water Services; Sudhir Murthy, NEWhub Corp

9:05 a.m. Sludge Settleability Improvements and SRT Decoupling Associated with Full-Scale Densification of BNR Activated Sludge
Eric Staunton, CDM Smith; Anjana Kadava, Doug Nolkemper, Johnson County Wastewater; Alexandra Doody; Sarah Stewart, CDM Smith

9:20 a.m. Effect of Hydrocyclones on the Morphology and Microbial Community of Activated Sludge Flocs
Robert Nerenberg; Cason Wilburn, University of Notre Dame; Niclas Astrand, Veolia Water Technologies & Solutions

9:35 a.m. Facilitated Discussion

10:00 a.m. Session Adjourns for Networking Break
Session 24:  Digital Twins
Friday, May 24, 2024
10:15 a.m. - 11:45 a.m.     1.5 PDHs

10:15 a.m.  Facilitator Introduction
Bruce Johnson, Jacobs; Nam Ngo, DC Water

10:20 a.m.  Reliable Insights based on Scarce Data – Innovative WRRF Hybrid Digital-Twins
Leiv Rieger, Heather Stewart, Cheng Yang, Jacobs; Keaton Lesnik, Maia Analytica; Joshua Registe, Jacobs; Ivan Miletic, inCTRL Solutions Inc.; Adrienne Menniti; Bruce Johnson, Jacobs

10:35 a.m.  Leveraging a Hybrid Machine Learning/Mechanistic Process Model to Forecast Effluent Quality and Optimize Treatment Performance
Leon Downing, Patrick Dunlap, Isaac Avila, Fabrizio Sabba, Black & Veatch

10:50 a.m.  Realizing the Beneficial Integration of Upstream Non-Sewer Sanitation Implementation on Downstream Wastewater Treatment through a Digital-Twin Platform Approach
Liron Friedman, Columbia University; Kartik Chandran

11:05 a.m.  Development and Validation of a Wastewater Treatment Process (WWTP) Hybrid Modeling Framework Integrated with Artificial Intelligence Algorithms
Sudhir Kshirsagar, Global Quality Corp.; Barbara Lence, Vannary Seng, University Of British Columbia; Pavan Saranguhewa, Global Quality Corp

11:20 a.m.  Facilitated Discussion

11:45 a.m.  Conference Adjourns
Session 25: Optimizing High Purity Oxygen Processes for Nutrient Removal
Friday, May 24, 2024
10:15 a.m. - 11:45 a.m.
1.5 PDHs

10:15 a.m. Introduction, Overview & Interactive Audience Participation
JB Neethling, HDR Inc.

10:20 a.m. Fundamentals and Modeling HPO Bioreactors for N Removal. SRT, Temperature, pH, Alkalinity, CO$_2$(aq), Venting, etc. Adjustment Required to Simulators for HPO
Michael Stenstrom, University of California Los Angeles

10:35 a.m. Equipment Upgrades for HPO Generation, Dissolution/Spargers, Venting, etc. Options, Energy, etc.
Daniel Gay, Dwg Associates

10:50 a.m. Nutrient Removal Using HPO-LE Process LACSD Case Study
Bryce Danker, Hazen and Sawyer, Patricia Hsia, LA County Sanitation District

11:05 a.m. Interactive Audience Participation
JB Neethling, HDR Inc.

11:10 a.m. Process Optimization for N Removal in HPO WRRF Treating Hot Industrial Wastewater Case Study
Daniel Hingley, HDR Inc.

11:25 a.m. Cedar Rapids. Asset Renewal with N&P Removal at Industrial Dominant HPO. New Aerobic Granular Sludge Seeding to Air AS. Case Study
Eric Evans, HDR Inc.

11:40 a.m. Open Discussion

11:45 a.m. Conference Adjourns
Session 26: Densification
Friday, May 24, 2024
10:15 a.m. - 11:45 a.m.          Room: 1-D
1.5 PDHs

10:15 a.m. Facilitator Introduction
Brandt Miller, Hazen and Sawyer; Paul Wood, LAN

10:20 a.m. Intense from Day 1: Startup and Optimization of the
Largest Municipal BioMag Facility in the Country
Craig Ashcroft, Carollo Engineers; Erin Andersen; Tyler
Richards, City of Logan; Tim Lindsay; Tim Lindemann;
Richard Liebhaber

10:35 a.m. Selection and Evaluation of Emerging MOB Technology
for Ammonia Removal
Mahsa Mehrdad; Jacob Metch; Sean McKelvey, Emily
vanAssendelft, Philadelphia Water Department

10:50 a.m. MBR-DAS – Densification Improves MBR Performance at
the City of Detroit
Chris Shaw, Hui Guo, Sylvain Donnaz, Sheila Fyfe, Veolia;
Susan Danzl; Jeff Peeters, Veolia

11:05 a.m. Getting a Grip on AGS Waste Solids: Settleability and
Phosphorus Release Potential
Eric Evans, HDR; Abby Kigin; Ronald Sova, Dillon Devitt,
HDR; Matthew Thompson; Ashley Geesman

11:20 a.m. Technical Brief: Predicting Densification Index/SVI with
Design Curve from
Datasets Correlations of Full-scale Membrane Systems
Hui Guo, Sylvain Donnaz, Veolia; Dwight Houweling,
Dynamita North America Inc.; Niclas Astrand, Chris Shaw,
Veolia

11:25 a.m. Facilitated Discussion

11:45 a.m. Conference Adjourns
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<td>Los Angeles Co. Sanitation Dist.</td>
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<td>Ahmed Alsayed</td>
<td>Northwestern University</td>
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<td>Mehran Andalib</td>
<td>Stantec</td>
<td>Presenter Session 01, 23, Facilitator Session 07</td>
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<td>Craig Ashcroft</td>
<td>Carollo Engineers</td>
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<td>Niclas Astrand</td>
<td>Veolia Water Technologies &amp; Solutions</td>
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<td>Virginia Tech and HRSD</td>
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Monday, May 20

12:30 p.m. - 5:00 p.m. Facility Tour A

Tuesday, May 21

7:30 a.m. - 5:00 p.m. Registration
8:30 a.m. - 5:00 p.m. Workshop A, Workshop B
8:30 a.m. - 12:00 p.m. Workshop C
1:30 p.m. - 5:00 p.m. Workshop D

Wednesday, May 22

7:30 a.m. - 5:00 p.m. Registration
8:30 a.m. - 10:00 a.m. Opening General Session
10:30 a.m. - 12:00 p.m. Technical Sessions 1, 2, 3
12:00 p.m. - 1:30 p.m. Networking Luncheon
1:30 p.m. - 3:00 p.m. Technical Sessions 4, 6
1:30 p.m. - 5:00 p.m. Technical Session 5
3:30 p.m. - 5:00 p.m. Technical Sessions 7, 8
5:00 p.m. - 6:30 p.m. Networking Reception

Thursday, May 23

8:00 a.m. - 5:00 p.m. Registration
8:30 a.m. - 10:00 a.m. Technical Sessions 9, 10, 11
10:30 a.m. - 12:00 p.m. Technical Sessions 12, 13, 14
12:00 p.m. - 1:30 p.m. Networking Luncheon
1:30 p.m. - 3:00 p.m. Technical Sessions 15, 16, 17
3:30 p.m. - 5:00 p.m. Technical Sessions 18, 19, 20

Friday, May 24

8:00 a.m. - 11:45 a.m. Registration
8:30 a.m. - 10:00 a.m. Technical Sessions 21, 22, 23
10:15 a.m. - 11:45 a.m. Technical Sessions 24, 25, 26
11:45 a.m. Conference Adjourns
UPCOMING WEF EVENTS

Residuals and Biosolids Conference
June 18-21, 2024
Oklahoma City, OK
www.wef.org/ResidualsBiosolids

Circular Water Economy Summit
July 15-17, 2024
Dallas, TX
http://www.wef.org/CWEsummit

WEFTEC
October 5-9, 2024
New Orleans, LA
www.weftec.org

WEF/AWWA Utility Management Conference
February 11-14, 2025
Dallas, TX
www.wef.org/utilitymanagement
Register Now for WEF’s Integrated Leadership Webcast Series (ILWS)

This online, self-paced leadership course provides water professionals from around the world access to professional development and networking in one place. Register by June 24th to refine your leadership skills and participate in discussions with your peers while gaining access to the pre-recorded webcasts from the Water Leadership Institute. WEF members save $50 on registration.

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