CONFERENCE PROGRAM

wef Education & Training Events

2024 INNOVATIONS IN TREATMENT TECHNOLOGY CONFERENCE

May 21-24, 2024 | Virginia Beach, VA

#TreatmentTechConf

wef.org/TreatmentTech

weftec® 2024
the water quality event™

The must-attend annual meeting of the worldwide water community

LEADING THE FUTURE OF WATER

WEFTEC.ORG

WEFTEC2024
NEW ORLEANS, LOUISIANA, USA
CONFERENCE: Oct. 5–9, 2024
EXHIBITION: Oct. 7–9, 2024
New Orleans Morial Convention Center

WEF Innovations in Treatment Technology Conference

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

www.wef.org/TreatmentTech

This conference is hosted by the Water Environment Federation, in cooperation with the Virginia Water Environment Association.

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 whore 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

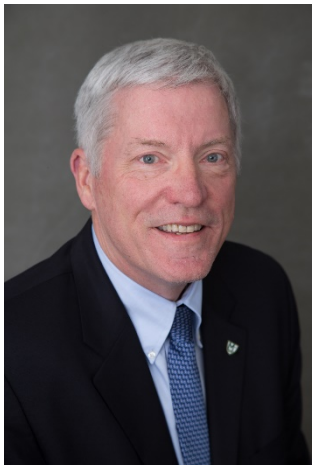
Stephanie Klaus, HRSD

Nerea Uri Carreño, VandCenterSyd

George Wells, Northwestern University

TABLE OF CONTENTS

CONFERENCE COMMITTEES



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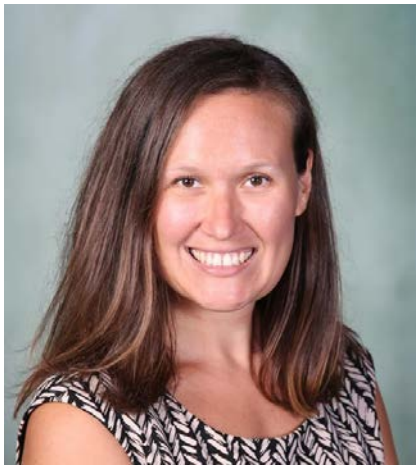

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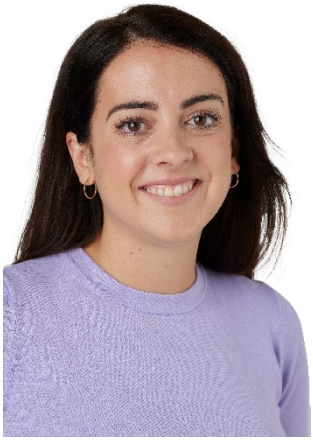

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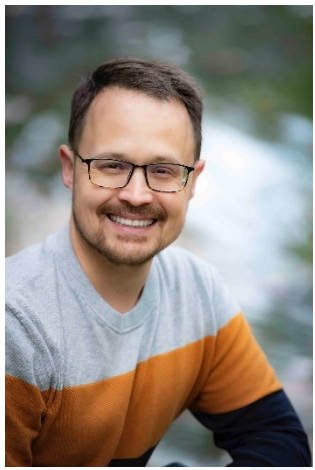

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COMMUNITY MEETINGS

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 *Sessions 1 through 8	7:45 a.m. – 8:15 a.m.
Thursday, May 23 – Suite 5 *Sessions 9 through 26	7:45 a.m. – 8:15 a.m.

CODE OF CONDUCT

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.

WEF Events Code of Conduct

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.

WEF Member Code of Conduct

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.

RECEPTIONS AND MEAL FUNCTIONS

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.

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

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.

CONTINUING EDUCATION

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 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.

SPONSORS

We would like to thank the following sponsoring companies for their contributions to the conference and program.

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

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https://invent-uv.com/
OPENING GENERAL SESSION

SESSIONS-AT-A-GLANCE

Number	Title	Start Time	End Time	CE Credits
Monday, May 20				
Tour A	HRSD's Nansemond Treatment Plant and SWIFT Research Center	12:30 p.m.	5:00 p.m.	4.5 GCHs
Tuesday, May 21				
Workshop A	On Suspension Separation	8:30 a.m.	5:00 p.m.	0.6 CEUs
Workshop B	Applying Old and New Tools to Intensify the Future of WW Biofarms	8:30 a.m.	5:00 p.m.	0.6 CEUs
Workshop C	Exploring the Application and Interpretation of 'omics Data in Biological Nutrient Removal (BNR)	8:30 a.m.	12:00 p.m.	0.3 CEUs
Workshop D	Evolution of Treatment Process Optimization Utilizing Advanced Data Analytics and Machine Learning	1:30 p.m.	5:00 p.m.	0.3 CEUs
Wednesday, May 22				
OGS	Opening General Session	8:30 a.m.	10:00 a.m.	1.5 GCHs
Session 01	Mainstream PNA	10:30 a.m.	12:00 p.m.	1.5 PDHs
Session 02	Contaminants of Emerging Concern and PFAS	10:30 a.m.	12:00 p.m.	1.5 PDHs
Session 03	Low Dissolved Oxygen Processes	10:30 a.m.	12:00 p.m.	1.5 PDHs
Session 04	PdNA Fundamentals	1:30 p.m.	3:00 p.m.	1.5 PDHs
Session 05	Understanding & Optimizing Water Reuse: Advanced Techniques and Case Studies	1:30 p.m.	5:00 p.m.	3.0 PDHs
Session 06	Young Professionals Program	1:30 p.m.	3:00 p.m.	1.5 PDHs
Session 07	PdNA Implementation	3:30 p.m.	5:00 p.m.	1.5 PDHs
Session 08	Membrane Aerated Biofilm Reactor - From Theory to Modeling to Practice & Emerging Applications	3:30 p.m.	5:00 p.m.	1.5 PDHs

SESSIONS-AT-A-GLANCE

Number	Title	Start Time	End Time	CE Credits
Thursday, May 23				
Session 09	Full Scale Optimization Strategies	8:30 a.m.	10:00 a.m.	1.5 PDHs
Session 10	Source-Separation of Toilet Waste as a Viable Option for Resource Recovery in the Water Industry	8:30 a.m.	10:00 a.m.	1.5 PDHs
Session 11	Greenhouse Gases	8:30 a.m.	10:00 a.m.	1.5 PDHs
Session 12	Carbon Management for P Removal	10:30 a.m.	12:00 p.m.	1.5 PDHs
Session 13	Biosolids and Resource Recovery	10:30 a.m.	12:00 p.m.	1.5 PDHs
Session 14	GHG: Emerging Processes and Mitigation Strategies	10:30 a.m.	12:00 p.m.	1.5 PDHs
Session 15	Carbon Management for N Removal	1:30 p.m.	3:00 p.m.	1.5 PDHs
Session 16	Digestion	1:30 p.m.	3:00 p.m.	1.5 PDHs
Session 17	Data-Driven Models	1:30 p.m.	3:00 p.m.	1.5 PDHs
Session 18	Primary Treatment & Process Intensification	3:30 p.m.	5:00 p.m.	1.5 PDHs
Session 19	Thermal Hydrolysis Process	3:30 p.m.	5:00 p.m.	1.5 PDHs
Session 20	Transforming Wastewater Utilities: A Journey into Innovative Practices	3:30 p.m.	5:00 p.m.	1.5 PDHs
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

FACILITY TOUR

(Additional fees apply)

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.

PRE-CONFERENCE WORKSHOPS

(Additional fees apply)

Workshop A: On Suspension Separation
Tuesday, May 21 **Room: 1-A**
8:30 a.m. - 5:00 p.m. **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

PRE-CONFERENCE WORKSHOPS

(Additional fees apply)

Workshop A: On Suspension Separation
Tuesday, May 21 **Room: 1-A**
8:30 a.m. – 5:00 p.m. **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**

PRE-CONFERENCE WORKSHOPS

(Additional fees apply)

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

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

(Additional fees apply)

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

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

PRE-CONFERENCE WORKSHOPS

(Additional fees apply)

Workshop C: Exploring the Application and Interpretation of 'omics Data in Biological Nutrient Removal (BNR)

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

TECHNICAL SESSIONS

Session 01: Mainstream PNA
Wednesday, May 22, 2024 **Room: 1-A**
10:30 a.m. - 12:00 p.m. **1.5 PDHs**

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 **Room: 1-BC**
10:30 a.m. - 12:00 p.m. **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 **Room: 1-D**
10:30 a.m. - 12:00 p.m. **1.5 PDHs**

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**

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

1:30 p.m. **Facilitator Introduction**
Jacek Mąkinia, Gdansk University of Technology; Lin Sun, Western University

1:35 p.m. **An Evaluation of Dual Carbon Source Strategies For Denitrification**
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

1:50 p.m. **Primary Sludge Fermentate Use for N Removal in Chemical P Removal Plants: Investigation of Side Impacts**
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

2:05 p.m. **Cracking The Code of Nitrite Accumulation: Insights into Partial Denitrification Fundamentals**
Parin Izadi, Mehran Andalib, Parnian Izadi, Art Umble, Stantec; Rania Hamza, Toronto Metropolitan University

2:20 p.m. **Mechanistic Understanding of the Kinetic Difference Between the Methanol and Glycerol-Driven Partial Denitrification Anammox in Low Nitrogen Polishing Moving Bed Biofilm Reactors**
Jiefu Wang, Virginia Tech; Yewei Sun, Wendell Khunjar, Gregory Pace, Hazen and Sawyer; Michael McGrath, Fairfax County Government; Mujahid Ali; Zhiwu Wang

2:35 p.m. **Facilitated Discussion**

3:00 p.m. **Session Adjourns for Networking Break**

TECHNICAL SESSIONS

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**

Speakers: Raj Chavan, AtkinsRealis; Tanush Wadhawan, Dynamita North America; Edmund Kobylinski; 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. **Netoworking 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 **Room: 1-D**
1:30 p.m. - 3:00 p.m. **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 **Room: 1-A**
3:30 p.m. - 5:00 p.m. **1.5 PDHs**

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**

Session 08: Membrane Aerated Biofilm Reactor – From Theory to Modeling to Practice & Emerging Applications

Wednesday, May 22, 2024 **Room: 1-D**

3:30 p.m. - 5:00 p.m. **1.5 PDHs**

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 Communitites**
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 **Room: 1-A**
8:30 a.m. - 10:00 a.m. **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 **Room: 1-BC**

8:30 a.m. - 10:00 a.m. **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**

TECHNICAL SESSIONS

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 N_2O 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 N_2O 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 **Room: 1-A**
10:30 a.m. - 12:00 p.m. **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 **Room: 1-BC**
10:30 a.m. - 12:00 p.m. **1.5 PDHs**

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

11:35 a.m. **Technical Brief: Design and Performance Evaluation of Active Solar-Assisted Biosolids Drying with Decentralized Thermal Recovery System**
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 **Room: 1-D**
10:30 a.m. - 12:00 p.m. **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 Mtigating N_2O 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 N_2O 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; Yasawantha 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 **Room: 1-A**
1:30 p.m. - 3:00 p.m. **1.5 PDHs**

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 **Room: 1-BC**
1:30 p.m. - 3:00 p.m. **1.5 PDHs**

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

1:35 p.m. **Advancing IntensiCarbTM 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**

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

1:30 p.m. **Facilitator Introduction**
Jeffrey Moeller, The Water Research Foundation; Alex Doody, CDM Smith

1:35 p.m. **State of Advanced Process Control and Machine Learning in Wastewater Treatment for Situational Awareness and Optimization**
Prabhushankar Chandrasekeran, Arcadis; Ashwin Dhanasekar, The Water Research Foundation

1:50 p.m. **Challenges of Developing Data-Driven Tools on Controlled Full-Scale Processes: A Case Study on Acoustic Sensor Development for TS Measurement**
Nam Ngo, DC Water; Gina Kittleson, University of Michigan Dept of Civil & 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

2:05 p.m. **Confronting Process Complexity and Data Sparsity: Machine Learning for Modelling a Full-Scale A-Stage process**
Ahmed Alsayed, Northwestern University; Nam Ngo, Haydee De Clippeleir, DC Water; Usman Khan; George Wells, Northwestern University

2:20 p.m. **Data Pipeline**
Peter Vanrolleghem, Université Laval

2:35 p.m. **Facilitated Discussion**

3:00 p.m. **Session Adjourns for Networking Break**

Session 18: Primary Treatment & Process Intensification
Thursday, May 23, 2024 **Room: 1-A**
3:30 p.m. - 5:00 p.m. **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**

Session 19: Thermal Hydrolysis Process
Thursday, May 23, 2024 **Room: 1-BC**
3:30 p.m. - 5:00 p.m. **1.5 PDHs**

3:30 p.m. **Facilitator Introduction**
Erik Larson, Vaughan Company

3:35 p.m. **Biological Treatment of Hydrothermal Liquefaction Wastewater from Sewage Sludge with Municipal Wastewater Activated Sludge**
Jiefu Wang, Virginia Tech; Zhiwu Wang; Sandeep Kumar; Yi Zheng, Meicen Liu, Kansas State University; Isamu Umeda, Old Dominion University

3:50 p.m. **Effect of Thermal Hydrolysis Pretreatment on the Friability of Thermally-Dried Digested Biosolid Pellets**
Dian Zhang, Stantec; Yitao Li, Virginia Tech; Rafael Iboleon; Robin Burch, Louisville & Jefferson County MSD; Zhiwu Wang; Alex Novak, Louisville & Jefferson County MSD

4:05 p.m. **Filtrate rDON and Ortho-P Control through Coagulant Addition During Dewatering of Thermal Hydrolysis Pretreatment-Enhanced Anaerobic Digester Sludge**
Yitao Li, Virginia Tech; Malcolm Taylor, Caroline Nguyen, Washington Suburban Sanitary Commision; John Novak, Virginia Tech; Zhiwu Wang

4:20 p.m. **Aerobic Curing of Thermally Hydrolyzed Sludge at HRSD's Atlantic Treatment Plant to Create a Low-Odor, High-Value Product and Reduce Truck Traffic**
Dana Gonzalez, Jeffrey Nicholson, Christopher Wilson, Charles Bott, HRSD

4:35 p.m. **Facilitated Discussion**

5:00 p.m. **Session Adjourns**

Session 20: Transforming Wastewater Utilities: A Journey into Innovative Practices

Thursday, May 23, 2024 **Room: 1-D**

3:30 p.m. - 5:00 p.m. **1.5 PDHs**

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 organizationsperspectives: 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 **Room: 1-A**
8:30 a.m. - 10:00 a.m. **1.5 PDHs**

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 **Room: 1-BC**
8:30 a.m. - 10:00 a.m. **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

9:35 a.m. **Technical Brief: Successful Implementation of Biofilm Anammox in IFAS A2O Process for Simultaneous N and P Removal in Mainstream Treatment Train**
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 **Room: 1-D**
8:30 a.m. - 10:00 a.m. **1.5 PDHs**

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 **Room: 1-A**
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 **Room: 1-BC**

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 **Room: 1-D**
10:15 a.m. - 11:45 a.m. **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**

PRESENTER-FACILITATOR DIRECTORY

Phil Ackman
Los Angeles Co. Sanitation Dist.
Facilitator Session 21

Ahmed Alsayed
Northwestern University
Presenter Session 17

Mehran Andalib
Stantec
Presenter Session 01, 23, Facilitator Session 07

Maxwell Armenta
Brown and Caldwell
Presenter Session 16

Craig Ashcroft
Carollo Engineers
Presenter Session 26

Niclas Astrand
Veolia Water Technologies & Solutions
Presenter Session 08

Wim Audenaert
AM-Team
Presenter Session 05

Gnanaraj Augustine
Columbia University
Presenter Session 14

Isaac Avila
Black & Veatch
Presenter Session 24

Megan Bachmann
Virginia Tech and HRSD
Presenter Session 07

Bishav Bhattarai
Black & Veatch
Presenter Session 11

Micah Blate
Hazen and Sawyer
Presenter Session 13

Charles Bott
HRSD
Presenter Workshop A

Onder Caliskaner
Caliskaner Water Technologies
Presenter Session 18

Prabhu Chandrasekeran
Arcadis
Presenter Session 17

Qigang Chang
Advanced Engineering & Environmental Services Inc.
Presenter Session 05

Prithviraj Chavan
AtkinsRealis
Coordinator Session 05, Facilitator Session 13

Anna Cleaver
AECOM
Facilitator Session 11

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University of Idaho
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Jacobs
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Martha Dagnew
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Duke University
Coordinator Workshop C, Facilitator Session 15

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Veolia Water Technologies & Solutions
Presenter Workshop B, Session 26

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CDM Smith
Facilitator Session 17, 23

Leon Downing
Black & Veatch
Presenter Session 09

Riley Doyle
HRSD
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Victory Fiifi Dsane
Tomorrow Water
Presenter Session 01

Sarina Ergas
University of South Florida
Presenter Session 01

Eric Evans
HDR
Presenter Session 25

Yuan Fang
Stantec
Presenter Session 12

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The Water Research Foundation
Presenter Session 16

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Black & Veatch
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Metro Water Recovery
Presenter Workshop D

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Columbia University
Presenter Session 24

Rahil Fofana
DC Water
Facilitator Session 07

Alex Fuentes
WSSC Water
Presenter Workshop D

Alexandria Gagnon
HRSD
Presenter Session 09

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Dwg Associates
Presenter Session 25

Ashley Geesman
City of Ames, IA
Presenter Session 26

Eugenio Giraldo
Presenter Session 21

Dana Gonzalez
Carollo Engineers
Presenter Session 19, Facilitator Session 03

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Cornell University
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Peibo Guo
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Suez
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Caitlyn Harris
HRSD
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Leiyu He
the College of Mineral and Earth Science-Penn State University
Presenter Session 01

Barry Heffernan
Presenter Session 08

Daniel Hingley
HDR
Presenter Session 25

Soklida Hong
Hazen and Sawyer
Presenter Session 22

Dwight Houweling
Dynamita
Coordinator Session 08, Facilitator Session 05

Patricia Hsia
Los Angeles County Sanitation District
Presenter Session 25

Joseph Husband
Arcadis
Presenter Session 20

Shafkat Islam
George Washington University
Presenter Session 04

Parin Izadi
Stantec Consulting Ltd.
Presenter Session 04

Jose Jimenez
Brown and Caldwell
Presenter Session 03

Bruce Johnson
Jacobs
Presenter Session 24

Tom Johnson
Jacobs
Presenter Workshop A**,** Workshop B, Facilitator Session 18

Sreerama Murthy Kasi
Olsson
Presenter Session 05

Steven Kestel
APG Neuros
Presenter Session 21

David Kinnear
Kinnear Engineering
Coordinator Workshop A

Stephanie Klaus
HRSD
Presenter Workshop B**,** Session 20

Edmund Kobylinski
Olsson
Presenter Session 05

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Presenter Session 24

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Facilitator Session 22

Mojolaoluwa Ladipo-Obasa
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Coordinator Session 06, Presenter Session 07, Facilitator Session 15

Erik Larson
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Facilitator Session 19

Blythe Layton
Clean Water Services
Presenter Workshop C

Trung Le
Brown and Caldwell
Presenter Session 11

Chengpeng Lee
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Presenter Session 04

Guangbin Li
University of Maryland
Facilitator Session 02, 12

Yitao Li
Virginia Tech
Presenter Session 19

Michael Liu
LACSD
Facilitator Session 01

Nancy Love
University of Michigan
Presenter Session 06, 10

Rasha Maal-Bared
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Jacek Mąkinia
Gdansk University of Technology
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Metro Water Recovery
Coordinator Workshop B, Presenter Session 23

Alejandro Martin-Linares
University of Notre Dame
Presenter Session 08

Kester McCullough
Universite Laval / HRSD
Presenter Session 03

Lilian McIntosh
HRSD
Presenter Session 03

James McQuarrie
AECOM
Presenter Workshop B, Facilitator Session 18

Seyed Mostafa Mehrdad
University of Calgary
Presenter Session 11

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Presenter Session 26

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Clean Water Services
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Brandt Miller
Hazen and Sawyer
Facilitator Session 26

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Brown and Caldwell
Presenter Workshop A, Session 09, Facilitator Session 12

Jeffrey Moeller
The Water Research Foundation
Facilitator Session 17

Sudhir Murthy
NEWhub Corp
Presenter Workshop A

Kim Nace
Brightwater Tools
Coordinator Session 10

Ajay Nair
Microvi
Presenter Session 13

Neri Nathan
Fluence
Presenter Session 08, 22

JB Neethling
HDR
Coordinator Session 25

Robert Nerenberg
University of Notre Dame
Presenter Workshop B, Session 08

Nam Ngo
DC Water
Presenter Workshop A, Session 17, Facilitator Session 24

Patrick O'Donnell
INVENT Environmental
Facilitator Session 23

Gregory Pace
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DC Water
Presenter Session 22

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Pima County RWRD
Coordinator Workshop D

Gayathri Ram Mohan
Hazen and Sawyer
Presenter Session 05

Tanja Rauch-Williams
Carollo Engineers
Presenter Workshop D, Session 03, Facilitator Session 16

Eric Redmond
Black & Veatch
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Pusker Regmi
Brown and Caldwell
Presenter Workshop A, Workshop B, Session 09, 15

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Aqua-Aerobic Systems Inc.
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John Rickermann
Jacobs
Presenter Workshop D

Daniel Rizzuti
GHD Limited
Presenter Session 12

Megan Ross
SediVision, LLC
Presenter Session 09

Fabrizio Sabba
Black & Veatch
Presenter Session 02, 12

Germano Salazar-Benites
HRSD
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Robert Sharp
Hazen and Sawyer
Facilitator Session 01

Jamina Shupack
Rich Earth Institute
Presenter Session 10

Savanna Smith
North Carolina State University
Presenter Session 22

Ornella Sosa-Hernandez
Clean Water Services
Presenter Session 16

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CDM Smith
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Hannah Stohr
Virginia Tech
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University of Kansas
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Yewei Sun
Hazen and Sawyer
Presenter Session 07

Lin Sun
Western University
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Matthew Thompson
HDR
Presenter Session 26

Nerea Uri Carreño
VCS Denmark
Presenter Workshop B, Workshop C, Session 08, 14, 20, Facilitator Session 11

Peter Vanrolleghem
modelEAU - Université Laval
Presenter Workshop A, Session 17

Sudhakar Viswanathan
374Water
Presenter Session 02

Tanush Wadhawan
Dynamita
Presenter Session 05

Brett Wagner
AECOM
Facilitator Session 21

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Hazen and Sawyer
Presenter Session 04, 19

David Wankmuller
Hazen and Sawyer
Presenter Session 15

George Wells
Northwestern University
Presenter Workshop C, Session 20,
Facilitator Session 22

Cason Wilburn
University of Notre Dame
Presenter Session 23

Jacob Williams
Jacobs
Facilitator Session 16

Paul Wood
LAN
Facilitator Session 26

Arthur Xu
HDR
Presenter Session 21

Yuan Yan
Cornell University
Presenter Session 15

Thor Young
GHD
Facilitator Session 09

CONFERENCE SCHEDULE-AT-A-GLANCE

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

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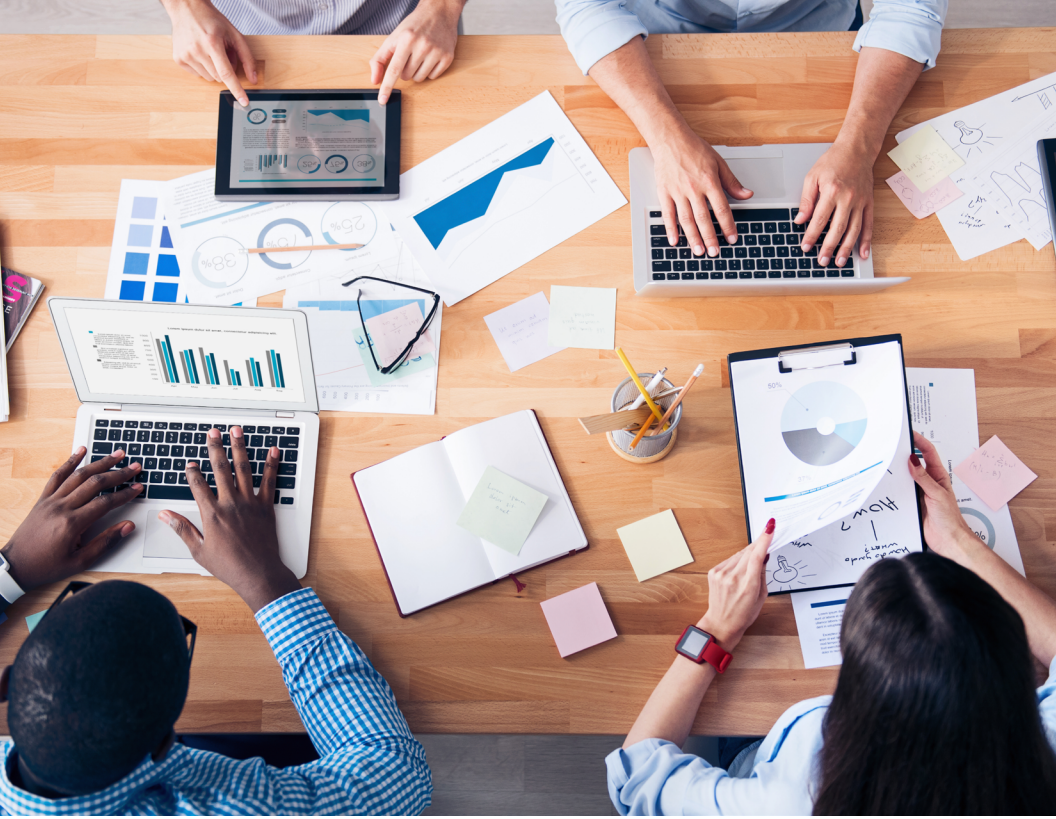

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