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wef Education & Training Events

WEF Innovations in Treatment Technology
May 21-24, 2024
Virginia Beach Convention Center
Virginia Beach, VA

www.wef.org/TreatmentTech

Technical Program

(last updated April 11, 2024)

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wef Education & Training Events

Pre-Conference events (additional registration required):

Tour: HRSD's Nansemond Treatment Plant and SWIFT Research Center
Workshop A: On Suspension Separation
Workshop B: Applying Old and New Tools to Intensify the Future of WW Biofarms
Workshop C: Exploring the application and interpretation of 'omics data in Biological Nutrient Removal (BNR)
Workshop D: Evolution of Treatment Process Optimization Utilizing Advanced Data Analytics and Machine Learning

Conference Technical Sessions (included with full conference registration):

Mainstream PNA
- A New Strategy to control Nitrite Oxidizing Bacteria (NOB) in the Main Stream Anammox Process using Supernatant from Anaerobic Digester.
- Nitrification At Elevated Temperatures- Feasibility of Achieving Mainstream Partial Nitrification (PN) By Heat Shocks
- Integrating Ion Exchange And Direct/Indirect Bioregeneration via Partial Nitritation/Anammox for Deammonification of Mainstream Wastewater
- Comprehensive Microbial Community Analysis and Mechanistic Insights in Hybri
- Ion Exchange and Partial Nitritation/Anammox (IX-PN/A) Process for Mainstream Wastewater Treatment

Contaminants of Emerging Concern and PFAS
- Deep Diving into PFAS Foam Fractionation: A Comparison of Four Technologies to Remove PFAS from Leachate
- Innovation and Resurgence of Sub and Supercritical Water Oxidation Processes for the Destruction of Contaminants of Emerging Concern
- Optimizing PFAS Removal in Carbon-Based Advanced Water Treatment for Indirect Potable Reuse
- Effective PFAS Removal and Waste Reduction using a Novel Micro-adsorbent Slurry and Separations Technology

Low Dissolved Oxygen Processes
- Advancing Low-Energy Biological Nutrient Removal Using Low Dissolved Oxygen Operation
- Testing a Systematic Process and Aeration Control Approach for Transitioning from High to Suboxic DO Operation at the Pomona WRF
- Microbial Adaptation to Low DO Biological Nutrient Removal
- Novel Methods for Determination of Nitrifier Kinetics During Adaptation to Low DO

PdNA Fundamentals
- An Evaluation of Dual Carbon Source Strategies For Denitrification
- Primary Sludge Fermentate Use for N Removal in Chemical P Removal Plants: Investigation of Side Impacts
- Cracking The Code of Nitrite Accumulation: Insights into Partial Denitrification Fundamentals
- Mechanistic Understanding of the Kinetic Difference Between the Methanol and Glycerol-Driven Partial Denitrification Anammox in Low Nitrogen Polishing Moving Bed Biofilm Reactors

Understanding & Optimizing Water Reuse
- SWIFT's experiences with ozone-biofiltration for municipal indirect reuse
- Does the Addition of Propan Gas Degrade Contaminants of Emerging Concern in Biofiltration?
- Triple Bullseye Triumph: One innovative barrier "Ozone/Two-Stage Biofiltration" for Organics, Nutrients and CEC removal in Advanced Water Treatment
- Design and optimization of Advanced Oxidation Processes for drinking water production with the AMOZONE model
- City of Fargo's design and operational experiences for industrial reuse of secondary treated wastewater using advanced filtration
- Mass balancing tools for reused applications and brine management
- Role of process modeling in simulatin reuse applications

PdNA Implementation
- HRSD's Journey to the Full-Scale Implementation of Mainstream Partial Denitrification/Anammox (PdNA) IFAS
- Insights into the Success of PdN Selection in a Methanol Driven PdNA System
- Insights from 1+ Year of Full-scale Mainstream Deammonification via Partial Nitrification-Denitrification-Anammox
- Leveraging Glycerol-Driven and Primary Effluent-Driven Partial Nitrification/Denitrification/Anammox within an Integrated Advanced Water Treatment Facility for Large-Scale Potable Reuse

Membrane Aerated Biofilm Reactor — From Theory to Modeling to Practice & Emerging Applications

Full Scale Optimization Strategies
- A Journey of Upgrades and Innovations to Achieve Capacity Improvements at Metro Water Services' Central WRF
- Key Control Concepts to Enable Low Energy, Densified Biological Nutrient Removal
- Full-scale Application of a Reduced-Order Model to Tune Ammonia-Based Aeration Control
- The Next Generation of BNR: A Radical Shift in Operational and Design Strategies
- Technical Brief: Advanced Sand and Grit Mapping and Quantification

Source-Separation of Toilet Waste as a Viable Option for Resource Recovery in the Water Industry
- Source Separation to Achieve Resource Efficiency and Demonstration Projects
- Practical Implementation of Urine Separation at the Community Scale in Brattleboro, Vermont
- Technologies that can Facilitate Distributed Wastewater Treatment, Nutrient Recovery, and Onsite Water Reuse

Greenhouse Gases
- Development of a Tiered Approach for Cost-Effectively Measuring Real-time Direct Greenhouse Gas Emissions from Wastewater Treatment
- Fugitive Methane the Next Frontier in the Fight Against Climate change
- Hot Spots, Hot Moments: Identifying Key Factors for N2O Production from Pilot-Scale Testing
- Modeling-Based Development of N2O Mitigation Strategies in Two Full-Scale Wastewater Treatment Plants

Carbon Management for P Removal
- Optimization of EBPR at Full-Scale: Lowering Costs and Improving Effluent Quality
- Sensitivity Analysis of Anaerobic Zone Mass Fraction and Hydrolysis/Fermentation Rate
- From Small to Full-Scale: Lessons Learned from S2EBPR Operation in a C-Limited Facility
- Pilot Testing Algae Treatment for Nutrient Removal and Carbon Capture

Biosolids and Resource Recovery
- Assessment of Diverse End-Products of Innovate Biosolids Management Technologies: Is the Market Ready for New Products?
- Phosphorus Sequestration in Biosolids, Nuisance Struvite Control via Aerobic Digestion and Chemical Addition to TH-AD Digestate, and Downstream Effects
- Evaluating the Potential for Improving Class A Biosolids Nutrients Ratio and Applications through Vivianite Recovery
- Biomineralisation - Harnessing Novel Microorganisms to Remove Phosphorus from Wastewater whilst Simultaneously Producing Biostruvite
- Technical Brief: Design and Performance Evaluation of Active Solar-Assisted Biosolids Drying with Decentralized Thermal Recovery System

GHG: Emerging Processes and Mitigation Strategies
- Quantifying Nitrogenous Greenhouse Gas from Emerging Biological Nutrient Removal (BNR) Processes
- Understanding and Mtigating N_2O Emissions in a Sidestream Anammox Reactor, Including Novel Catalyst-Mediated Abatement
- Monitoring N_2O Emissions in the Partial Denitrification Processes in Rope-Type Media Biofilm Reactors
- Connecting Greenhouse Gas Emissions to Microbial Community Selection in Low Energy BNR

Carbon Management for N Removal
- Shedding Light on the Complexities of Internal Carbon Driven Denitrifiers in Biofilm & Floc
- Comparative Strategies in Managing Internal Carbon for Stringent Nutrient Limits: A Study of Two WRRFs
- Post-Anoxic Denitrification via Respiration of Stored Material to Achieve Low TN Discharge Limits
- The Recognition of Enhanced Organic Matter Detection and Pollutants through the Combination of Fluorescence Real Time Sensing and AI

Digestion
- Advancing IntensiCarbTM Technology for Anaerobic Digestion Enhancement and Intensification via Scale-Up Piloting
- Anaerobic Digestion Sizing: Venturing Beyond Conventional Organic Loading Rates
- In-house Evaluation of High Strength Wastes for Co-digestion which Strengthen Relationships with Local Contributors
- Innovation and the Practical Application of Innovative Technology in Biosolids

Data-Driven Models
- State of Advanced Process Control and Machine Learning in wastewater treatment for situational awareness and optimization
- Challenges of Developing Data-Driven Tools on Controlled Full-Scale Processes: A Case Study on Acoustic Sensor Development for TS Measurement
- Confronting Process Complexity and Data Sparsity: Machine Learning for Modelling a Full-Scale A-Stage process
- Data Pipeline

Primary Treatment & Process Intensification
- Evaluation of Advanced Primary Treatment Technologies at Water Resource Recovery Facilities for Carbon Diversion and Management
- Thickening the Plot - Enhanced Primary Treatment Residuals Handling
- Intensification of Water Resource Recovery Facilities via Advanced Primary Treatment and Advanced Secondary Treatment Processes
- Early Adopters Prove Effectiveness and Resiliency of Latest-Generation Multi-Purpose Filtration

Thermal Hydrolysis Process
- Biological Treatment of Hydrothermal Liquefaction Wastewater from Sewage Sludge with Municipal Wastewater Activated Sludge
- Effect of Thermal Hydrolysis Pretreatment on the Friability of Thermally-Dried Digested Biosolid Pellets
- Filtrate rDON and Ortho-P Control through Coagulant Addition During Dewatering of Thermal Hydrolysis Pretreatment-Enhanced Anaerobic Digester Sludge
- Aerobic Curing of Thermally Hydrolyzed Sludge at HRSD's Atlantic Treatment Plant to Create a Low-Odor, High-Value Product and Reduce Truck Traffic

Transforming Wastewater Utilities: A Journey into Innovative Practices

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 can water utilities make the most out of it. Participants will hear from an array of experts ranging from academia, industry or utility companies, and from a wide range of

Modeling for Process Optimization
- Innovative Design and Optimization Tool — Applying CFD to Achieve Optimal Design
- Biofilm Carrier Migration Model using Diffusional Resistance Impact on Half Saturation Constants - Conceptual Improvement Needs
- Predicting Primary Clarifier Performance with Empirical and Machine Learning Models
- Utilizing Model Predictive Control to Maximize Aeration System Efficiency

Anammox Technologies
- Full-Scale Side by Side Evaluation of DEMON 1.0 vs DEMON 2.0 Design and Operation
- Nitritation over Nitrification in Sidestream Treatment with MABR — A Starting Point to Complete TN Removal Process
- New Strategy for Integration of Anaerobic Side-stream Reactor with Mainstream B-stage Nitritation for Short-cut Nitrogen Removal with Granulation
- Removal of Total Nitrogen by Innovative Anammox Biocatalyst
- Technical Brief: Successful Implementation of Biofilm Anammox in IFAS A2O Process for Simultaneous N and P Removal in Mainstream Treatment Train

Hydrocyclone Applications at Full-Scale Facilities
- Elucidating the Influence of Activated Sludge Particle Size Distribution on Settling and Nutrient Removal Properties of Full-scale DAS
- Fishing for Nitrification and Excess Biological Phosphorus Removal in Cold Weather with Densification Process-Controlling Densified Sludge Functionality
- Sludge Settleability Improvements and SRT Decoupling Associated with Full-Scale Densification of BNR Activated Sludge
- Effect of Hydrocyclones on the Morphology and Microbial Community of Activated Sludge Flocs

Digital Twins
- Reliable Insights based on Scarce Data — Innovative WRRF Hybrid Digital-Twins
- Leveraging a Hybrid Machine Learning/Mechanistic Process Model to Forecast Effluent Quality and Optimize Treatment Performance
- Realizing the Beneficial Integration of Upstream Non-Sewer Sanitation Implementation on Downstream Wastewater Treatment through a Digital-Twin Platform Approach
- Development and Validation of a Wastewater Treatment Process (WWTP) Hybrid Modeling Framework Integrated with Artificial Intelligence Algorithms

Optimizing High Purity Oxygen Processes for Nutrient Removal

This session will cover topics such as fundamentals for hpoas and nutrient reduction, modeling and implementing n removal in HPO AS, EBMUD nitrogen reduction to reduce tn discharge by 30%, nitrogen reduction using alternative technologies at PWD, asset replacement / aging infrastructure, asset renewal at Cedar Rapids, and Hopewell Water Renewal (HWR).

Densification
- Intense from Day 1: Startup and Optimization of the Largest Municipal BioMag Facility in the Country
- Selection and Evaluation of Emerging MOB Technology for Ammonia Removal
- MBR-DAS — Densification Improves MBR Performance at the City of Detroit
- Getting a Grip on AGS Waste Solids: Settleability and Phosphorus Release Potential
- Technical Brief: Predicting Densification Index/SVI with Design Curve from

For the most detailed, up-to-date version of the conference program, please view the full program online at www.wef.org/treatmenttech

Pre-conference 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 this.***

Pre-conference Workshops
Additional fees apply

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

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 Boxed Lunches**

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**

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 pm 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
8:30 a.m. – 5:00 p.m.

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 Boxed Lunches**

Workshop B agenda continues on following page

Pre-conference Workshops
Additional fees apply

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.

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
8:30 a.m. – 12:00 p.m.

Speakers: Adrienne Menniti; Erik Coats, University of Idaho; Blythe Layton, Clean Water Services; Riley Doyle; Leon Downing, Black and Veatch; Nerea Uri, VCS Denmark; George Wells, Northwestern University; Jeseth Delgado Vela, Duke University

8:30 a.m. **Introduction to 'omic methods**

8:50 a.m. **Utility perspectives on potential process insights from 'omic methods**

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, IMG/JGI**

11:05 a.m. **Lessons learned and future directions**
-GAOs aren't the bad guys after all
-Process modeling and 'omics
-Metabolomics and transcriptomics
-Process Control via Molecular Methods

11:45 a.m. **Wrap up and Q&A**

12:00 p.m. **Workshop Adjourns**

Pre-conference Workshops
Additional fees apply

Workshop D: 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.

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
Wednesday, May 22, 2024
8:30 a.m. - 10:00 a.m.

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**

10:00 a.m. **End of Session**

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

10:30 a.m. **Facilitator Introduction**

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.

10:30 a.m. **Facilitator Introduction**

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.

10:30 a.m. **Facilitator Introduction**

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
1:30 p.m. - 3:00 p.m.

1:30 p.m. **Facilitator Introduction**

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**

Session 05: Understanding & Optimizing Water Reuse: Advanced Techniques and Case Studies
Wednesday, May 22, 2024
1:30 p.m. - 5:00 p.m.

Speakers: Prithviraj Chavan, Atkins; Tanush Wadhawan, Dynamita North America; Edmund Kobylinski; Germano Salazar-Benites, Hampton Roads Sanitation District (HRSD); Qigang Chang, Advanced Engineering & Environmental Services Inc; Sreerama Murthy Kasi; Gayathri Ram Mohan, Hazen and Sawyer; Hannah Stohr, HRSD; 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**

4:00 p.m. **Mass balancing tools for reused applications and brine management**

4:20 p.m. **Role of process modeling in simulatin 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.

More information coming soon.

Session 07: PdNA Implementation
Wednesday, May 22, 2024
3:30 p.m. - 5:00 p.m.

3:30 p.m. **Facilitator Introduction**

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
3:30 p.m. - 5:00 p.m.

Speakers: Dwight Houweling, Dynamita North America Inc.; Neri Nathan, Fluence; Barry Heffernan; Jeff Peeters, Veolia Water Technologies & Solutions; Timothy Constantine; Nerea Uri, VCS Denmark; Robert Nerenberg; Niclas Astrand, Veolia Water Technologies; Alejandro Martin-Linares, University of Notre Dame

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.

(1) From theory to modeling to practice. What makes MABR unique and how it can be modeled. This will be followed by a practitioner perspective of how MABR technology is being used today to deliver value for utilities. This includes process configurations, value propositions, and key learnings from full-scale and research interests, such as the fate of N_2O.

(2) Emerging Applications. Experts from the three leading MABR technology suppliers will provide their perspectives on new applications for MABR, including sidestream treatment, coupling with other intensification solutions, and synergies with hydrogen production.

Session 09: Full Scale Optimization Strategies
Thursday, May 23, 2024
8:30 a.m. - 10:00 a.m.

8:30 a.m. **Facilitator Introduction**

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.

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

8:30 a.m. **Facilitator Introduction**

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

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.

10:30 a.m. **Facilitator Introduction**

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

10:30 a.m. **Facilitator Introduction**

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, 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
10:30 a.m. - 12:00 p.m.

10:30 a.m. **Facilitator Introduction**

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 Carreno, 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
1:30 p.m. - 3:00 p.m.

1:30 p.m. **Facilitator Introduction**

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. **The Recognition of Enhanced Organic Matter Detection and Pollutants through the Combination of Fluorescence Real Time Sensing and AI**
Hila Korach-Rechtman, Anne-Li Steutel-Maron, Kando

2:35 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.

1:30 p.m. **Facilitator Introduction**

1:35 p.m. **Advancing IntensiCarbTM Technology for Anaerobic Digestion Enhancement and Intensification via Scale-Up Piloting**
Amr Abdelrahman, Western University; 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

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
1:30 p.m. - 3:00 p.m.

1:30 p.m. **Facilitator Introduction**

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
3:30 p.m. - 5:00 p.m.

3:30 p.m. **Facilitator Introduction**

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
3:30 p.m. - 5:00 p.m.

3:30 p.m. **Facilitator Introduction**

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
3:30 p.m. - 5:00 p.m.

Speakers: Nerea Uri, VCS Denmark; Stephanie Klaus, HRSD; George Wells, Northwestern University; Joseph Husband, Arcadis

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 can water utilities make the most out of it. Participants will hear from an array of experts ranging from academia, industry or utility companies.

- 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.

Session 21: Modeling for Process Optimization
Friday, May 24, 2024
8:30 a.m. - 10:00 a.m.

8:30 a.m. **Facilitator Introduction**

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.

8:30 a.m. **Facilitator Introduction**

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

8:30 a.m. **Facilitator Introduction**

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, Carollo Engineers; 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.

10:15 a.m. **Facilitator Introduction**

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, saac 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.

Nitrogen (N) can be removed in High Purity Oxygen activated sludge (HPOAS) processes. This session presents HPOAS and air activated sludge process differences impacting N reduction. A full-scale case study of a HPO Ludzack-Ettinger process at LACSD demonstrated significant N removal. An implementation of a parallel aerobic granular sludge (AGS) and seeding HPO process to reduce N in industrial wastewater in Cedar Rapids is anticipated to improve settleability and nitrification in the HPO process. Incorporating nitrifying MBBR and denitrification in an industrial (high temperature and hazardous air pollutants in HPO plant. Higher efficiency equipment for asset replacement and renewal. Include interactive sessions for audience participation.

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.

10:15 a.m. **Facilitator Introduction**

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, Veolia Water Technologies & Solutions; Sylvain Donnaz; Sheila Fyfe, Veolia Water Technologies & Solutions; Susan Danzl; Jeff Peeters, Veolia Water Technologies & Solutions

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, Veolia; Sylvain Donnaz, Veolia; Dwight Houweling, Dynamita North America Inc.; Niclas Astrand, Veolia; Chris Shaw, Veolia

11:25 a.m. **Facilitated Discussion**

11:45 a.m. **Conference adjourns**