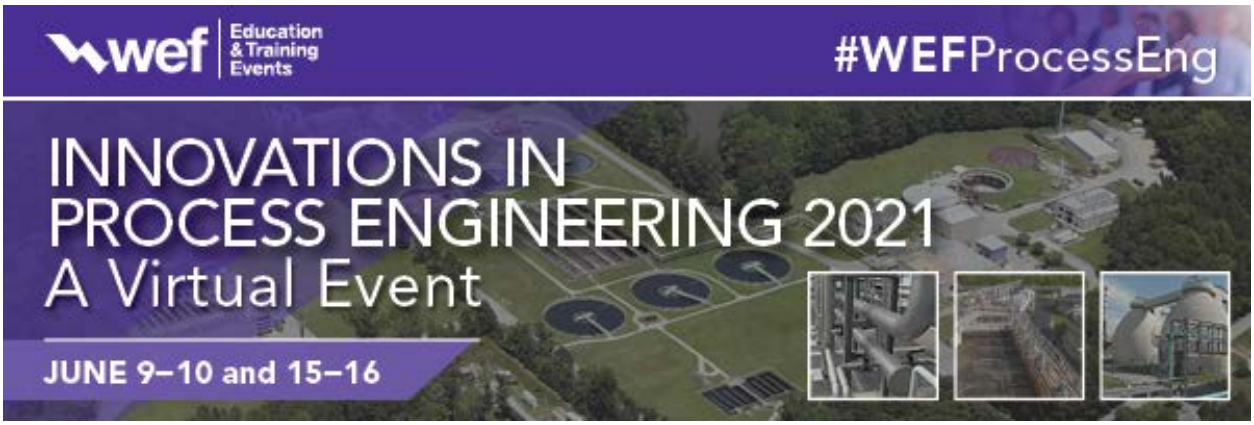
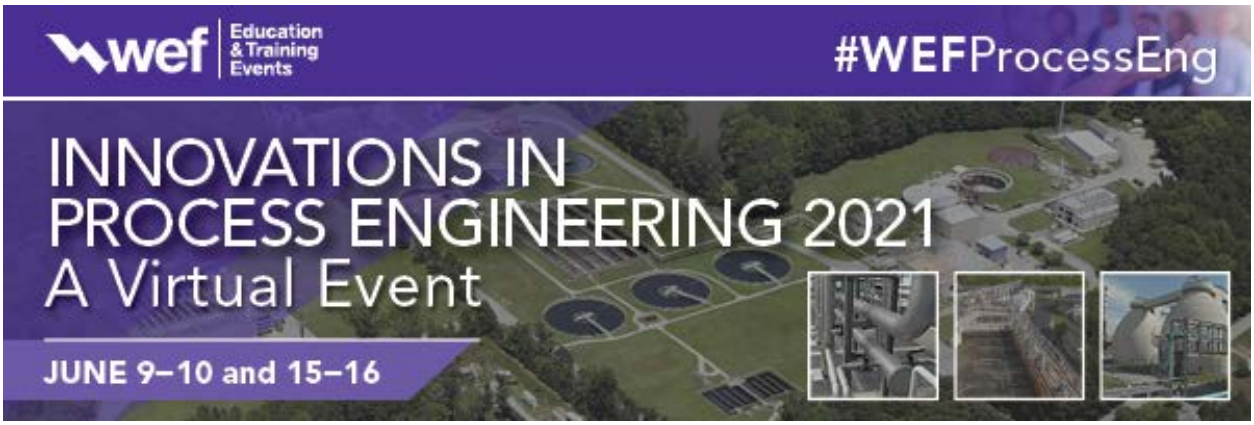


Innovations in Process Engineering 2021: A Virtual Event

Technical Program

(Updated May 26, 2021)

Virtual Event
June 9-10 and June 15-16, 2021



General Virtual Event Information

The Innovations in Process Engineering 2021 Virtual Event will be held online on an interactive platform where you'll gain access to ten Technical Sessions as well as a Technology Spotlight, Company Demos and Networking Opportunities as a part of this first-time virtual event.

Technical sessions are comprised of back-to-back, quick, and high-level presentations pre-recorded by each speaker, followed by a live roundtable facilitated discussion filling the remaining time. Real-time questions from attendees will be encouraged, and informal networking throughout each of the four days of the virtual event will be available for continued one-on-one and small group conversations.

Attendees should join these technical sessions from a device that can use Zoom.

More information about Company Demos, Technology Spotlights, and Networking Opportunities is coming soon!

Sponsors

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

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Pre-Conference Workshop

(Additional fees apply)

Machine Learning in the Water Industry
June 8, 2021
1:00 p.m. – 4:00 p.m. ET (UTC -4)

Katya Bilyk, Hazen and Sawyer; Erika Bailey, Raleigh Water; Alexandra Gagnon, HRSD; Kathryn Newhart, Denver Metro Wastewater Reclamation District; Abigail Antolovich, Denver Water; Jeffrey Sparks, HRSD

In conventional modeling for water and wastewater treatment processes, mechanistic models are constructed from known relationships about fluid dynamics, thermodynamics, chemistry, and biology. While this approach has served the water sector for decades for design purposes, the precision of mechanistic models alone is rarely sufficient for real-time process control due to the variation of full-scale treatment. To model nonideal process behavior, data-driven modeling approaches can be used. Machine learning (ML) identifies patterns in seemingly unrelated datasets without the need for prerequisite knowledge of how a process operates. Due to the flexibility of ML, it has become a key component of monitoring and control in many process industries. However, implementation at water and wastewater treatment facilities has lagged due to a lack of understanding of how these methods could be integrated into a control schema. This session will focus on introducing participants to the basics of ML, examples of ML in water and wastewater treatment, and a discussion on implementation given existing digital infrastructure.

More information about this workshop is coming soon!

Wednesday, June 9, 2021

Opening General Session
Wednesday, June 9, 2021, 11:00 a.m. – 12:00 p.m. ET (UTC -4)

Please save the time in your calendar. Final agenda to be confirmed soon.

Company Demo
Wednesday, June 9, 2021, 12:00 p.m. – 12:30 p.m. ET (UTC -4)
Sponsoring companies demonstrate the latest products, resources and problem-solvers with live chat Q&A

12:00 p.m. **Garbage In / Garbage Out - Keys to Specifying Computational Fluid Dynamics (CFD) Inputs for Successful Projects**
Presented by: Vaughan Company

12:15 p.m. **World Water Works – Change the Pace of Innovation in the Water Industry**
Presented by: World Water Works

Wednesday, June 9, 2021

Session 1: MABR
Wednesday, June 9, 2021, 1:00 p.m. - 2:00 p.m. ET (UTC -4)

1:00 p.m. **Welcome and Introduction from the Session Moderators**
Tim Constantine, Jacobs; Martha Dagnew, Western University

1:03 p.m. **Advancing Resource Recovery Using Hybrid Membrane Aerated Biofilm Reactor Processes**
Glen Daigger, Avery Carlson, Huanqi He, Brett Wagner, Cheng Yang, University of Michigan

1:10 p.m. **Eliminating N2O Emissions to Zero: ZeeLung MABR Shows the Way**
Dwight Houweling, SUEZ Water Technologies & Solutions; Nerea Uri Carreo, Vandcenter Syd; Moreno di Pofi, Sven Baumgarten, Daniel Coutts, Giuseppe Guglielmi, Jeff Peeters, SUEZ Water Technologies & Solutions

1:17 p.m. **Insights on MABR Performance through Multivariate Analysis of Operational Data from the Full-Scale Demonstration at the Ejby Mølle WRRF**
Nerea Uri Carreo, Vandcenter Syd; Per Nielsen, VCS Denmark; Tim Constantine, Jacobs; Krist Gernaey, Department of Chemical and Biochemical Engineering, Technical University of Denmark. Lyngby (Denmark; Xavier Flores-Alsina, Department of Chemical and Biochemical Engineering, Technical University of Denmark. Lyngby (Denmark)

1:24 p.m. **Sidestream Deammonification MABR Development and Performance in Bench-Scale Reactor Treating Anaerobic Digester Dewatering Centrate**
Bryce Figdore, HDR; Michael Liu, Eric Krikorian, LA County Sanitation District; Matt Reeve, Jeff Peeters, SUEZ Water Technologies & Solutions

1:31 p.m. **ZeeNAMMOX™: Cracking the Code on Resilient and Cost-effective Side-stream Nitrogen Removal**
Zebo Long, Suez WTS; Leon Downing, Black & Veatch; Dwight Houweling, SUEZ Water Technologies & Solutions; John Ireland, Suez WTS; Jeff Peeters, Daniel Coutts, Reeve, SUEZ Water Technologies & Solutions

1:38 p.m. **Facilitated Discussion**

Wednesday, June 9, 2021

Session 2: PDNA
Wednesday, June 9, 2021, 2:30 p.m. - 3:30 p.m. ET (UTC -4)

2:30 p.m. **Welcome and Introduction from the Session Moderators**
Leon Downing, Black & Veatch; Paul Wood, Lockwood, Andrews & Newnam, Inc.

2:33 p.m. **The Theoretical Benefits of Mainstream Shortcut Nitrogen Removal Revisited and Validated by Full-scale Implementation of Partial Denitrification-Anammox**
Kester McCullough, Cornell University / HRSD; Stephanie Klaus, Michael Parsons, Charles Bott, HRSD

2:40 p.m. **Optimizing and Validating Mainstream Partial Denitrification-Anammox (PdNA) in Deep-Bed Polishing Filters: Assessment of Media Type and Carbon Source**
Rahil Fofana, DC Water; Megan Bachmann, HRSD; Benay Akyon, Xylem; Kimberly Jones, Jeseth Delgado Vela, Howard University; Stephanie Klaus, Michael Parsons, Charles Bott, HRSD; Christine DeBarbadillo, Haydee De Clippeleir, DC Water & Sewer Authority

2:47 p.m. **Application of Partial Nitrification, Denitrification-Anaerobic Ammonia Oxidation for Nitrogen Removal at WRRFs**
Wendell Khunjar, Hazen and Sawyer

2:54 p.m. **Mainstream Anammox Implementation in MBBRs: Journey from Pilot-Scale PNA to Full-scale PdNA Design**
Stephanie Klaus, Sarah Schoepflin, Justin Macmanus, Michael Parsons, Charles Bott, HRSD

3:01 p.m. **Optimization of Fermentate-Based Pre-Anoxic Partial Denitrification-Anammox (PdNA) Applications**
Nicole Forney, George Washington University; Mojolaoluwa Ladipo-Obasa, DC Water; Rumana Riffat, George Washington University; Bernhard Wett, ARAconsult; Charles Bott, HRSD; Christine DeBarbadillo, Haydee De Clippeleir, DC Water & Sewer Authority

3:08 p.m. **Facilitated Discussion**

Thursday, June 10, 2021

Session 3: Intensification
Thursday, June 10, 2021, 11:00 a.m. - 12:00 p.m. ET (UTC -4)

11:00 a.m. **Welcome and Introduction from the Session Moderators**
Glen Daigger, University of Michigan; Belinda Sturm, University of Kansas

11:03 a.m. **Mobile Organic Biofilm (MOB) Process: Biofilm and Suspended-Growth Synergies Expand Treatment Capacity without Extensive Modifications to Existing Infrastructure**
Joshua Boltz, Arizona State University; Glen Daigger, University of Michigan; Mari Winkler, University of Washington; Jason Calhoun, NUVODA; Stephany Wei, John Andrews Carter, University of Washington

11:10 a.m. **Long-Term Performance of Pilot-Scale Aerobic Granular Sludge at the Noman M. Cole Pollution Control Plant**
Gregory Pace, Wendell Khunjar, Hazen and Sawyer; Kendra Sveum, Donohue & Associates; Ankit Pathak, Virginia Polytechnic Institiute and State University; Elizabeth Manning, Paul Le Bel, Hazen and Sawyer; Jessica Donati; Mujahid Ali, Jason Wilkinson, Fairfax County; Terry Reid, Darryl Gravagno, Aqua-Aerobic Systems

11:17 a.m. **Integrating and Evaluating Process Changes using the MOB Process from Nuvoda**
Peter Schauer, Clean Water Services

11:24 a.m. **Microbial Insight on a Granular Biofilm Process**
Ditte Hansen, Erling Brodersen, Aarhus Vand; Frank Rasmussen, TechRas Miljø¸ ApS; Flemming Møller, Aarhus Vand; Markus Schmied, EssDe; Marta Nierychlo, Aalborg University; Lise Hughes, Aarhus Vand

11:31 a.m. **Facilitated Discussion**

Thursday, June 10, 2021

Session 4: Carbon Management & Diversion
Thursday, June 10, 2021, 1:00 p.m. - 1:30 p.m. ET (UTC -4)

1:00 p.m. **Welcome and Introduction from the Session Moderators**
Stephanie Klaus, HRSD; Tanja Rauch-Williams, Carollo

1:03 p.m. **Bioflocculation Controller for Contact Stabilization Process: Respiring New Life into an Old Process**
Patrexia Tampon, Khoa Nam Ngo, Haydee De Clippeleir, DC Water & Sewer Authority; Tim Van Winckel; Arash Massoudieh; Charles Bott, HRSD; Bernhard Wett, ARAconsult; Sudhir Murthy, DC Water & Sewer Authority; Ahmed Al-Omari, Brown and Caldwell

1:10 p.m. **Controlling Biofilm Retention Time in an A-stage High Rate MBBR for Organic Carbon Redirection**
Alessandro Di Biase, Maciej Kowalski, University of Manitoba; Tanner Devlin, Nexom; Jan Oleszkiewicz, University of Manitoba

1:17 p.m. **Integrated Shortcut Nitrogen Removal with Anammox and Sidestream bioP — Redirecting Carbon for Maximum Benefit**
Kester McCullough, Cornell University / HRSD; Stephanie Klaus, Anand Patel, Kyle Malin, HRSD; Christopher Wilson; IL HAN, Cornell University; Haydee De Clippeleir, DC Water & Sewer Authority; April Gu, Department of Civil and Env. Eng; Charles Bott, HRSD

1:25 p.m. **Facilitated Discussion**

Thursday, June 10, 2021

Session 5: Disinfection, Reuse, Emerging Contaminants
Thursday, June 10, 2021, 2:00 p.m. - 2:30 p.m.

2:00 p.m. **Welcome and Introduction from the Session Moderators**
Matt Higgins, Bucknell University; Chris Maher, Clean Water Services

2:03 p.m. **Enhancing 1,4-Dioxane Removal Through Co-Metabolic Biofiltration in Advanced Water Treatment Systems for Potable Reuse**
Hannah Stohr, HRSD; Ramola Vaidya, HDR; Germano Salazar-Benites, HRSD; Tyler Nading; Chris Wilson, Charles Bott, HRSD

2:10 p.m. **Development of a Critical Control Point Based Monitoring Framework for Membrane Bioreactors**
Amos Branch, Andrew Gilmore, Carollo Engineers, Inc.; Nicola Fontaine; Andrew Salveson, Carollo Engineers

2:17 p.m. **A Disruptive Solution for Municipal Wastewater Disinfection: Performic Acid (PFA) with Advanced Dose Control (ADC)**
Domenico Santoro, USP Technologies; Kyriakos Manoli; Roberta Maffettone, Bishop Water Technologies; Siva Sarathy

2:25 p.m. **Facilitated Discussion**

Tuesday, June 15, 2021

Session 6: Innovative Biosolids Treatment
Tuesday, June 15, 2021, 11:00 a.m. - 12:00 p.m. ET (UTC -4)

11:00 a.m. **Welcome and Introduction from the Session Moderators**
Raj Bhattarai, Clean Water Strategies; Jeanette Brown, Manhattan College

11:03 a.m. **Intensification of Solids Processing via Vacuum Assisted Anaerobic Sludge Treatment**
Diego Rosso, University of California, Irvine; Jose Jimenez, Kati Bell, Christopher Muller, Ahmed Al-Omari, Brown and Caldwell; Domenico Santoro, Eunkyung Jang, USP; George Nakhla, University of Western Ontario; Frances Okoye, Elsayed Elbeshbish, Ryerson University

11:10 a.m. **Process Understanding of Full-scale Micro-aeration to Improve Biogas Quality and Anaerobic Digestion**
Adrian Romero, Josef Cesca, Jacobs; Derek Van Rys; Bruce Johnson, Jacobs; Bart Kraakman, CH2M

11:17 a.m. **How Low Can We Go — Evaluating the Limits of SRT and Loading Rates with THP-AD Systems for Process Intensification**
Matthew Higgins, Bucknell University; Bill Barber, AECOM; Steven Beightol, Bucknell University; Sudhir Murthy, NEWhub; Christine DeBarbadillo, Haydee De Clippeleir, DC Water & Sewer Authority

11:24 a.m. **High Value Carbon Product Recovery From Municipal Solids And High Strength Organic Waste**
Wendell Khunjar, Hazen and Sawyer

11:31 a.m. **Real-Time Process Monitoring and Predictive Management of Anaerobic Codigestion using a New Bioelectrochemical Based Biosensor**
Sandeep Sathyamoorthy, Black & Veatch; Yueyun Tse, NorthET (UTC -4) University; Brian Shoener, Black & Veatch; Peter Kistenmacher, Central Marin Sanitation Agency; Patrick Kiely, Island Water Technologies Inc.; Colin Ragush; Vishnu Rajasekharan

11:38 a.m. **Enhancing Nutrient Recovery and Reducing GHG Emissions from Composting through Modeling**
Eric Walling, Universite Laval; Celine Vaneeckhaute, Université Laval; Evangelia Belia, Primodal Inc.

11:45 a.m. **Facilitated Discussion**

Tuesday, June 15, 2021

Session 7: Sidestream Treatment
Tuesday, June 15, 2021, 1:00 p.m. - 1:30 p.m. ET (UTC -4)

1:00 p.m. **Welcome and Introduction from the Session Moderators**
Joe Husband, Arcadis; Zhongtian Li, Perdue University

1:03 p.m. **Novel Process to Simultaneous Releases Ammonia and Phosphate from Waste Activated Sludge using Sensible Heat Recovered from Thermal Hydrolysis Process**
Hong Zhao, I Kruger Inc; Sudhakar Viswanathan, Veolia Water Technologies; Garrett Geer, Kristen Wisdom, Isaac Avila, Metro Wastewater Reclamation District; Jim McQuarrie, TetraTech; Luke Wood, Kruger Inc; Brad Mrdjenovich, VEOLIA; Rich DiMassimo, Kruger Inc

1:10 p.m. **Optimization of Struvite Recovery Utilizing an Alternative Magnesium Source and Process Control Strategies**
Sydney Goy, Virginia Tech/HRSD; Mikaela Verigin; Robby Jones, Jeffrey Sparks, Seth Luma, Charles Bott, HRSD

1:17 p.m. **The Undetected Thief: How our Neglect of Influent Metal Sampling is Limiting Sustainable Phosphorus Recovery and our Need for Updated Wastewater Characterization Guidelines**
Colin Fitzgerald, Jacobs; Leon Downing, Black & Veatch

1:24 p.m. **Facilitated Discussion**

Tuesday, June 15, 2021

Session 8: Novel Treatment
Tuesday, June 15, 2021, 2:00 p.m. - 2:30 p.m. ET (UTC -4)

Moderated by: Jeseth Delgado Vega, Howard University; Sandeep Sathyamoorthy, Black & Veatch

Unique to this session, 6 five-minute Flash Talk presentations will be highlighted back-to-back. Questions from attendees will be encouraged with an opportunity to discuss with speakers through informal networking available after the session.

2:00 p.m. **Conversion of Recalcitrant Nutrient Species to Readily Removable/Recoverable Forms Using Electro-oxidation**
Synthia Parveen Mallick, Kaushik Venkiteshwaran, Patrick McNamara; Brooke Mayer, Marquette University

2:05 p.m. **Advanced High-rate Total Nitrogen Removal using Methane-delivered through Membrane Biofilm Reactors**
Sadaf Mehrabi, Western University; Martha Dagnew

2:10 p.m. **Autotrophic Denitrification — Transcending from Incidental to Beneficial**
Eric Evans, HDR; Timothy Ellis, Iowa State Univ; Jaeyoung Park; James Flamming, City of Cedar Rapids WPCF

2:15 p.m. **Continuous Monitoring of Nitrification Kinetics in a Low DO Activated Sludge**
Leon Downing, Eric Redmond, Caitlin Ruff, Black & Veatch

2:20 p.m. **Using Particle Settling Velocity Distributions for Innovative Dynamic Grit Chamber Modeling**
Queralt Plana Puig, modelEAU - Universite Laval; Paul Lessard; Peter Vanrolleghem, modelEAU-Universite Laval

2:25 p.m. **Whole Plant Sulfur Modeling - Influent Works Odor Control Approaches Impact Nutrient Harvesting at WRRFs**
Eric Redmond, Ulrich Bazemo, Black and Veatch; Lynne Moss, Black & Veatch; Leon Downing, Black & Veatch

Wednesday, June 16, 2021

Session 9: CFD Modeling
Wednesday, June 16, 2021, 11:00 a.m. - 11:30 a.m. ET (UTC -4)

11:00 a.m. **Welcome and Introduction from the Session Moderators**
Chris deBarbadillo, Black & Veatch; Dave Kinnear, KPS

11:17 a.m. **Using State-of-the-Art CFD Modeling to Define Adequate Digester Mixing**
Alonso Griborio, Hazen & Sawyer; Andrea Edgerton; Charles Bott, Chris Wilson, Matthew Poe, HRSD

11:03 a.m. **Virtual Piloting: The Disruptive Application of Computational Fluid Dynamics Simulation for Process Development, Innovation and Scale-up**
Wim Audenaert, Ingmar Nopens, Simon Duchi, Miguel Daza, Cilia De Wilde, Usman Rehman, a.m.-TEAM

11:10 a.m. **Getting to the Bottom of Granular Sludge Separation with CFD Modeling**
Ed Wicklein, Carollo Engineers; Beate Wright, Carollo Engineers; Sudhir Murthy, DC Water & Sewer Authority; Charles Bott, HRSD; Robert Angelotti; Haydee De Clippeleir, Christine DeBarbadillo, DC Water; Tanja Rauch-Williams, Carollo Engineers

11:17 a.m. **Facilitated Discussion**

Technology Spotlight

Technology Spotlight
Wednesday, June 16, 2021, 12:00 p.m. – 1:30 p.m. ET (UTC -4)

Technology Spotlight Presentations are an alternative learning experience that brings attendees directly to manufacturers and service providers for topic-focused discussions that allow presenters to showcase products and services in technical and educational presentations combined with equipment or hands-on visuals. You may have seen similar presentations at a Mobile Session at an in-person event in the past.

More information about the Technology Spotlight is coming soon!

Wednesday, June 16, 2021

Session 10: Data Analytics
Wednesday, June 16, 2021, 2:00 p.m. - 3:00 p.m. ET (UTC -4)

2:00 p.m. **Welcome and Introduction from the Session Moderators**
Amit Kaldate, SUEZ; Blair Wisdom, Denver MWRD

2:03 p.m. **Development and Deployment of Real-Time Software for Long-Range Forecasting of Biological Phosphorus Removal Stability**
Keaton Lesnik, Maia Analytica; Adrienne Menniti, CH2M; Jeff Van Note, Clean Water Services; Josh Ellington, Nightswim

2:10 p.m. **Data Driven Decision Making at Metro Wastewater Reclamation District**
Joshua Goldman-Torres, Kristen Wisdom, MWRD; Kate Newhart

2:17 p.m. **Evaluation of a Data-Driven Aeration Controller at a Water Resource Recovery Facility**
Greg Budzynski, Metro Wastewater Reclamation District; Kate Newhart

2:24 p.m. **Brute Force PID Loop Tuning is not Optimum: Using Step-Response Tuning Methods from Control Engineering for BNR and More**
Alexandria Gagnon, Charles Bott, HRSD

2:31 p.m. **Improved Aeration Modelling using Innovative Concepts for Prediction of Key Factors in Oxygen Transfer**
Dániel Bencsik, Tanush Wadhawan, Imre Takacs, Dynamita SARL; Charles Bott, HRSD; Diego Rosso, University of California, Irvine

2:38 p.m. **Digital Twin Development Implementation, and Results for the Changi WRP, Singapore**
Bruce Johnson, Yin Ping Mak, Jacobs; Raja Kadiyala, CH2M; Garrett Owens, Colin Newbery, Priska Grace, Sean Sing, Aayush Saxena, Jacobs; Jack Greene

2:44 p.m. **Facilitated Discussion**