



## **Day Two: Wednesday, June 22**

### **Technical Program**

*Updated as of May 17, 2022*

**June 20-23  
Hyatt Regency Miami  
Miami, Florida, USA**

**#WEFProcessEng**

*This conference is held by the Water Environment Federation and in cooperation with the Florida Water Environment Association.*

**Session 10: Carbon Management for BNR**

**Wednesday, June 22, 2022**

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

- 8:30 a.m. Integrating Partial Denitrification (PD), Enhanced Biological Phosphorus Removal (EBPR) and Anammox in a Single Stage Process Bioreactor**  
Soklida Hong, University of Utah; Mari Winkler, University of Washington; Zhiwu Wang, Virginia Tech; Ramesh Goel
- 8:45 a.m. In-Tank Carbon Generation As a Primary Benefit of RAS and MLSS Fermentation for Stabilizing Biological Phosphorus Removal Performance**  
David Wankmuller; Damon Forney; Wendell Khunjar, Hazen & Sawyer; Jimmy Pridgen, City of Wilson
- 9:00 a.m. Quantifying the Contribution of P Assimilation versus Polyphosphate Accumulation in High-rate EBPR Reactors**  
Howard Truong, Northwestern University/DC Water
- 9:15 a.m. Compressed Gas Mixing and Inline Fermentation Enhances Biological Phosphorus Removal**  
John Koch
- 9:30 a.m. Facilitated Discussion**
- 10:00 a.m. Session adjourns for networking break**

## **Session 11: Thermal Hydrolysis**

**Wednesday, June 22, 2022**

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

- 8:30 a.m.      Invited Presentation – Thermal Hydrolysis as a Solution for Utilities**
- 8:45 a.m.      Reducing Retention Time and Cost of Anaerobic Digestion Using Thermal Hydrolysis & Experiences and Lessons Learnt from Food and Organic Co-Digestion with Thermal Hydrolysis**  
William Barber; Matthew Higgins, Bucknell University
- 9:00 a.m.      Application of Thermal Hydrolysis to Intensify Methane Production in Anaerobic Co-Digestion of Biosolids and Grease Interceptor Waste**  
Francis De Los Reyes, North Carolina State University; Seraphim Falterman; Erika Bailey, City of Raleigh
- 9:15 a.m.      Evaluating Factors Impacting Hydrothermal Hydrolysis of Sludge Prior to Fermentation and Anaerobic Digestion**  
Farokh Laqa Kakar; Steven N. Liss, Ryerson University; Elsayed Elbeshbishy
- 9:30 a.m.      Facilitated Discussion**
- 10:00 a.m.      Session adjourns for networking break**

## **Session 12: Optimization Using Sensors and Control**

**Wednesday, June 22, 2022**

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

- 8:30 a.m.      Development of Total Solids Prediction Using Passive Acoustic Sensors**  
Han Nguyen, Haydee De Clippeleir, Ryu Suzuki, Nicholas Passerelli, Aklile Tesfaye, Elkin Hernandez, DC Water; Arash Massoudieh, Catholic University of America
- 8:45 a.m.      Addressing Nutrient Sensor Cost, Reliability, and Performance at HRSD**  
Arba Williamson, Joshua Walker, HRSD
- 9:00 a.m.      Bringing Aeration Control into the 21st Century & How to Right-size Your Blowers to Realize Expected Savings**  
Dale de Kretser, Coenraad Pretorius, GHD
- 9:15 a.m.      Energy Savings and Increased BOD Removal Through Improved Aeration Basin Blower Control**  
Eric Hovland; David Hatfield, Hatfield EATS
- 9:30 a.m.      Facilitated Discussion**
- 10:00 a.m.      Session adjourns for networking break**

## **Session 13: Harnessing Internal Carbon Sources**

**Wednesday, June 22, 2022**

**10:45 a.m. - 12:00 p.m.**

**10:45 a.m. Invited Presentation**

**11:00 a.m. Demonstration of SND, Post Denitrification with Internally Stored Carbon and Anammox Potential at a Mainstream Full-Scale BNR Facility**

Pusker Regmi, Brown and Caldwell; Marty Johnson, WSSC Water; Caroline Nguyen; Ahmed Al-Omari; George Wells, Northwestern University Library; Brad Yeakle, Washington Suburban Sanitary Commission

**11:15 a.m. Kinetics, Biofilm Profile and Microbial Composition of a Fixed Rope Partial Denitrifying Reactor: Case for External vs. Internal Carbon Sources**

Lin Sun; Wudneh Shewa; Christine Gan; Kevin Bossy; Martha Dagneu

**11:30 a.m. Technical Brief: Investigating the Use of Internally Stored Carbon in Post-Anoxic Denitrification**

Kayla Bauhs, Brown and Caldwell; Alexandria Gagnon, Charles Bott, HRSD

**11:35 a.m. Facilitated Discussion**

**12:00 p.m. Session adjourns for lunch in exhibit hall**

**Session 14: Blazing Solids**

**Wednesday, June 22, 2022**

**10:45 a.m. - 12:00 p.m.**

**10:45 a.m.      Could Thermal Processing be the Answer? Fundamentals of Pyrolysis, Gasification, and Incineration**

Stanley Chilson, CET-GHD; Charles Winslow, GHD

**11:00 a.m.      Decarbonization Using Pyrolysis - A Burning Question**

Per Nielsen, Niels Askjær, VCS Denmark

**11:15 a.m.      Full Scale Pyrolysis for Biosolids: Reducing Contaminants and Closing The Loop**

Valentino Villa, Elizabeth Bridges, Garrett Benisch, Bioforcetech; Rob Kerschner, Kerschner Environmental Technologies, LLC

**11:30 a.m.      Facilitated Discussion**

**12:00 p.m.      Session adjourns for lunch in exhibit hall**

## **Session 15: Advances in Process Modeling**

**Wednesday, June 22, 2022**

**10:45 a.m. - 12:00 p.m.**

- 10:45 a.m.     Application and Field Verification of CFD Modeling for Clarifier Optimization**  
Alonso Griborio, Hazen & Sawyer
- 11:00 a.m.     Virtual Piloting and Development of a Digital Twin of a Novel Membrane Bioreactor Technology**  
Miguel Daza, AM-Team; Naoya Tamura, Maezawa Industries Inc.; Katsuki Kimura, Hokkaido University; Wim Audenaert, AM-Team; Usman Rehman
- 11:15 a.m.     One and the Same: Linking Collection System and Resource Recovery Facilities through Sewer Process Models**  
Adrian Romero, Jacobs; Mark Holstad, Albuquerque Bernalillo County Water Utility Authority; Matthew Ward, The WATS Guys; Jes Vollertsen, Aalborg University; Tom Johnson, Jacobs
- 11:30 a.m.     Technical Brief: Performance Assessment of a Full-Scale Disinfection Unit of a WWTP Using CFD Modelling**  
Cesare Piacuzzi, Giacomo Bellandi, Alejandro Claro Barreto, Wim Audenaert, AM-Team; Roberta Muoio; Roberto Di Cosmo, Davide Scaglione, Gruppo CAP; Usman Rehman,
- 11:35 a.m.     Facilitated Discussion**
- 12:00 p.m.     Session adjourns for lunch in exhibit hall**

## **Session 16: It's All About Carbon**

**Wednesday, June 22, 2022**

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

- 1:30 p.m.      Impacts of Advanced Primary Treatment Technologies on Performance of Water Resource Recovery Facilities**  
Onder Caliskaner, Caliskaner Water Technologies; Lilly Imani; George Tchobanoglous; Yihan Zhang, University of California Davis; Brian Davis, Linda County Water District
- 1:45 p.m.      A Swiss-Army Knife Approach: Application of High-Rate Contact Stabilization at Blue Plains**  
Maryam Sabur, District of Columbia Water and Sewer Authority; Nam Ngo; Margaret Anderson, Northwestern University; Bernhard Wett; Charles Bott, HRSD; Arash Massoudieh, Catholic University of America; Aklile Tesfaye, DC Water
- 2:00 p.m.      Converting Rectangular and Circular Primary Tanks into the AAA Biologically Enhanced Settler**  
Sudhir Murthy, NEWhub Corp; Bernhard Wett
- 2:15 p.m.      To Remove or to Redirect - The Impact of HRT and SRT on the Performance of the Novel AAA Process for Carbon Management**  
Ahmed Alsayed; Moomen Soliman; Ahmed EIDyasti, York University
- 2:30 p.m.      Technical Brief: Enhanced Primary Treatment for Carbon Redirection to meet Utility's Long Term Sustainability Goal**  
Bikram Sabherwal, Leon Downing, Black & Veatch; Brian Shoener, University of Illinois At Urbana-Champaign
- 2:35 p.m.      Facilitated Discussion**
- 3:00 p.m.      Session adjourns for networking break**



## **Session 17: Advances in Solids Treatment**

**Wednesday, June 22, 2022**

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

- 1:30 p.m.      Biogas Harvester Recovers Dissolved Biogas for Energy Production, GHG Reduction, and H<sub>2</sub>S Collection**  
John Willis, Brown and Caldwell; Ashwin Dhanasekar, The Water Research Foundation; Robert Fergen, Miami Dade County Florida; Debbie Griner; Melissa Jauregui; Fabian Rangel-Rojas, Brown and Caldwell
- 1:45 p.m.      Biosolids the Hidden Treasure: Current and future trends in biosolids resource recovery technological and market maturity**  
Prithviraj Chavan, Ross Wilson, Richard Lancaster, Esme Piechoczek, Andrew Thompson, Atkins; Garry Strange, Thames Water, UK; Sarah-Jane Westlake, Atkins
- 2:00 p.m.      A Method for Determining When an Anaerobic Digester Needs Mixing**  
Coenraad Pretorius, David Solley, GHD; Duncan Taylor; Laura Roff
- 2:15 p.m.      Performance and Lessons Learned for Digestion with Recuperative Thickening and High Solids Mixing**  
Daniel Chien, Rick Chan, Carollo Engineers; Rashi Gupta; Nicholas Talbot; Brian Schumacker; Manuel Santos
- 2:30 p.m.      Facilitated Discussion**
- 3:00 p.m.      Session adjourns for networking break**

## Session 18: Sensors to Data to Knowledge to Action

Wednesday, June 22, 2022

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

- 1:30 p.m. Using Data-Driven Models To Answer Operatorâ€™s Questions About Their WRFs, And Future Applicability Of Data-Driven Modeling To The Water Industry**  
Katya Bilyk, Javad Roostaei, Wendell Khunjar, Hazen & Sawyer; Ankit Pathak
- 1:45 p.m. It's OK to be a Control Freak: Deploying machine learning algorithms and model-based controllers for WRRF optimization**  
Jeffrey Sparks, HRSD; Tanush Wadhawan, North Dakota State University; Peter Vanrolleghem, Modeleau Université Laval; Charles Bott, HRSD
- 2:00 p.m. Defining Resilience under Wet Weather Events Using Long-Term Sensor-Based Performance Data**  
Isaac Musaazi, Howard University; Lauren Stadler, Rice University; Jeseth Delgado Vela, Howard University; Moriah Brown; Dylan Christenson, Texas Tech University Health Sciences Center; Priyanka Ali; Lu Liu, Iowa State University
- 2:15 p.m. Mantis.AI - a Digital Twin for Forecasting and Optimizing Future Plant Performance in Real-Time**  
Jacob Barclay; Nick Piccolo; Rajeev Goel, Spencer Snowling, Hydromantis ESS, Inc.; Houssam Eljerdi, Pima County Regional
- 2:30 p.m. Technical Brief: Third Party Validation of Artificial Intelligence for Water Reclamation and Reuse**  
Kyle Thompson; Andrew Salveson, Carollo Engineers; Yasuhiro Matsui, Mika Kawata, Yokogawa Electric Corporation; Kevin Hardy, Encina Wastewater Authority; Amos Branch; Jason Assouline, Carollo
- 2:35 p.m. Facilitated Discussion**
- 3:00 p.m. Session adjourns for networking break**

**Session 19: It's Not All About Carbon**

**Wednesday, June 22, 2022**

**3:45 p.m. - 5:00 p.m.**

- 3:45 p.m. Unexpected Journey in Tertiary NDN: Challenges, Solutions, and Opportunities**  
Michael Liu, LA County Sanitation District; Paul Pitt; Artin Laleian; Rachel Deco, Eric Krikorian, LA County Sanitation District; Joyce Lehman, Metropolitan Water District of Southern California
- 4:00 p.m. Mitigating Volatile Sulfur Compound Emission from Primary and Secondary Activated Sludge Systems Using New Low-Cost Operational Strategies**  
Nam Ngo; Margaret Anderson, Northwestern University; William Albrittain, Chris J. Reilly, DC Water; Arash Massoudieh, Catholic University of America; Nicholas Passarelli, Ryu Suzuki, DC Water
- 4:15 p.m. Zeolite Incorporated Technologies for Enhancing Shortcut Nitrogen Removal Processes in Mainstream Wastewater Treatment**  
Anndee Chester, University of Minnesota
- 4:30 p.m. Technical Brief: Impact of Seawater Infiltration on Biological Phosphorus Removal, Chlorine-Based Disinfection, and Settling**  
Alexandria Gagnon, Charles Bott, HRSD; Tanush Wadhawan, North Dakota State University
- 4:35 p.m. Facilitated Discussion**
- 5:00 p.m. Session adjourns**

## **Session 20: Today's Alchemy Miracle: Hydrothermal Liquefaction Turns Sludge into Diesel and Jet Fuel**

**Wednesday, June 22, 2022**

**3:45 p.m. - 5:00 p.m.**

**Moderator:** John Willis, Brown and Caldwell

**Presenters:** Michael Thorson, Pacific Northwest National Laboratory; David Blair, Metro Vancouver; Glenn Fuller, Kern Oil

While many Water Resource Recovery Facility residuals are beneficially reused as biosolids, many wastewater solids are still disposed of in landfills or by incineration. The Pacific Northwest National Laboratory (PNNL) has conducted decades of research on hydrothermal liquefaction (HTL) to re-form waste carbon into biological crude oil (Bio-crude) and renewable methane as energy products. Much of this work has been funded by the US Department of Energy (US-DOE) to reduce the country's dependency on foreign oil while lowering the carbon intensity of the transportation sector.

Within the wastewater sector, initial Water Research Foundation (WRF) work at Metro Vancouver was foundational to US-DOE awarding WRF funding to pilot a Genifuel 10-to-15 wet-ton/day HTL demonstration at Central Contra Costa Sanitary District's plant. That HYPOWERS project completed Phase-1 in spring 2019 but has since been on hold while resolving funding and contractual issues. In parallel, metro Vancouver began procuring their own similarly sized unit with their efforts now ahead of the HYPOWERS project. Parallel research has been commissioned with the University of British Columbia including a literature review (Basar, et. al, 2021) and investigations on non-catalytic treatment of HTL aqueous phase.

This session includes presentations from leading technology, utility, and industry experts on the above projects and topics followed by a panel discussion.

*A detailed agenda for this session is coming soon.*

## **Session 21: Sensors and Instrumentation**

**Wednesday, June 22, 2022**

**3:45 p.m. - 5:00 p.m.**

**Facilitators:** Tanja Rauch Williams, Isaac Musaaazi

*This is a Technology Spotlight session. Format of this session will include quick, in-depth reviews on various technologies, presented by technical experts and utility representatives. Facilitated discussion with audience participation will follow in the remaining time at the end of the session, with additional time during breaks to continue those conversations.*

### **Technology Reviews**

**Hach**

Bob Dabkowski

*Additional presenters will be added as soon as they are confirmed.*

**4:30 p.m.      Facilitated Discussion**

**5:00 p.m.      Session adjourns**