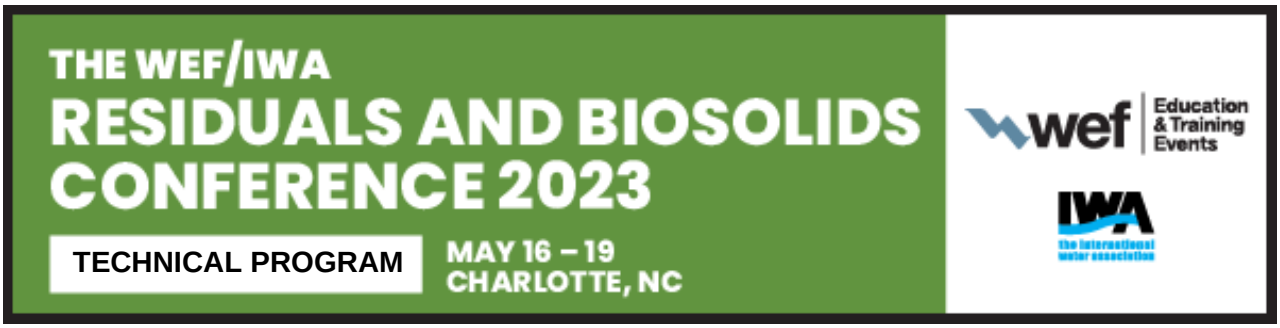

WEF/IWA Residuals and Biosolids Conference 2023

May 16-19, 2023

Charlotte Convention Center, Charlotte, North Carolina, USA

Technical Program

(last updated March 29, 2023)

Pre-conference Workshops
(Additional fees apply)

Workshop A: Dewatering Optimization: Practical Ways to Improve Performance
Tuesday, May 16, 2023
8:00 a.m. – 4:30 p.m.

The first part of the workshop will take place at the convention center, and the second half will take place onsite at a nearby facility for practical examples. Transportation to and from the facility will be provided.

8:00 a.m. **Introduction and review of workshop agenda and goals**
David Oerke, Jacobs - Chair, Pre-Conference Task Force, WEFRBC Solids Separation Subcommittee

8:10 a.m. **Use MENTI survey questions to rank dewatering challenges**
Stephanie Spalding, HDR-Co-Chair

8:20 a.m. **Update on Dewatering Optimization Through Experimentation, Analysis of Data, Training, Controls and Communication**
Mike Gates, Chris Maher, Clean Water Services

9:00 a.m. **Mechanical Optimization of Dewatering Equipment**
Adam Parmenter, HDR

9:30 a.m. **Successful Start-Up and Dewatering Optimization on THP Digested Biosolids at HRSD**
Jeff Nicholson, HRSD

10:00 a.m. **Coffee and Networking Break**

10:30 a.m. **Design Considerations and Case Studies for Dewatered Solids Conveyance and Pumping**
Zwelani Ngwenya, Jacobs

11:00 a.m. **Dewatering Equipment Selection and Sludge Characteristics Study Update**
Shaun Hurst, Andritz

11:30 a.m. **Interactive Breakout Problem Solving Session with "what has worked," lessons learned, and O&M challenges**
David Oerke, Jacobs; Stephanie Spalding, HDR

12:15 p.m. **Travel to Irwin WWRF by Bus with Box Lunches Provided**

1:00 p.m. **Irwin Tour and Viewing of Dewatering Equipment**

4:30 p.m. **Workshop adjourns**

Pre-conference Workshops
(Additional fees apply)

Workshop B: Accounting and Mitigating GHG Emissions from Biosolids using BEAM

Tuesday, May 16, 2023
8:30 a.m. – 12:00 p.m.

Speakers: Shannon Cavenaugh, Brown & Caldwell; Emma Shen, Jacobs; William Steven Brower, Brown & Caldwell; Christine Polo, Carollo; Andrew Carpenter, Northern Tilth

In light of the findings in the United Nations Intergovernmental Panel on Climate Change Sixth Assessment Report, which clearly states that climate change caused by human activity is accelerating beyond what was previously estimated with consequences already felt across the world, it is crucial that wastewater utilities seek to cut greenhouse gas (GHG) emissions and increase carbon sequestration. The objective of this workshop is to engage participants in the best practices to move towards that critical goal. This workshop will provide valuable background information about sources and sinks of GHG emissions from solids handling processes and end uses, and will use the results of GHG accounting to determine practical approaches to reduce a utility's climate impact. Participants in this workshop will learn how to determine sources and sinks of GHG emissions from residuals treatment and biosolids management at water resource recovery facilities (WRRFs), understand how to calculate GHG emissions and offsets using BEAM (Biosolids Emissions Assessment Model), and gain insight into the ways to reduce WRRF carbon footprints and how the value of GHG reduction can be used in capital planning and prioritization.

Pre-conference Workshops
(Additional fees apply)

Workshop C: Fundamentals of Anaerobic and Aerobic Digestion using Process Simulators

Tuesday, May 16, 2023
8:30 a.m. – 5:00 p.m.

Speakers: Paul Dombrowski, Woodard & Curran; Jeanette Brown, Manhattan College; Philip Pedros, Mott MacDonald; Nick Piccolo, Hatch

The operator focused workshop will consist of lecture material covering the fundamentals of digestion systems coupled with treatment system model simulations driving home each major concept presented in the lecture. It is proposed that each attendee will have access to a computer loaded with the simulator software. The material will be focused on both aerobic and anaerobic digestion with added ancillary topics such as pre-thickening, sludge pre-conditioning (hydrolysis), variations in sludge feed concentrations and constituents and will also include considerations of solids processing recycles, including recycle pollutant loads. Examples using primary sludge, secondary sludge and outside the fence line wastes (septage, FOG, food waste) will be incorporated into examples and problems. The simulator platform used will be an updated version of SimuWorks, developed by Hatch (formerly Hydromantis). Simuworks is an overlay software platform that runs on the well-established process modeling software, GPS-X. The SimuWorks/GPS-X platform has been used by the workshop presenters to deliver liquid train fundamental wastewater training programs throughout the United States, including at the 2018 and 2019 WEF Nutrient Conferences, 2022 WEFTEC and at events at Pennsylvania, South Carolina, New England, New York and California WEA events. This platform has also served as a major component of the WEFTEC Operations Challenge Process Control Event since 2016. This will be the first time the Biosolids Simulator version of SimuWorks will be used for a full day operations training program.

Pre-conference Workshops
(Additional fees apply)

Workshop D: Delving into Digestion: Anaerobic Digestion Process, Design, and Operation
Tuesday, May 16, 2023
1:30 p.m. – 5:00 p.m.

1:30 p.m. **Introduction**
Jeff Coyne, Hazen and Sawyer

1:35 p.m. **Anaerobic Digestion Process**
Christopher Muller, Brown & Caldwell

2:05 p.m. **Advanced Process/THP Design Basics**
Stephanie Spalding, HDR. Inc

2:35 p.m. **Anaerobic Digestion Part 1: Unit Process Design Basics**
Michael Bullard, Hazen and Sawyer

3:00 p.m. **Coffee and Networking Break**

3:30 p.m. **Anaerobic Digestion Unit Process Design Part 2: How to Design a Digester**
Michael Bullard, Hazen and Sawyer

3:50 p.m. **Gas Handling and Utilization - Gas Safety and Gas Handling**
Regina Hansen, Ovivo

4:20 p.m. **Gas Handling and Utilization - Gas Upgrading and Beneficial Use**
Greg Knight, Black and Veatch

4:55 p.m. **Closing**
Jeff Coyne, Hazen and Sawyer

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

Pre-conference Workshops
(Additional fees apply)

Workshop E: Emerging Contaminants and Pathogens: Recent Global Developments in Science, Treatment Technologies and Regulatory Landscape

Tuesday, May 16, 2023
1:30 p.m. – 5:00 p.m.

Speakers: Banu Ormeci, Carleton University

This workshop is organized by the IWA - SGSM (International Water Association Sludge Management Specialist Group). The workshop will provide an overview of recent developments on emerging contaminants and pathogens and their implications for biosolids treatment, management, and land application. The emerging contaminants will include PFAS and microplastics, which have become particularly important in recent years. Emerging pathogens will include emerging viruses such as SARS-CoV-2 and other respiratory viruses. The workshop will cover the fate of PFAS, microplastics, and emerging pathogens during treatment processes and after land application. In addition, we will present recent research/testing results from Europe and North America on the removal of PFAS using thermal treatment processes. Furthermore, there will be a presentation to summarize the regulatory developments on biosolids treatment and management from around the world and new proposed/established limits of emerging contaminants for land application of biosolids. The speakers will focus on the "big picture" issues and will benefit industry professionals, practitioners, and scientists. Our goal is to bring the most recent advances and developments in Europe, Australia, North America etc. to the conference attendees. We believe that the workshop will be well received and will be of interest to a wide range of audience.

Opening General Session
Wednesday, May 17, 2023
8:30 a.m. - 10:00 a.m.

More information about the Opening General Session is coming soon.

Session 01: Impacts of Thermal Processes on PFAS - Updates from Water Research Foundation Projects
Wednesday, May 17, 2023
10:45 a.m. - 11:45 a.m.

Speakers: Lynne Moss, Patrick Mcnamara, Black & Veatch; Derya Dursun, Hazen and Sawyer; John Ross, Brown and Caldwell

Per- and Polyfluoroalkyl Substances (PFAS) have dramatically shifted the biosolids management landscape, with one state already passing a ban on land application due to PFAS in biosolids. Utility managers have limited options for dealing with PFAS. As a result, interest in thermal processes has grown as a management option for biosolids. Thus, there is a great research need to understand how thermal processes impact the fate of PFAS, and therefore the Water Research Foundation (WRF) has supported this important research need. This session will highlight findings from three complimentary WRF projects that focus on thermal treatment of PFAS in biosolids.

Session 02: Today's Alchemy Miracle: How Hydrothermal Liquefaction turns Sludge into Diesel and Jet Fuel
Wednesday, May 17, 2023
10:45 a.m. - 11:45 a.m.

Speakers: John Willis, Brown and Caldwell; Glenn Fuller, Kern Oil; Michael Thorson, Pacific Northwest National Laboratory; Xavier Fonoll Almansa, Great Lakes Water Authority

While many Water Resource Recovery Facility (WRRF) residuals are beneficially reused as biosolids, offsetting chemical fertilizers, sequestering/re-stocking carbon, and improving soil health and drought tolerance, 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 (CH4) as energy products, dating back to early 1990s. 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 lower the carbon intensity of the transportation sector, which accounts for 37.5% of the United States' (US) GHG emissions from fossil fuel combustion or 31.6% of the total net emissions in calendar 2019 (US-EPA, 2021).

This session incudes presentations from leading technology, utility, and industry experts on how HTL works and status of current projects to advance this technology in the wastewater sector, followed by a panel discussion.

Session 03: Digestion Optimization and Troubleshooting
Wednesday, May 17, 2023
10:45 a.m. - 11:45 a.m.

10:45 a.m. **Feasibility of Advanced Digestion Options to Reduce Biosolids Volume**
Jose Bicudo, Rony Das, Associated Engineering; Sara Elkadi, Tanya Bogoslowski, Deacon Liddy, GHD; Dempsey Luke, Rod MacLean, City of Kelowna

11:15 a.m. **Importance of Digester Foaming Control in Moving Towards Energy Neutrality**
Amy McDonald, Gokul Bharambe, Jacobs; Josef Cesca; David Parry, Jacobs; Jose Gonzalez, Sydney Water Corporation

Alternate **An Optimization Tool - Relationship Between Ultraviolet-Visible Spectra and Soluble Species in the Liquid Phase of Wastewater Sludge During Digestion**
Eskandar Poorasgari; Banu Ormeci, Carleton University

11:45 a.m. **Session adjourns for networking luncheon**

Session 04: Process Case Studies in Dewatering
Wednesday, May 17, 2023
10:45 a.m. - 11:45 a.m.

10:45 a.m. **Process Capability Assessment of Centrifugal Sludge Thickening Under Various Hydraulic and Solid Loading Conditions**
Zhongtian Li, Rashi Gupta, Carollo Engineers

11:15 a.m. **Building for the Future: A Commonsense Approach for Kalamazoo Water Reclamation Plants' Dewatering Facility Upgrade**
Ryan Stoughton, City of Kalamazoo; Joshua Gable, Centrisys/CNP

Alternate **Better Processes and Best Practices: Rethinking Thickening and Dewatering**
Edward Fritz, Operators Unlimited

11:45 a.m. **Session adjourns for networking luncheon**

Technology Spotlight I
Wednesday, May 17th
12:30 p.m. - 1:20 p.m.

Please eat lunch first and then the three exhibitors listed below will each be holding the same 20-minute presentation two times in a row. Participants are invited to join a different presentation at each of the times listed below. Choose the top two you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kickoff concurrently at: ***12:35 PM*** *and* ***1:00 PM*** *in each of the three booths.*

12:30 PM	Technology Spotlight Introduction at entrance to exhibit hall
12:35 PM	3 Simultaneous Presentation A
1:00 PM	3 Simultaneous Presentation B

Booth 305 **Carbon Neutrality Biosolids Drying Achieved in Bottrop. Biosolids Incineration Plant no longer requires supplemental coal.**
Alexander Kraemer, Thermal Process Systems, Inc.

Booth 224 **Optimizing Dewatering Under Changing Sludge Characteristics**
Scott McKay, SMK Consulting at Fournier Booth

Booth 803 **Performance Optimization for Centrifuge Biosolids Dewatering**
Sean Tierney, Frazenburg

Session 05: Regulatory and Market Trends in Land Application
Wednesday, May 17, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **Biosolids Beneficial Use and Disposal Trends in South Carolina and Georgia**
Nickolas Hines, Material Matters Inc

2:00 p.m. **Critical Regulatory and Litigation Developments Impacting Biosolids and Compost Beneficial Use**
Andrew Silton, James Slaughter, Beveridge & Diamond PC

2:30 p.m. **Lystek THP: Land Application and Biosolids Markets**
Mike Beswick, Lystek

3:00 p.m. **Networking break**

3:45 p.m. **Anecdotes, Analyses, and Unexpected Advantages: Why Degraded Landscapes Benefit More from Biosolids**
John Lavery, SYLVIS Environmental Services Inc.; Houston Marsh, Metro Vancouver

4:15 p.m. **Guidance Document for Wastewater Agencies Overseeing Biosolids Handling Contractors**
Greg Kester, California Association of Sanitation Agencies; Rebecca Overacre, East Bay Municipal Utility District

4:45 p.m. **Session adjourns for networking reception in exhibit hall**

Session 06: Microplastics and other Emerging Contaminants
Wednesday, May 17, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **Alkaline-Thermal Hydrolysis Prior to Anaerobic Digestion Affects Fate of Microplastics**
Dilara Hatinoglu, University of Maine; Faika Dilek Sanin, Middle East Technical University

2:00 p.m. **Behaviour of Microplastics in Methane Fermentation of Sewage Sludge, Japan**
Kazuyuki Oshita, Masaki Takaoka, Guo Wenjing, Liu Sai, Kenji Shiota, Kyoto University

2:30 p.m. **Thermophilic Digestion is Enhanced in The Presence of Polyamide Microplastics**
Faika Dilek Sanin, İrem Şimşek, Middle East Technical University

3:00 p.m. **Networking break**

3:45 p.m. **A Surveillance Study: Pharmaceutical and Personal Care Products (PPCPs) in Biosolids**
Shubhashini Oza, Jeremy Harafield, Shirin Estahbanati, Daniel Wolgemuth, Brown & Caldwell; John Norton, Xavier Fonoll Almansa, Majid Khan, Great Lakes Water Authority; Christopher Muller, Brown & Caldwell; Katherine Bell, Stantec

4:15 p.m. **Microplastic Flow and Behavior in Sludge Treatment System in Japan**
Liu Sai, Kazuyuki Oshita, Masaki Takaoka, Kyoto University

4:45 p.m. **Session adjourns for networking reception in exhibit hall**

Session 07: Intensifying Digestion
Wednesday, May 17, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **Optimizing Two-Stage Anaerobic Digestion**
Justin Wippo, Thermal Process Systems

2:00 p.m. **Where Should my THP Go? Drivers to Implementing Thermal Hydrolysis at Woodman Point, Perth, Australia**
Gokul Bharambe, Jacobs; Lydia Wong; David Parry, Peter Burrowes, Jacobs

2:30 p.m. **South San Francisco-San Bruno Water Quality Control Plant Employs High-Solids Digestion to Enable Food Waste Co-Digestion & Advance Energy Neutrality with Lowest Lifecycle Cost**
Margaret Laub, Anaergia

3:00 p.m. **Networking break**

3:45 p.m. **The Impact of Solids Retention Time Reduction on Thermal Hydrolysis Pretreatment-Enhanced Mesophilic Anaerobic Digestion**
Yitao Li, Hao Luo, Virginia Tech; Mary Strawn, Lisa Racey, Fasil Haile, Arlington County Water Pollution Control Bureau; Brian Balchunas, Chris Moline, Lawrence Hentz, HDR Inc; Zhiwu Wang

4:15 p.m. **Growing Up Together: Sidestream Startup Concurrent with THP Digestion to Meet Strict Recycle Limits**
Matthew Vanhorne, Paul Le Bel, Hazen; Joe Uglevich; Robert Wierzbicki

Alternate **Effects of Primary Sludge Blending and Alum Addition on Thermal Hydrolysis-Enhanced Anaerobic Digestion of Waste Activated Sludge and Recalcitrant Dissolved Nitrogen Formation**
Hao Luo, Virginia Tech; Zhiwu Wang; Malcolm Taylor, Caroline Nguyen, Washington Suburban Sanitary Commision

4:45 p.m. **Session adjourns for networking reception in exhibit hall**

Session 08: Dewatering and Polymer Optimization
Wednesday, May 17, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **Finding the Right Polymer for Your Operation…It's Not Just the Unit Price**
Maggie Macomber, Charlotte Water; Jonathan Lapsley, David Wagoner, CDM Smith

2:00 p.m. **Multi-Point Polymer Addition to Reduce Overall Polymer Demand**
Matthew Higgins, Bucknell University; Ryan Iwata, Brown and Caldwell; Steven Beightol

2:30 p.m. **Affinity Laws for Decanter Centrifuges: Impacts of G Force on Dewatering Centrifuge Capacity and Performance. An Explanation of the G-Volume Scaling Methodology**
Jim Hanson, GEA North America

3:00 p.m. **Networking break**

3:45 p.m. **Increasing the Accuracy of Project Planning Through Meta-Analysis of Dewatering System Performance**
Christian Primm, HUBER Technology, Inc.

4:15 p.m. **Addressing Biosolids Hydrogen Sulfide Odor Complaints While Meeting Effluent Metals Limits – A "Win-Win" for a Brewery**
Lam Nguyen, Brenda Blake, Michael Fagan, USP Technologies

4:45 p.m. **Session adjourns for networking reception in exhibit hall**

Session 09: Biogas
Thursday, May 18, 2023
8:30 a.m. - 11:45 a.m.

8:30 a.m. **Pursuing Bioenergy Projects in a Dynamic Funding Environment**
Alison Nojima, Brown and Caldwell; Alexis Valenti

9:00 a.m. **What's It Worth to You? Arlington Regen Biogas Utilization Evaluation**
Brian Bakke, Stephanie Spalding, Brian Balchunas, HDR Inc; Mary Strawn, Arlington County Water Pollution Control Bureau

9:30 a.m. **Biogas Action Planning in Tallahassee – Plans for the Future with Improvements for the Now**
Eric Auerbach, Arcadis; Mariana Costa Tomazelli; Sondra Lee, City of Tallahassee

10:00 a.m. **Networking break**

10:45 a.m. **Digester Gas to Biomethane – Design, Construction and Operation Lessons Learned**
Laura Locke, AECOM Canada Ltd.; Laura Ng, Krystal Kirchen, Metro Vancouver

11:15 a.m. **San Jose Cogeneration Facility Project Case Study**
Andrew Lehane, City of San Jose; Nathan Ebbs, David Parry, Jacobs

Alternate **Road Trip III: A Path to The Road Less Traveled**
Daniel Hull, John Willis, Brown and Caldwell; Robert Taylor

Alternate **Biogas to RNG Case Study**
Matt Freed; Kristina Gerber, Veolia WTS

11:45 a.m. **Session adjourns for networking luncheon**

Session 10: PFAS Challenges and Treatment
Thursday, May 18, 2023
8:30 a.m. - 11:45 a.m.

8:30 a.m. **Quantifying Supercritical Water Oxidation Efficiency Treating PFAS Laden Sludge, Ion Exchange Resin and Aqueous Film Forming Foam**
Sudhakar Viswanathan, 374Water Inc.; Marc Deshusses, Duke University; Kobe Nagar, Doug Hatler, 374Water Inc.

9:00 a.m. **Lab-scale Evaluation of PFAS Decomposition and Flue Gas Qualities from Biosolids Incineration Process**
Hong Zhao, Jon Orr, Veolia/Kruger; Jeff Mocock; Takahiro Yamada; Moshan Kohandawala, University of Dayton Research Institute; Argun Erdogan, Veolia/Kruger

9:30 a.m. **Impact of Several Biosolids Stabilization Technologies on PFAS**
Todd Williams, Scott Grieco, Bahman Bani, Jacobs

10:00 a.m. **Networking break**

10:45 a.m. **Cost Implications of PFAS Destruction in Wastewater Solids: A Case Study from the Minnesota Pollution Control Agency**
Anna Munson, Derya Dursun, Micah Blate, Mohammad Abu-Orf, Hazen and Sawyer; Ali Ling, Barr Engineering; Scott Kyser, Minnesota Pollution Control Agency

11:15 a.m. **Master Planning When the Ground Keeps Shifting: Portland (ME) Water District's Biosolids Master Planning Experience in the Age of PFAS**
Scott Firmin, Portland Water District

8:30 a.m. **Alternate: Two Birds, One Stone: Utilizing Biosolids Thermal Processing Technologies for PFAS removal**
Ramola Vaidya, Mamatha Hopanna, Sebastian Smoot, HDR

Alternate **Determining Background Concentrations of PFAS in Massachusetts Soils**
Tom Schwartz, Northeast Biosolids and Residuals Association; Lisa McIntosh, Lisa Campe, Woodard and Curran, Inc.

11:45 a.m. **Session adjourns for networking luncheon**

Session 11: Circular Water Economy
Thursday, May 18, 2023
8:30 a.m. - 11:45 a.m.

8:30 a.m. **Using Bench-Scale Testing to Determine if Food Waste Co-digestion is Right for You**
Christine Polo, Rashi Gupta, Tanja Rauch-Williams, Carollo Engineers; Matthew Higgins, Bucknell University; Jan Hauser

9:00 a.m. **Global Lessons for Benchmarking and Reducing Fugitive Methane Emissions from Sludge Treatment and Biogas Handling**
Emma Shen, Adrian Romero, Aprilia Vellacott, Amanda Lake, Jacobs

9:30 a.m. **Assessing the GHG Emission Tradeoffs of Energy Recovery with Thermal Drying**
Nicole Stephens, Steven Lobo, Stantec

10:00 a.m. **Networking break**

10:45 a.m. **Developing a Robust and Resilient Anaerobic Digestion Process for Co-Digestion of Food Waste and Municipal Solid Waste**
Emma Guertin, Brown and Caldwell; Francis De Los Reyes, North Carolina State University

11:15 a.m. **Camden Bioenergy Facility Energy Independence Project**
Charles Winslow, Jay Surti, GHD

Alternate **Brownfield Restoration with Biosolids in Metropolitan Chicago: Soil Health Reconstruction**
Guanglong Tian; Theresa Johnston, Albert Cox, Metropolitan Water Reclamation District of Greater Chicago; Heng Zhang, MWRD of Greater Chicago At Cicero Stickney WTP; Edward Podczerwinski

Alternate **Greenfield Wastewater Resource Recovery Facility in Southern California Leverages State of the Art Technology to Deliver Complete Resource Recovery & Community Resilience**
Margaret Laub, Anaergia

11:45 a.m. **Session adjourns for networking luncheon**

Session 12: Innovative Processes in Anaerobic Digestion
Thursday, May 18, 2023
8:30 a.m. - 11:45 a.m.

8:30 a.m. **Pilot-Scale Anaerobic Digestion and Dewatering of Aerobic Granular Sludge**
Muriel Steele, Charlotte Water; Matthew Higgins, Bucknell University; Bryce Figdore, HDR Inc

9:00 a.m. **Phosphorus Release and Recovery from Digested Anaerobic Sludge in an Electrochemical System**
Zixuan Wang, Zhen He, Washington University in St. Louis

9:30 a.m. **Condition-Based Monitoring of Biogas Compressor Using Nonintrusive Sensors and Machine Learning**
Zhongtian Li, Rashi Gupta, Carollo Engineers

10:00 a.m. **Networking break**

10:45 a.m. **Enhancing Anaerobic Digestion Performance with the Microbial Hydrolysis Process**
David Parry, Maddy Fairley-Wax, Jacobs; Scott McClelland, Encina Wastewater Authority; Gary Nigro, Oakland County Water Resource Commission

11:15 a.m. **Novel Application of Vacuum Extraction to Anaerobic Digestion for Process Intensification and Resource Recovery**
Christopher Muller, Brown and Caldwell; Domenico Santoro, USP Technologies; Ahmed Al-Omari; Eunkyung Jang; George Nakhla, University of Western Ontario; John Norton, Xavier Fonoll Almansa, Great Lakes Water Authority; Francis Okoye; Ali Kadir, Western University of Ontario; Katherine Bell, Stantec

11:45 a.m. **Session adjourns for networking luncheon**

Technology Spotlight II
Thursday, May 18th
10:15 a.m. - 10:45 a.m.

The two exhibitors listed below will each be holding a 20-minute presentation once each. Participants are invited to join a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kickoff concurrently at: ***10:15 AM*** *in each of the two booths.*

10:15 AM 2 Simultaneous Presentation A

Booth tbc **Advanced dewatering for most conventional to most innovative conditioning Special focus on PXVNeo HydroThermal Carbonisation plant, first HTC on municipal sewage sludge in the US**
Jean-Francois Mischler, Bucher Unipektin AG

Booth 215 **Truck Loading System: the FOIL**
Robert Christy, RDP Technologies

Technology Spotlight III
Thursday, May 18th
12:30 p.m. - 1:20 p.m.

The two exhibitors listed below will each be holding a 20-minute presentation once each. Participants are invited to join a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kickoff concurrently at: ***1:00 PM*** *in each of the two booths.*

12:55 PM Technology Spotlight Introduction at entrance to exhibit hall
1:00 PM 2 Simultaneous Presentation A

Booth 323 **Understanding the physio-chemical mechanism for PFAS elimination under supercritical conditions**
Sudhakar Viswanathan, 374Water Inc.

Booth 525 **Double your cake solids in under 1 min**
Christopher Boyd, Charter Machine Co

Session 13: Case Studies
Thursday, May 18, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **100% Renewable Solar Biosolids Drying: Two Years of Surprising Performance**
Kenneth Klittich, Brown and Caldwell; Adam Festger; Lee Lambert; Richard Traeger

2:00 p.m. **Relief of Undigestion: Optimizing a Biosolids Drying Facility in Response to Major Feedstock Changes**
Sean Murnan, Manuel Irujo, New England Fertilizer Company

2:30 p.m. **Fort Worth's Alternative Delivery Biosolids Management Solution**
Peter Burrowes, Jacobs; Steven Nutter, Fort Worth Water Department; Suzanna Abbe, Matthew Berg, Timothy Lyons, Jacobs

3:00 p.m. **Networking break**

3:45 p.m. **Evolution of an Intelligent Biosolids System**
Chris Maher, Mike Gates, Clean Water Services

4:15 p.m. **Two Birds with One Stone: Addressing Off-Season Woes and Producing a Class A Product at SHVUA**
Thomas Johnson, Jacobs; Mark Houle, South Huron Valley WWTP

Alternate **Multi-utility Collaboration to Address Biosolids Management Challenges in the South Carolina Low Country**
C. Michael Bullard, Olivia Flynn, Hazen and Sawyer; Mark Cline, Charleston Water System; Allan Clum, Mount Pleasant Waterworks; Jarred Jones; Ruth Borgmann, Jacqueline Yeh, Hazen and Sawyer

Alternate **NYC's Biosolids Master Plan**
Jane Gajwani, NYCDEP; Paul Knowles, Mohammad Abu-Orf, Hazen and Sawyer; Mikael Amar, Natalia Perez, Jen McDonnell, NYCDEP; John Lavery, SYLVIS Environmental Services Inc.; Jennifer Muir; Carl Lagasca, AECOM

4:45 p.m. **Session adjourns**

Session 14: Co-Digestion
Thursday, May 18, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **WRF Research Highlights: New Discoveries and Tools to Support Your Co-Digestion Program**
Stephanie Fevig, The Water Research Foundation; Mohammad Abu-Orf, Hazen and Sawyer; Ganesh Rajagopalan, AECOM; Tanja Rauch-Williams, Carollo Engineers

2:00 p.m. **Business Case Evaluation of Co-digestion for Wasatch Resource Recovery and Wasatch Integrated Waste Management**
Juliet Ohemeng-Ntiamoah, David Parry, Jacobs; Matthew Myers, Wasatch Resource Recovery; Nathan Rich, Wasatch Integrated Waste Management

2:30 p.m. **An Evaluation Study of Santa Rosa's Existing Co-digestion Program: Why Truck Along when You can Optimize?**
Maxwell Armenta, Alison Nojima, Brown and Caldwell; Renae Gundy, City of Santa Rosa Water Administration

3:00 p.m. **Networking break**

3:45 p.m. **Co-digestion of Organic Wastes in Anaerobic Digesters: Potential Benefits, Unintended Consequences and Lessons Learned from Multiple Studies**
Ganesh Rajagopalan, AECOM

4:15 p.m. **WRF Project# 5307: Evaluation of Source Separated Organic Feedstock Pretreatment and Management Practices**
Micah Blate, Mohammad Abu-Orf, Derya Dursun, Kelly Landry, Conner Murray, Hazen and Sawyer

Alternate **Advancing Resource Recovery with Sustainable Food Waste Management**
Michael Keleman, Casey Furlong, InSinkErator

4:45 p.m. **Session adjourns**

Session 15: New Research in Anaerobic Digestion
Thursday, May 18, 2023
1:30 p.m. - 3:00 p.m.

1:30 p.m. **On Establishing Microbial Community-Process Function Relationships in Anaerobic Digestion**
Nicholas JN Benn, Antonio Martins, Daniel Zitomer, Marquette University

2:00 p.m. **Bioaging of Polyethylene And Its Impact on Sorption of Organics**
Faika Dilek Sanin, Maha Dassouki Dit Tahan, İpek İmamoğlu, Middle East Technical University

2:30 p.m. **Assess the Effectiveness of Free Nitrous Acids in Controlling Problematic Microorganisms in Biosolids Treatment**
Guangbin Li, Camila Proano, Jakob Brinkman, University of Maryland; Xueming Xu, Virginia Tech

Alternate **Thermal Hydrolysis for All: Options for Small and Medium Size Plants**
Coenraad Pretorius, GHD; Jeremy Kraemer; Jay Surti, GHD

3:00 p.m. **Session adjourns for networking break**

Session 16: Advances and Innovations in Thermal Processes I
Thursday, May 18, 2023
1:30 p.m. - 4:45 p.m.

1:30 p.m. **Pyrolysis, Gasification, and Incineration – How They Compare**
Lloyd Winchell, John Ross, Brown and Caldwell; Dominic Brose; Thais Bremm Pluth; Xavier Fonoll Almansa, John Norton, Great Lakes Water Authority

2:00 p.m. **Designing for the Future of Solids Management Optimizing Biodrying and Pyrolysis Treatment Design**
Anthony Tartaglione, Hazen and Sawyer; David Ernst; Allan Briggs, Derya Dursun, Mohammad Abu-Orf, Hazen and Sawyer

2:30 p.m. **Design and Performance Evaluation of a Solar Assisted Dryer with Decentralized Thermal Recovery Gasification System**
Alexander Kraemer, Harvest Technology, LLC; Steffen Ritterbusch, engineering4environment

3:00 p.m. **Networking break**

3:45 p.m. **Demostrated Full-Scale Biosolids Drying & Pyrolysis at Rialto Bioenergy Facility to Eliminate PFAS in Biosolids, Facilitate Sustainable Biosolids Management, & Advance the Circular Economy**
Margaret Laub, Anaergia

4:15 p.m. **Advanced Thermal Conversion of Sewage Sludge to Biochar**
Ross Wilson, Richard Lancaster, Atkins; Yadira Bajon Fernandez, Cranfield University; Esme Piechozcek, Sarah-Jane Westlake, Atkins; Ken Shapland, UKWIR; Ewan McAdam, Stuart Wagland, Phil Longhurst, Cranfield University; Dan Green, Wessex Water

4:45 p.m. **Session adjourns**

Session 17: Regional Biosolids Session: What Do You Need to Know before Solidifying Your Plans?
Thursday, May 18, 2023
3:45 p.m. - 4:45 p.m.

Speakers: Vanessa Borkowski, Stantec; Karla Sangrey, Upper Blackstone Water Poll Abatement District; Mike Engelmann, Pinellas County Utilities; Quinton Fletcher, City of Atlanta; Jeffrey Ziegenbein; Charles Alix; Richard Tsang, Eric Spargimino, CDM Smith; Drury Whitlock, Jacobs

With an increasingly dynamic regulatory landscape, the water industry is at a fork in the road to determine the best approach for biosolids handling and use: does one regionalize or go at it alone? The answer to this question is not entirely straightforward, as the path forward is an economic commitment riddled with regulatory, legal, and engineering hurdles.

This workshop is comprised of two panel discussions to address new and existing biosolid regionalization programs. Panel 1 will include the new programs to highlight the current drivers for regionalization, stakeholder considerations, funding opportunities, regulatory hurdles, legal requirements, private-sector solutions, and end-user perspectives all through the lens of our most recent industry advancements. As a nod to biosolids regionalization programs with 10 or more years under their belt, Panel 2 will include historical context, economic performance, and lessons learned during the life of the program. Each panel will include prepared questions and allow for audience Q&A for a set period of time. Following each panel Q&A, the audience is encouraged to have thoughtful discussions at their roundtables.

Facility Tour
(Additional fees apply)

Charlotte Water's McAlpine Creek Water Facility Tour
Friday, May 19, 2023
8:00 a.m. – 11:00 a.m.
Capacity: 55

Join us on a tour of Charlotte Water's McAlpine Creek Water Facility (64MGD). There you will see our 1.0 MW combined heat and power system, our dewatering done by centrifuges, and our Class B land application program. You'll also learn more about our plan and design to implement nutrient harvesting and THP at this location.

Session 18: Managing Biosolids in the Carolinas
Friday, May 19, 2023
8:30 a.m. - 11:15 a.m.

8:30 a.m. **The Changing Landscape of Biosolids Management in North Carolina Over the 21st Century's First Two Decades**
Robert Forbes, Jacobs; A. Rubin, North Carolina State University; Todd Williams, Jacobs; Michelle Mayes

9:00 a.m. **Forging a Path Amidst Rising Tip Fees and Regulatory Uncertainty - One South Carolina Utility's Biosolids Approach**
Tom Nangle, Brown and Caldwell; Rick Jolley, Spartanburg Water

9:30 a.m. **From Master Planning to THP. Charlotte Water's Approach to Regionalize Solids Handling and Treatment.**
Kwok-Wai Tsang, CDM Smith Inc; Joseph Lockler, City of Charlotte/Charlotte Water; Giovanna Forti Portiollo, Charlotte Water

10:00 a.m. **Networking break**

10:15 a.m. **Implementation of Raleigh Water's Bioenergy Recovery Project**
Greg Knight, Black & Veatch; Baile Erika, Raleigh Water; C. Michael Bullard, Hazen and Sawyer; Christine deBarbadillo; John Kiviniemi; Kurtis Proffit, Black & Veatch; Amy Hanna, Hazen; Lisa Joseph, Jeffrey Bognar, Raleigh Water

10:45 a.m. **Survey for the City of Raleigh of Existing THP Biosolids Characteristics and End-Use**
William Brower, Brown and Caldwell; Ronald Alexander, R. Alexander Associates, Inc.; Marla Dalton, City of Raleigh

Alternate **Do I Need to Dry The Cake? An Overview of Sludge Drying Technologies and Drivers for Implementation in the Carolinas**
Charles Goss, AECOM

Alternate **Taking Back Control of Residuals: Flipping the Script From Disposal to Reuse**
Will Allen, Brandon Gott, GHD Consulting Services

11:15 a.m. **Conference adjourns**

Session 19: Resource Recovery
Friday, May 19, 2023
8:30 a.m. - 11:15 a.m.

8:30 a.m. **A National Bioresources Strategy for England**
Sarah-Jane Westlake, Richard Lancaster, Esme Piechozcek, Atkins; Yadira Bajon Fernandez, Ewan McAdam, Cranfield University; Garry Strange, Peter Talboys, Atkins; Paul Shaffer, CIWEM; Ross Wilson, Atkins; Ken Shapland, UKWIR

9:00 a.m. **TUAS WRP - A Resource Recovery Factory**
Colin Newbery, Gokul Bharambe, Peter Burrowes, Jacobs; Mark Wei Qiang Wong, Charles Lim, Nunthinee Sundaramurthi, Wee Siang Liow, Public Utilities Board Singapore

9:30 a.m. **The Opportunity for WRRFs to Advance Regional GHG Reduction Goals**
Jay Surti, Charles Winslow, Mary Martis, John Story, Mohammad Islam, GHD

10:00 a.m. **Networking break**

10:15 a.m. **Demand-Driven Gas Production Using Co-Substrates from the Dairy Industry**
Christian Hubert, Bettina Steiniger, Bundeswehr University Munich; Christian Schau

10:45 a.m. **Anaerobic Co-digestion of FOG and Municipal Solids Enhances Volatile Solids Destruction at Full-Scale Facility: How Adding FOG Improved Digester Performance and the Microbial Community that Facilitated FOG Destruction**
Thomas Solon, Renewable Water Resources; Sudeep Popat

Alternate **Bioplastic Production from Salty Food Waste**
Xueyao Zhang, Virginia Tech; Naresh Amradi, Amro Hassanein, Stephanie Lansing, University of Maryland; Zhiwu Wang

11:15 a.m. **Conference adjourns**

Session 20: Upgrading Biogas to RNG
Friday, May 19, 2023
8:30 a.m. – 10:00 a.m.

Speakers: Silvia Fuentes, WSSC Water; Jeff Prevatt, Pima County Regional

Upgrading biogas to RNG standards for pipeline injection and RIN sales are an excellent complement to the water reclamation portfolio of renewable products providing an additional source of revenue. While many utilities utilize digester biogas for cogeneration and thermal demands, many continue to flare excess biogas. Upgrading biogas to RNG can provide an additional source of utility revenue while simultaneously reducing carbon emissions.

This Session provides an overview of the processes involved in upgrading of biogas to renewable natural gas standards for pipeline injection and ultimate distribution and sale of renewable identification number (RIN) credits.

Session 21: Advances and Innovations in Thermal Processes II
Friday, May 19, 2023
8:30 a.m. - 11:15 a.m.

8:30 a.m. **Does Thermal Hydrolysis Alter the Efficiency besides the Rate of Anaerobic Digestion?**
Hao Luo, Virginia Tech; Zhiwu Wang; Mary Strawn, Fasil Haile, Arlington County Water Pollution Control Bureau

9:00 a.m. **Assessing Impacts of Thermal Hydrolysis on Mainstream Non-Biodegradable Organic Carbon and Nutrients at the Broad Run WRF**
Ankit Pathak, Wendell Khunjar, Hazen & Sawyer; Kendra Sveum, Bradley Schmitz, Loudoun Water; Rafael Iboleon, Virginia Tech CEE Department - Occoquan Laboratory; Zhiwu Wang

9:30 a.m. **Integrating Hydrothermal Pre-treatment and Vacuum Fermentation for Volatile Fatty Acids and Methane Recovery from Municipal Sludge**
Farokh Laqa Kakar, Brown and Caldwell; Frances Okoye; Hussain Aqeel, Queen's University; Katherine Bell, Stantec; Steven Liss, Toronto Metropolitan University; Elsayed Elbeshbishy; Christopher Muller, Brown and Caldwell; Ahmed Al-Omari

10:00 a.m. **Networking break**

10:15 a.m. **Biosolids and Algae – Two Problematic Birds, One Sustainable Stone**
Dan Levy, Charles Goss, Will Lovins, AECOM; James Oyler, Genifuel Corporation

10:45 a.m. **Dry Another Day**
Julianne Amenta, Hazen and Sawyer; Kendra Sveum, Loudoun Water; Matthew Vanhorne, Hazen and Sawyer

Alternate **Demonstration of Supercritical Water Oxidation to Diversify End Products, Destroy PFAS and Reduce Air Emissions**
Derya Dursun, Mohammad Abu-Orf, Hazen and Sawyer; Lynn Grijalva; Belton Copp, 374Water Inc.

11:15 a.m. **Conference adjourns**

Session 22: Turning Waste Products into Premium Products
Friday, May 19, 2023
10:15 a.m. – 11:15 a.m.

Speaker: David Buurma, LaSalle Agri

Learn about the challenges of producing and marketing biosolids-derived fertilizers from the largest distributor of biopellets/fertilizers in Ontario. Presentations will discuss how to produce a quality product, create a strong brand, and build a reliable distribution system. Topics covered include:

- Storage
- Spreading Application Process
- Equipment Customization
- Policy Opposition
- Expanding into new markets
- Public Acceptance

This session will expand on each item and how this organization has overcome obstacles and taken advantage of market opportunities.

11:15 a.m. Conference adjourns