AWWA Water Quallity Technology Conference (WQTC)
Session Descriptions
November 17-21, 2024 in Schaumburg, Illinois

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PCW01	PCW01 - Drinking Water Microbiology: Methodologies and Quality Control	This workshop will provide an overview of the microbial drinking water programs within the US and Canada. Training will include a hands on component where attendees can observe and perform the methods used to analyze drinking water supplies. The workshop will also provide an overview of Quality Control and Quality Assurance (QC/QA) programs and how they are necessary in drinking water programs.	11/17/24	8:00 AM	5:00 PM	Jennifer	Best	Microbiologist	US EPA
PCW02	PCW02 - Adding Utility Benchmarking to Your Continuous Performance Improvement Toolbox	This workshop shows utilities how to use benchmarking data from AWWA's Utility Benchmarking Survey (UBS) to improve performance. Using results from UBS, utilities can focus their efforts on areas with gaps and set improvement targets. This workshop will educate attendees on how to utilize the UBS data as a part of their continuous performance improvement process. Three utilities will share their experiences in how they use the UBS data to drive strategic performance. Several examples will be provided in demonstrating how these utilities established performance targets and how they communicate their performance to their stakeholders. Workshop attendees will take part three group exercises to learn how to use specific UBS indicators to improve performance and service delivery.	11/17/24	8:00 AM	12:00 PM	Frank	Roth	Program Manager	American Water Works Association
PCW03	PCW03 - Algae and Cyanobacteria Blooms: Track, Identify and Predict	Cyanobacteria have the potential to produce harmful toxins which can cause adverse health effects in humans and animals. Monitoring tools are needed to assess environmental conditions and stop blooms in their nascent stages. By highlighting three HAB monitoring technologies, this workshop will provide a comprehensive introduction to algae HAB monitoring, from the reservoir to the lab.	11/17/24	1:00 PM	5:00 PM	Greg	Ford	Director of Development	Phytoxigene
T1	DuPage Water Commission (DPWC)	The second largest water supply system in Illinois, the DuPage Water Commission (DPWC) has been providing water to DuPage County municipalities since beginning operations in 1992. Lake Michigan water treated by the City of Chicago is purchased by DPWC and ultimately reaches the DuPage Pumping Station. The DuPage Station's nine distribution pumps have a pumping capacity of 185 million gallons of water per day. The station's reservoir holds 30 million gallons. The complex control center is equipped with sophisticated computers that monitor the delivery of water through more than 185 miles of transmission and feeder mains to the Commission's wholesale customers.	11/17/24	12:00 PM	12:00 PM	n/a - technical facility tour			
MON01	MON01 - Manganese Removal and Release	This session will tackle manganese contamination, from regulatory frameworks to practical applications such as biofiltration, delving into case studies like the Washington State Manganese Initiative and the dual challenge of manganese and arsenic treatment in Lincoln, Nebraska.	11/18/24	10:30 AM	12:00 PM	Philip	Brandhuber	Owner	Brandhuber Wtr. Quality/Trtmnt LLC
MON01-01	Washington State Manganese Initiative - When Regulations Are Not Enough	The 'Manganese Initiative' is the Washington Department of Health's (DOH) effort to change decades of guidance to water systems regarding the health impacts of manganese in drinking water without changing existing regulations. Research worldwide has given us a more complete understanding of how manganese interacts with drinking water systems and its human health impacts. This effort focuses on first changing department staff's beliefs regarding manganese, and then using the leverage of public health advocacy to encourage water system to reduce manganese exposure to their customers. Challenges, lessons learned from increased field investigations and successes will be presented.	11/18/24	10:30 AM	11:00 AM	Stephen	Deem		Washington Department of Health
MON01-02	Manganese Distribution System Release after Implementing Treatment or Switching Sources	Manganese (Mn) in drinking water poses health and aesthetic issues. As water systems implement treatment or change sources to lower the Mn concentration entering the distribution system, legacy Mn that has accumulated within the distribution system needs to be considered. Water sampling was performed in four different distribution systems with source water Mn between 55-2300 µg/L. Following a treatment or source change, Mn in the distribution system was consistently greater than at the entry point after the change for 3 of the 4 systems. Mn levels varied, and elevated Mn persisted longer at sites farther out in the distribution system. Factors related to Mn release included iron, nitrate, and chlorine residual.	11/18/24	11:00 AM	11:30 AM	Asher	Keithley		U.S. Environmental Protection Agency

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON01-03	Mechanistic Insights into Manganese Removal from Groundwater using Biofiltration	Manganese (Mn) in drinking water can lead to both aesthetic and operational issues. Moreover, Mn exposure has been linked to cognitive and neurobehavioral effects in children. Consequently, the World Health Organization has set a provisional guideline of 80 µg/L for Mn in drinking water. Biofiltration has been recognized as an effective method for removing Mn from drinking water. Despite its effectiveness, the processes underlying Mn removal in biofilters are not entirely understood and require further investigations. In this study, we conducted a 240-day pilot-scale study focusing on how Mn removal process evolves over time as the biofilter matures by using a combination of pilot-scale operations and batch testing.	11/18/24	11:30 AM	12:00 PM	Hemant	Arora	PhD Candidate	
MON02	MON02 - Reuse and Concentrate Management	This session focuses on cutting-edge approaches in potable water reuse and concentrate treatment technologies. Topics include demonstrating pathogen removal with sMBR, enhancing risk resiliency for potable reuse in El Paso, and 1,4-dioxane removal using RO and concentrate stream oxidation.	11/18/24	10:30 AM	12:00 PM	Daniel	Haddock	Director of Water Utility Services	INTERA
MON02-01	Risk Resiliency through Potable Reuse: the Next Horizon for El Paso Water	El Paso Water is exploring options to provide a new potable reuse supply to meet growing demands in the northwestern portion of the city, and achieve a dual objective of reducing risk of sewer overflows by diverting wastewater from a force main in that area as the supply for the new reuse facility. For this initial feasibility study, a comprehensive suite of reuse alternatives, including indirect potable reuse and direct potable reuse are under consideration.	11/18/24	10:30 AM	11:00 AM	Caroline	Russell		
MON02-02	Treatment of 1,4-Dioxane with Reverse Osmosis and Subsequent Concentrate Stream Oxidation	Piedmont Triad Regional Water Authority is pilot-testing multiple processes to remove 1,4-dioxane from their surface water supply, including reverse osmosis applied to combined filter effluent, and GAC, IX, and UV/AOP applied to the membrane retentate stream. This presentation discusses the effectiveness of such advanced treatment processes in removing 1,4- dioxane from a surface water source.	11/18/24	11:00 AM	11:30 AM	Greg	Flory		
MON02-03	Acid and Base Recovery from Desalination Brine in Innovative Zero-liquid Discharge Process with Bipolar Membrane Electrodialysis	The overall project focus is on treating the KBHDPs RO concentrate, accounting for the evaluation of multiple systems in both bench- and pilot-scale. The technical hypothesis is that an integrated approach of three innovative electrodialysis (ED) processes in series, e.g., selective ED (SED) – ED brine concentrator (EDBC) – bipolar membrane ED (BMED), can successfully treat RO concentrate and recover product water for irrigation while generating chemicals for onsite uses or revenue. My work on this project is centered on testing the BMED system at the bench-scale setting for the generation of acids and bases from highly concentrated salt stream and identifying the optimal point of application for the system to be scaled-up in the future.	11/18/24	11:30 AM	12:00 PM	Abdiel	Lugo Montes	PhD Candidate	New Mexico State University
MON03	MON03 - Challenges with Quantification & Disinfection of Internalized Legionella	The ability of Legionella pneumophila (Lp) to live and replicate within amoeba hosts proves challenging with respect to detection, quantification, and disinfection. Underestimation of Legionella pneumophila concentrations in building and distribution systems can potentially mask the issue and delay remedial actions. This session will review and compare (i) the accuracy of detection methods, (ii) the efficacy of disinfectants, and (iii) Lp proliferation under different conditions.	11/18/24	10:30 AM	12:00 PM	Sherry	Parker	Water Quality Manager	Provo Water Co. Ltd.
MON03-01	Systematic Review of Detection and Disinfection of Amoeba-Internalized Legionella Pneumophila	Legionella pneumophila can exist in free-living (FL-) or amoeba-internalized (AI-) states. AI-L. pneumophila (AI-Lp) have increased resistance to conventional oxidants (i.e., chlorine, chloramine) when internalized in either trophozoites or cysts. It is unknown if current enumeration methods detect AI-Lp along with FL-Lp. The aim of this systematic literature review is to identify knowledge gaps relating to detection and treatment not only of Legionella and their hosts alone, but of host-internalized and/or protozoan-primed L. pneumophila. The review will summarize common detection methods along with dose-response curves to compare disinfectant effectiveness against FL-Lp and AI-Lp.	11/18/24	10:30 AM	11:00 AM	Ayella	Maile-Moskov		Southern Nevada Water Authority

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON03-02	Understanding the Impact of Free-living Amoeba Hosts on Quantification of Legionella Pneumophila in Water	L. pneumophila (Lp) replicate intracellularly in the environment, most often within a free-living amoeba (FLA) host. Once released, either through FLA cell lysis or FLA production of extracellular vesicles (EVs), Lp have demonstrated increased virulence towards human macrophages. Quantifying the true Lp population in a sample is imperative for understanding the infection risk within a specific water system. The goal of this project is to evaluate the ability of direct plating (ISO 1137:2017), IDEXX Legiolert, and qPCR to account for amoeba internalized and EV-associated Lp. The results of this study will inform future Lp monitoring efforts and allow us to better understand if we are underestimating true Lp populations.	11/18/24	11:00 AM	11:30 AM	Christina	Morrison		
MON03-03	Replication of Lab and Environmental Legionella Pneumophila Isolates within Acanthamoeba Polyphaga Under Varying Conditions	This research examines Acanthamoeba polyphaga internalization of different lab and environmental L. pneumophila strains under a variety of conditions. L. pneumophila replication within A. polyphaga was compared for different temperatures (15, 25, 35°C) and multiplicities of infection (ratio of L. pneumophila per amoeba). Infections of amoeba with L. pneumophila were performed in nutrient free media (Page's amoeba saline) mimicking idealized laboratory conditions and with dechlorinated tap water to mirror conditions found in treated water. The results presented here examined the potential for L. pneumophila proliferation in a host often associated with biofilms in relevant water matrices under a variety of operating temperatures.	11/18/24	11:30 AM	12:00 PM	Ayella	Maile-Moskov		Southern Nevada Water Authority
MON04	MON04 - Impacts for Hot Water Heaters and Pipe Materials on Premise Plumbing Contamination	This session will explore volatile organic compounds in plastic drinking water pipes, alongside an analysis of chemical and microbial contaminants in polypropylene systems. Additionally, there will be a focus on residential hot water heaters and their implications for premise plumbing operation practices.	11/18/24	10:30 AM	12:00 PM	Christina	Devine		
MON04-01	Temperature Effects on Diffusion and Partitioning of Volatile Organic Compounds in Plastic Drinking Water Pipes	The primary focus of this presentation is an experimental examination of the uptake and release of several organic contaminants of concern in plastic drinking water pipes under a range of temperatures relevant to drinking water systems. During this study, greater contaminant uptake and lower contaminant leaching was observed in polyethylene pipes at elevated temperatures under certain conditions. Data and modeling developed in this work have important implications for sampling and decontamination of drinking water systems affected by disasters such as wildfires and industrial accidents. Temperature effects may be particularly important to premise plumbing applications, which frequently involve transport of both hot and cold water.	11/18/24	10:30 AM	11:00 AM	Levi	Haupert		US EPA
MON04-02	Vertical Stratification of the Water Microbiome in an Electric Water Heater Tank: implications for premise plumbing opportunistic	Hot water systems are the most frequent environment associated with the prevalence and growth of opportunistic premise plumbing pathogens (OPPPs). Previous studies associated electric water heaters with a higher prevalence of OPPPs than gas heater devices and concluded that design variables, water column stratification, and sedimentation contribute to Legionella colonization in electric devices. The outcome of this study sheds light on the role of vertical stratification on water quality in an electric water heater tank connected to a simulated home plumbing system and has implications for OPPPs and public health.	11/18/24	11:00 AM	11:30 AM	Vicente	Gomez-Alvare		
MON05	MON05 - The Microplastics Maelstrom. Part 1: In the Laboratory	Although microplastics are unregulated, and both occurrence and health effects pertaining to drinking water are not well-understood, the topic continues to garner significant interest from utilities and their customers. This second installment of the two-part series profiles advances in analytical methods.	11/18/24	10:30 AM	12:00 PM	Sydney	Samples	Research Program Manager	

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON05-01	Development of Optimal Methods to Isolate Microplastics for Analyses in Drinking Water	Quantification of microplastics in drinking water using Raman or FTIR spectroscopy must be preceded by a “clean-up” step to remove extraneous organic and inorganic particulates. Various procedures have been proposed that include digestion, oxidation, and acidification techniques, however, an optimal method has not been systematically investigated. Following “clean-up”, particles are separated by passing water through filters prior to quantification using Raman spectroscopy. Since remaining extraneous particles that outnumber microplastics by a factor of up to 1,000:1, the time required to analyze all particles is impractical. As such, “sub-sampling” strategies were evaluated to reduce analysis time while maintaining accuracy.	11/18/24	10:30 AM	11:00 AM	Husein	Almuhtaram	Postdoctoral Fellow	University of Toronto
MON05-02	Comprehensive Microplastics Identification and Quantification in Drinking Water using Raman Spectroscopy and Optical Microscopy	Microplastics monitoring represents an important step towards maintaining a safe drinking water supply. Methods implemented in California represent an important step forward in this area. However, the speed of the chemical characterization step necessitates the use of sub-sampling which introduces some errors in the quantification and may miss some of the most dangerous microplastics particles. This presentation describes the progress in developing a rapid scanning Raman device which can provide characterization of the vast majority of microplastics particles in a sample while holding the potential to identify those particles that require more analysis. This presentation will discuss the rationale for this work and current progress.	11/18/24	11:00 AM	11:30 AM	Steve	Barnett	CEO	Soar Optics
MON05-03	Direct Comparison of Raman Spectroscopy to Pyro-GC/MS for Microplastic Quantification in Source and Treated Drinking Waters	Analysis of microplastics in drinking water is primarily conducted using Raman or FTIR spectroscopy to determine particle size, concentration, and polymer type. However, these spectroscopic techniques cannot be used to directly determine particle mass, which typically forms the basis for contaminant regulation. This presentation directly compares the use of pyrolysis-gas chromatography-mass spectrometry to quantify microplastic mass versus Raman spectroscopy for 10 treatment facilities. In addition, a proposed method for calculating microplastic mass based on Raman spectroscopic data has been developed and assessed. Results from this work provide the basis for future microplastic monitoring and potential regulation in drinking water.	11/18/24	11:30 AM	12:00 PM	Husein	Almuhtaram	Postdoctoral Fellow	University of Toronto
MON06	MON06 - Lead Assessment Tools and Approaches	This session will present experiences with assessing corrosion control.	11/18/24	10:30 AM	12:00 PM	Quirien	Muylwyk	Americas Practice Director - Water Quality	AECOM
MON06-01	Redefining Protocols: Tucson Water's Distribution System and Site Assessment Approach	One of the EPA’s 2023 Lead and Copper Rule Improvements (LCRI) is the “Distribution System and Site Assessment” (DSSA), the more comprehensive LCRR Find-and-Fix Assessment. Designed to address lead levels exceeding the new action level of 10 ug/L in premise plumbing of customers’ homes. The presentation discusses the two assessment steps: distribution system assessment and site system assessment. Attendees will gain insights into implementing the DSSA, developing visual aids and organizing multi-disciplinary groups for effective communication and implementation.	11/18/24	10:30 AM	12:00 PM	ALEJANDRA	FRAIJO	Water/Wastewater Project Engineer	HDR Engineering
MON06-02	Trouble Shooting Flow-Through Pipe Loop Operations	With the LCRR requiring the lead trigger level and LCRI proposing to lower the action level, more utilities will need to perform corrosion optimization studies, and large and medium systems will be required to perform flow-through pipe loop studies. Because data for these studies are collected over more than a year, maintaining reliable operations and quickly trouble-shooting errors is key to collecting accurate, actionable results. This talk will draw on experience operating pipe loops over multiple years in utilities around the US to review best practices for training and data review, common operational issues, and best practices for maintenance and spare parts.	11/18/24	11:00 AM	11:30 AM	Joanna	Cummings		
MON06-03	The ‘True’ Cost of Orthophosphate: A Cost-Benefit Analysis of Orthophosphate Addition to Water and Wastewater Facilities	Erie County Water Authority serves more than 500,000 people through approximately 175,000 service connections in western NY. As the Authority’s distribution system contains lead service lines, they have proactively embarked on a pipe rig study evaluating an orthophosphate dose of up to 3 mg/L which would incrementally increase phosphorus concentrations in wastewater collection systems. This presentation will compare the addition of orthophosphate to the short- and long-term costs and benefits to the Authority under the implications of the LCRI. Future scenario planning is critical for many systems as they evaluate their annual budgets and strategies for reducing lead levels, while simultaneously achieving compliance.	11/18/24	11:30 AM	12:00 PM	Victoria	Nystrom	Principal Engineer	Hazen and Sawyer

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON07	MON07 - PFAS Planet: Characterization and Tracking	PFAS management in drinking water applications is not limited to treatment and associated residuals; a comprehensive response also includes understanding the vectors for water supply contamination. This session explores both identifying and characterizing PFAS contamination.	11/18/24	10:30 AM	12:00 PM	Lauren	Weinrich		American Water Company
MON07-01	Tools for the Characterization of PFAS in Wastewater	With the publication and availability of new test methods, expanded analyte lists for new PFAS compounds, the development of in-house methodology for novel analyte groups, and non-specific screening methods there is the potential for a tremendous amount of data available. With the variety of results that can be determined from a single sample, how does the end user sort through results? The intent of this presentation is to take a set of wastewater samples through several commercially available PFAS methods, including published methods that are recommended for use for National Pollutant Discharge Elimination System (NPDES) permits, like draft EPA 1633 and draft EPA 1621.	11/18/24	10:30 AM	11:00 AM	Jonathan	Thorn		Eurofins Lancaster Laboratories Environmental
MON07-02	Closing the Mass Balance of Targeted PFAS and Adsorbable Organic Fluorine throughout an Advanced Wastewater Treatment Plant	Per and polyfluoroalkyl substances (PFAS) are an unknown and underestimated burden to water and wastewater utilities. This study evaluated PFAS occurrence and behavior in an advanced wastewater treatment plant (WWTP). The two methods used for measuring PFAS were a non-targeted method that captures the adsorbable organic fluorine (AOF) in a sample and a targeted measurement of 44 PFAS analytes. The two methods were applied between each unit treatment process for the aqueous and solid streams in the WWTP. This study aimed to 1) provide results for AOF and targeted PFAS species, 2) establish a fluorine mass balance, and 3) understand the path of PFAS and AOF throughout the plant and evaluate differences in PFAS estimation for the two methods.	11/18/24	11:00 AM	11:30 AM	Sarah	Ortbal		University of Alabama
MON07-03	Applying a Vulnerability Assessment Tool to Track Down PFAS	In March 2023, the USEPA proposed a National Primary Drinking Water Regulation for PFAS. Estimates to comply with this proposed rule vary greatly and are in the billions of dollars. When possible, source control for PFAS is both more affordable and environmentally conscious than treatment downstream. To this end, the Birmingham Water Works -- the largest water utility in Alabama -- has undertaken a proactive monitoring program supported by Arcadis' PFAS Vulnerability Assessment Tool. This GIS-based tool has helped maximize the value of each sample towards identifying PFAS sources in the watershed. This presentation will discuss the source-identification capabilities of the tool and its potential to cut utility treatment costs.	11/18/24	11:30 AM	12:00 PM	Alma	Beciragic	Management Consultant	
MON08	MON08 - Unregulated Contaminants - the Next Frontier	This session will present research on contaminants of emerging concern, including unregulated disinfection byproducts, findings from UCMR5 on lithium occurrence and its potential as a new contaminant of concern, and a review of CECs in drinking water through the years.	11/18/24	1:15 PM	3:15 PM	Sarah	Page		Utah Division of Drinking Water
MON08-01	Co-occurrence of Unregulated DBPs with Regulated DBPs in DWDSs across the US – a Study under EPA's DBP/OP Consortium Project	Drinking water risk associated with opportunistic pathogen (OP) exposure must be balanced with those associated with disinfection by-product (DBP) exposure. Limited studies have examined the interactions between DBPs and OPs. To fill in the research gap, our project investigates the occurrence of both DBPs and OPs in drinking water distribution systems (DWDSs) and how they behave under different circumstances. This presentation will cover methods and results from the early stage DBP essays. Specifically, we will compare the co-occurrence of unregulated and regulated DBPs in DWDS in 20 participating utilities across the US. 26 species, including HAN4, THM4, I-THMs, HAA9 and HKs, were proposed to be tested.	11/18/24	1:15 AM	1:45 PM	Yue (Sophie)	Sun	PhD student	University of Massachusetts, Amherst
MON08-02	Lithium Occurrence: What We Have Learned from UCMR5	This presentation will mainly provide the latest UCMR5 outcomes, experienced challenges, and implemented solutions since the beginning of this monitoring cycle. The Li occurrence at the national and geographical state levels will be presented.	11/18/24	1:45 PM	2:15 PM	Yongtao	Li		Eurofins Eaton Analytical, LLC

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON08-03	Lithium – Is It The Next NPDWR?	Based on recent USGS and USEPA studies, lithium is likely to become the next regulated contaminant in drinking water as it can have an adverse human health effect and UCMR5 reporting shows it is found in drinking water at frequencies and concentrations of potential concern. Although lithium has important medicinal value, little is known about its effects at sub-therapeutic doses. Very little treatability information is currently available; data from interested utilities and ongoing treatment evaluations will be presented.	11/18/24	2:15 PM	2:45 PM	Christine	Owen	Director of Water & Reuse Innovation	Hazen and Sawyer
MON08-04	Review of 15+ Years of Compounds of Emerging Concern Data in Colorado Source Waters	The Northern Colorado Compounds of Emerging Concern Collaborative is a partnership between water utilities, a water wholesaler, and the University of Colorado Boulder that monitors for CECs in source waters throughout the Front Range of Colorado. Since 2008, the Collaborative has collected over 132,000 observations for 258 CECs across 51 sampling sites using state-of-the-art analytical techniques. In 2023, the Collaborative conducted a holistic analysis of the data to evaluate CEC occurrence, trends, and relevance to human health and the environment. This presentation summarizes the results of the data review and how other organizations can learn from the data and create similar programs.	11/18/24	2:45 PM	3:15 PM	Billy	Raseman		Hazen and Sawyer
MON09	MON09 - Pathogen LRVs with RO	This session explores strategies to assess and enhance pathogen removal efficiency and overall performance of RO systems, including innovative methods for managing RO concentrate, analyzing RO data, and responding to MBR breaches. The session aims to optimize RO processes for better regulatory compliance and system robustness. 	11/18/24	1:15 PM	3:15 PM	Bradley	Schmitz	Environmental Scientist	Loudoun Water
MON09-01	Strategies for Gaining Pathogen Removal Credits using Reverse Osmosis Membranes	This full-scale study investigates whether ionic indicators can be used to develop a membrane integrity testing method for RO membranes. This presentation presents testing results using MS2 bacteriophage, sulfate, and strontium on a 2.0 MGD RO system and can establish guidelines for granting pathogen removal credits for membranes.	11/18/24	1:15 PM	1:45 PM	Hunter	Adams	Environmental Laboratory Supervisor	City of Wichita Falls - Cypress Environmental Lab.
MON09-02	Layers of the Cake: Response of Pathogen LRVs and Downstream RO Fouling to MBR Breaches	Validating the pathogen log removal values (LRVs) achieved by MBR, and mitigating fouling of RO membranes downstream of MBR, are topics of increasing interest. The deposited fouling layer on the membrane surface, or cake layer, plays a significant role in MBR performance. In this study, a pilot-scale MBR-RO system was subjected to three rounds of controlled breaches. Each breach led to a discernable increase in the MBR filtrate turbidity and reduction in bacterial LRVs, although the magnitude and duration were variable. Viral LRVs and fouling propensity for RO remained remarkably constant pre- and post-breach. We believe that MBR cake is the underlying explanation for the observed differences between otherwise-identical breach conditions.	11/18/24	1:45 PM	2:15 PM	Michael	Adelman		
MON09-03	The Benefits of Thinking Abnormally: A New Way to Look at RO Data	Potable reuse requires removing pathogens by many orders of magnitude (log reduction values or LRVs). Reverse osmosis (RO) can remove pathogens by over 5 LRVs but this removal is challenging to verify in real-time. Research has focused on innovative sensors that can detect greater differences between RO feed and permeate. Nevertheless, the best approach to set alarms on these sensors remains an open question. A novel, non-normal statistical approach called the Shewhart sign chart was applied to 8 RO monitoring water quality surrogates from three utilities. This approach could detect true losses in LRV in three measurements while simultaneously halving false alerts for most surrogates evaluated.	11/18/24	2:15 PM	2:45 PM	Kyle	Thompson	Reuse Technologist	Carollo Engineers, Inc.
MON09-04	Novel Biological Concentrate Management for Increased Reverse Osmosis Recovery	This study applied biological treatment to RO concentrate from a brackish river source and extremely saline agricultural drainage. Controlled microbial deactivation of the antiscalant allowed for calcium sulfate to precipitate as a useful byproduct in the agricultural drainage, used as a soil amendment. Biological concentrate management increased the overall water recovery from 62 to 88% and 85 to >93% for the agricultural drainage and brackish river water, respectively. Biological concentrate management looks to address salinity through direct salt removal for areas impacted by salt importation, specifically California's Central Valley where 250,000 acres have been fallowed due to salinity and 1.5 million acres are salinity impaired.	11/18/24	2:45 PM	3:15 PM	Grace	Scarim		U.S. Bureau of Reclamation CO - Denver

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON10	MON10 - Legionella Occurrence in Drinking Water Distribution Systems	This session aims to address the knowledge gaps between occurrence/risk of Legionella in drinking water distribution systems and maintenance of disinfectant residuals. Studies from different parts of the country highlight the importance of monitoring distribution systems for Legionella. Actions taken in response to Legionella detection include flushing mains, increased sampling, boosting disinfectant residual and public communication.	11/18/24	1:15 PM	3:15 PM	Bina	Nayak	Water Research Project Manager	Pinellas County Utilities
MON10-01	Risk Assessment of Legionella pneumophila in Drinking Water Distribution Systems	Water Research Foundation project #5156 resulted in a combined large 5-year dataset of 9,181 samples from 57 utilities that permits an assessment of risk of Legionella pneumophila from distribution systems water. The low distribution system risk estimates indicate that L. pneumophila risks are not from the utility distribution systems for the systems monitored in this study.	11/18/24	1:15 PM	1:45 PM	Mark	LeChevallier	Retired	Dr. Water Consulting, LLC
MON10-02	National-Scale Legionella pneumophila Occurrence Survey	Fifty-seven utilities collected and analyzed DS samples for Legionella pneumophila for 12 weeks for each of two years. Overall, about 1% of samples were positive for L. pneumophila, with the overall rate slightly lower for chloramine systems than free chlorine systems. 18 utilities had at least one positive sample and a conservative estimate of the baseline positivity rate among utilities < 5%. A disinfectant residual concentration of 0.2 mg/L for both free chlorine and chloramine systems provided a significance benefit in reducing the occurrence of L. pneumophila. Further increases had only a small impact on occurrence. This study shows that utilities can limit L. pneumophila occurrence within a management plan including monitoring.	11/18/24	1:45 PM	2:15 PM	Timothy	Bartrand	Executive Director	ESPRI
MON10-03	Addressing Legionella Concerns in the Grand Rapids, MN Undisinfected Groundwater Supply System	In February 2024, the Minnesota Dept. of Health (MDH) reported epidemiologic and laboratory data pointing to areas of the Grand Rapids Public Utilities (GRPU) municipal water system as the source of a Legionnaires' disease outbreak, with fourteen confirmed cases since April 2023. As an undisinfected groundwater system, GRPU is implementing a 2-pronged approach to address concerns: (1) sampling water distribution system and volunteered building locations, and (2) investigating and implementing disinfection. This presentation will provide an overview of the GRPU water system, context from the MDH investigation, results from the Legionella and ATP sampling and disinfection implementation investigation, and outcomes from the expert panel.	11/18/24	2:15 PM	2:45 PM	Chad	Seidel	President	Corona Environmental Consulting
MON10-04	Addressing Legionella in a NJ Water System through Spatiotemporal Data Analysis and Improvements in Disinfection and Water Age.	In recent years, cases of Legionnaires' disease and higher than state-wide average Legionella detections have been reported in municipalities served by a New Jersey water system. In response, the CDC contacted the USEPA for technical support. EPA analyzed chlorine and Legionella data, and based on the analysis, NJDEP developed a remedial action plan in collaboration with EPA to mitigate Legionella. This presentation will provide a case study on remedial actions, including investigative sampling and low velocity flushing to optimize free chlorine residual within the distribution system. NJDEP and EPA will provide an overview of the flushing program, overall findings, and a summary of results since the program commenced in April 2023.	11/18/24	2:45 PM	3:15 PM	Matthew	Jones		NJ DEP, Div. of Wtr. Supply/Geoscience 401-04Q
MON11	MON11 - Distribution Management Impacts on Biofilms	This session will explore the impact of small-amplitude transients on biofilm formation in water distribution pipes, alongside an examination of biofilm structure under varying flow conditions. Additionally, this session will cover the diverse management approaches affecting biofilm dynamics in chloraminated distribution systems and discuss the importance of ATP monitoring for comprehensive risk assessment and asset management strategies.	11/18/24	1:15 PM	3:15 PM	Meg	Roberts	Associate VP	Hazen and Sawyer, P.C.

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON11-01	Examining the Effect of Small-Amplitude Transients on Biofilm Development in Water Distribution Pipes	The presentation reports on controlled experiments that examined the effect of small-amplitude transients on biofilm development in water distribution pipes. The results indicated that the presence of regular, low-amplitude transients increased the growth of bacterial cells in the biofilm adhered to the pipe wall. The results begin to shed light on how small transients caused by routine operational changes in a system (pump turning on, valve adjustments) can affect the growth of biofilms on the wall of drinking water pipes and the biostability of a distribution network.	11/18/24	1:15 PM	1:45 PM	Yves	Filion		Queen's University
MON11-02	Biofilm Structure and Composition under Varied Flow Conditions: Implications for Drinking Water Distribution	Growth of biofilms on drinking water distribution systems (DWDS) pipe surfaces is a particular concern and is detrimental to water quality in a wide variety of ways, including by creating a protective environment capable of harboring pathogenic microorganisms, accelerating decay of disinfectant residual, facilitating formation of disinfectant byproducts (DBPs), and releasing compounds contributing to taste, odor, and water discoloration. Extracellular polymeric substances (EPS) present in biofilms react with disinfectants resulting in the formation of DBPs. The research described in the abstract focuses on the investigation of the contribution and compositional characteristics of EPS that are responsible for the formation of DBPs in DWDS.	11/18/24	1:45 PM	2:15 PM	VINILA	VASAM	Student	West Virginia Univ. Dept. of Civil & Env. Eng.
MON11-03	The Impact of Different Management Approaches on Biofilms in Chloraminated DWDS	The impact of different management interventions (chlorine burning or flushing) on chloraminated biofilms and long-term water quality risk is largely unknown. Biofilms contain organic and inorganic material, which if dislodged can present a risk to public health and regulatory compliance. This research investigates how different management interventions (chlorine burn and flushing) impacted biofilms immediately, longer-term and upon subsequent mobilisation. This is the first time that biofilms have been grown and interventions applied within a controlled fully-representative pipe loop facility, located in a chloraminated UK DWDS. This research is part of a joint project between the University of Sheffield and Scottish Water, UK.	11/18/24	2:15 PM	2:45 PM	Jade	Rogers	PhD Student	
MON11-04	Monitoring Adenosine Triphosphate (ATP) in a Chloraminated Drinking Water Distribution System for Risk and Asset Management	The presentation reports the results of an extensive adenosine triphosphate (ATP) monitoring campaign in an urban, chloraminated drinking water distribution system. We analyzed over 5000 samples from two drinking water treatment plants (DWTPs), plant associated DWTP reservoirs, twelve outlying reservoirs and the DWDS between 2019–2022. ATP concentrations increased significantly between the two DWTP reservoirs and outlying reservoirs but decreased between the outlying reservoirs and DWDS samples. Relationships between ATP concentrations and other water quality variables varied and threshold action values are suggested.	11/18/24	2:45 PM	3:15 PM	Rasha	Maal-Bared	Principal Environmental Scientist	Maal-Bared,Rasha
MON12	MON12 - The Microplastics Maelstrom, Part 2: At the Utility	Although microplastics are unregulated, and both occurrence and health effects pertaining to drinking water are not well-understood, the topic continues to garner significant interest from utilities and their customers. The first installment of the two-part series focuses on practical considerations for utilities, including regulatory updates, sampling challenges, and treatment considerations. 	11/18/24	1:15 PM	3:15 PM	Helene	Baribeau	Representing self	Representing self
MON12-01	Drinking Water in the Plasticene Era: What Utilities Need to Know About Microplastics	With both the states of California and New Jersey initiating action on microplastics in drinking water, nearly 15 percent of the US now resides in a jurisdiction with some degree of explicit regulatory oversight of this increasingly important emerging contaminant. Thus, it is essential for the water treatment community to remain informed about the state of microplastics science, along with key issues pertinent to drinking water and regulatory developments. The purpose of this presentation is to provide such a strategic update, building on the experience accumulated through two Water Research Foundation projects, as well as work with the California Water Quality Monitoring Council.	11/18/24	1:15 PM	1:45 PM	Brent	Alspach	VP and Director of Applied Research	Arcadis

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON12-02	Microplastics Sampling: Addressing Unique Challenges for an Unprecedented Contaminant	WRF 5185 aims to elucidate the capabilities of various unit treatment processes to remove microplastics from drinking water. Disparities in reported unit process removal throughout the literature can be attributed to a combination of experimental challenges and protocol inconsistencies. With both California and New Jersey poised to monitor for microplastics, fostering conversation around best practices is vital to ensuring that data collected is representative and reliable. This presentation will: (1)Provide a summary of sampling-related insights from the WRF 5185 literature review (2)Outline key considerations for a microplastics monitoring program, and (3)Summarize lessons learned from the WRF 5185 sampling experience	11/18/24	1:45 PM	2:15 PM	Alma	Beciragic	Management Consultant	
MON12-03	Occurrence and Removal of Microplastics by Advanced and Conventional Drinking Water Treatment Facilities	This presentation describes the occurrence and removal of microplastics (as small as 2 µm) by a wide range of conventional and advanced treatment facilities. An extensive sampling campaign involved the collection of source and treated water, as well as immediately following each major treatment process at 10 facilities. Removal associated with individual processes, as well as microplastics present in distribution systems were determined. Raman spectroscopy was used to identify specific polymer types as well as quantify sizes and concentrations. As such, this study represents the most extensive assessment known to-date regarding occurrence and removal of microplastics during drinking water treatment.	11/18/24	2:15 PM	2:45 PM	Husein	Almuhtaram	Postdoctoral Fellow	University of Toronto
MON12-04	Impacts of microplastics accumulation on ultrafiltration membranes	Ultrafiltration (UF) effectively removes microplastics (MPs) in drinking water treatment. Limited studies have reported increased UF membrane fouling when considering artificially high concentrations of MPs. This presentation describes the retention of environmentally relevant MP types and concentrations via UF following coagulation, and the release of retained MPs during cleaning. While increased membrane fouling was not observed, lower release of retained MPs during cleaning (versus common foulants) suggests their potential to increase membrane fouling over extended operating periods. As such, the impact of MPs on long-term UF fouling, and cleaning approaches which specifically target the release of MPs should be further examined.	11/18/24	2:45 PM	3:15 PM	Tyler	Malkoske	PhD Student	University of Toronto
MON13	MON13 - Lead and Copper: Measurements and Monitoring	This session will explore methods used to monitor and assess lead in water. 	11/18/24	1:15 PM	3:15 PM	Darren	Lytle	Research Engineer	USEPA
MON13-01	Chicago's Lead Consumer Lead Testing Program, Using Behavioral Insights to Improve Kit Return Rates	Chicago DWM worked with the Behavioral Insights Team to evaluate its free consumer lead testing kit program. Every aspect of completing and returning a kit were investigated to redesign and streamline the entire process to improve return rates. The implemented interventions nearly doubled return rates with minimal cost.	11/18/24	1:15 PM	1:45 PM	Patrick	Schwer		
MON13-02	Improved Orthophosphate Lead Corrosion Control informed by Advanced Diagnostics	The EPA implemented the Lead and Copper Rule Revisions (LCRR) to mitigate lead exposure through drinking water due to its grave public health effects. Water utilities using pH and alkalinity adjustment for corrosion control treatments (CCT) will have difficulty meeting the LCRR requirements. Orthophosphate treatment at a circumneutral pH is effective at minimizing lead solubility and a lower pH result in less carcinogenic trihalomethane formation. However, transitioning from pH adjustment CCT to an optimized orthophosphate treatment at a circumneutral pH has not been previously attempted. We use correlative diffraction imaging techniques to improve our understanding of the mechanisms controlling lead release during this CCT transition.	11/18/24	1:45 PM	2:15 PM	Claire	Boronski		University of Colorado Boulder Environmental Eng.

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON13-03	Lead in Water: Learning from Field Versus Laboratory Analysis	Water lead measurements by two field analyzers (anodic stripping voltammetry-ASV and fluorescence spectroscopy), were compared to reference laboratory measurements by inductively coupled plasma mass spectrometry (ICP-MS) in progressively complex datasets. Field analyzer performance in three opportunistic laboratory datasets that contained dissolved lead was relatively good (ASV: y=0.803x, R2=0.976; no fluorescence data). Further lead underestimations were observed in five field datasets, some of which contained known particulate lead (ASV: y=0.542x, R2=0.756, 5% false negative rate; fluorescence: y=0.057x, R2=0.376, 31% false negative rate). Caution is encouraged when employing ASV and fluorescence field analysis.	11/18/24	2:15 PM	2:45 PM	Simoni	Triantafyllidou		US EPA
MON13-04	Real-Time Monitoring of Lead and Copper in Drinking Water Systems	The Lead and Copper Rule Improvements (LCRI) regulation will rely more heavily on using lead and copper testing and monitoring apparatuses. An issue exists in that the apparatuses' manual sampling constraints affect labor and laboratory budgets for long term monitoring. The frequency of automatic sampling and analysis can economically capture more metals release events for all metals fractions (dissolved, particulate, and total). Real-time lead and copper monitoring in drinking water systems was tested in 2024 and results are described. Cost criteria for various lead and copper testing and monitoring apparatuses as well as for direct pipe sampling in large buildings such as hospitals and schools will also be presented.	11/18/24	2:45 PM	3:15 PM	Abigail	Cantor	President, Chemical Engineer, Computer Programer	Process Research Solutions, LLC
MON14	MON14 - PFAS Planet: Residuals Management	Although residuals management is often overshadowed by occurrence and MCL compliance concerns in drinking water applications, this issue will have a substantial influence on the operating costs of PFAS treatment facilities. From the management of exhausted sorptive media to the discharge of reverse osmosis concentrate, the residuals from these best available technologies (BATs) may prove as problematic as MCL compliance itself. This session addresses both treatment and media regeneration options.	11/18/24	1:15 PM	3:15 PM	Kate	Hughes Keena	NC Drinking Water Business Class Lead	HDR
MON14-01	Evaluation of Conventional and Novel Treatment Technologies for RO Reject	RO reject containing PFAS is growing concern, especially with the uncertainty of CERCLA and NPDES regulations. Given the high concentration of background organics and inorganics in the reject, direct application of BAT adsorbents such as GAC and IX can be technically challenging and costly. Two technologies of interest in treating PFAS in RO reject are Surface Active Foam Fractionation (SAFF®) and Fluoro-sorb®, an alternative adsorbent. Water samples were treated through a bench-scale high-pressure RO in batch recirculation mode. The concentrate was treated with GAC, IX, Fluoro-sorb, and SAFF, respectively. The presentation will discuss water quality, testing methodology and results, and full-scale capital and operating projections.	11/18/24	1:15 PM	1:45 PM	Scott	Grieco		Jacobs
MON14-02	PFAS Removal in Drinking Water: Exploring Effective Residual Treatment for High Pressure Membrane Systems	This presentation will discuss the effectiveness of sorption technologies, specifically granular activated carbon and anion exchange resin, in removing PFAS from membrane residual waste. The study was conducted using water samples from nanofiltration facilities in Alaska and southern Ohio whose source water is contaminated with legacy PFAS. The residual streams from these sites are characterized with high levels of total organic compounds or hardness. This affected the sorption capacity and kinetics of sorption technologies, causing premature PFAS breakthrough. The study provides necessary information to evaluate sorbents on PFAS treatment in the membrane residual, assisting Public Water Systems in making informed decisions.	11/18/24	1:45 PM	2:15 PM	Tae	Lee	Engineer	US EPA
MON14-03	Treatment of PFAS and 1,4-Dioxane in Pilot-Scale Membrane Concentrate Using Foam Fractionation and Destruction Technologies	Piedmont Triad Regional Water Authority is pilot-testing the removal of PFAS and 1,4-dioxane using reverse osmosis (RO) and RO concentrate treatment methods, including foam fractionation and destruction. This presentation discusses the effectiveness of these concentrate treatment processes in removing emerging contaminants and the extent to which foam fractionation and destruction effluents can be blended with RO permeate.	11/18/24	2:15 PM	2:45 PM	Samantha	Black		

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON14-04	Pilot-Scale Regeneration of 'Single-Use' IX Resins for PFAS Removal	Strong base anion exchange (SB AIX) resins for PFAS removal are single use and must be either landfilled or incinerated after exhaustion. Media replacement has high operating costs and disposal opens water systems to potential legal liability for PFAS contamination at disposal sites. Regeneration of SB AIX resins could reduce operating costs and allow for resins to be used multiple times. This work presents pilot-scale regeneration of single-use SB AIX resins operated for PFAS removal at a surface water treatment plant. We demonstrate restoration of resin capacity for PFAS at pilot scale. We also present data on the feasibility of reusing regenerant solutions.	11/18/24	2:45 PM	3:15 PM	Alexander	Gorzalski	Founder	
PST01-01	Electro-regeneration of PFAS-laden activated carbons in groundwater	In this study, we investigated the sequential adsorption and electro-regeneration of Per- and Polyfluoroalkyl Substances (PFAS)-laden carbon using both pristine and silver (Ag)-doped F400 activated carbon in distilled and deionized (DI) water, as well as groundwater samples. The results indicate that the breakthrough points for both adsorbents in DI water, where 100% of the PFAS molecules were adsorbed, occurred at higher volumes compared to groundwater. Conversely, electro-regeneration for both adsorbents occurred at different bed volumes depending on the types of adsorbents, PFAS properties, and background water characteristic.	11/18/24	9:30 AM	10:30 AM	Gamze	Ersan		Arizona State University
PST01-02	Feasibility of Direct PFAS Removal from Contaminated Waters and Concentrates with Ion Exchange in Suspension	Ion exchange resin has been increasingly implemented for the removal of per- and polyfluoroalkyl substances (PFAS) from contaminated waters and wastewaters. The packed beds conventionally used for this purpose provide high rates of PFAs removal. However, many applications require heavy pre-treatment to reduce the suspended solids and dissolved organic carbon (DOC) content in the treated water for the beds to operate properly. The use of resin in suspension as in the Suspended ion exchange (SIX®) process can lift the requirement for pre-treatment. This study addresses the adsorption of PFAS with selective resins used in suspension in two types of qualities: a spiked surface water and a reverse osmosis (RO) concentrate.	11/18/24	9:30 AM	10:30 AM	Elisabeth	Vaudevire	Scientist	PWNT Holding B.V.
PST01-03	Passive Sampling for the Monitoring of PFAS in Water	In an effort to meet industry desires to gather time-weighted averages and potential source identification potentials for PFAS, ALS laboratories in Europe have begun offering full service capabilities for passive monitoring of PFAS by using DGT samplers deployed through moving water. This presentation presents a review of the passive sampling capabilities for PFAS compounds, and what it promises for the future of PFAS monitoring.	11/18/24	9:30 AM	10:30 AM	Samantha	Henningsen		ALS Environmental
PST01-06	Rapid PFAS Testing with no compromises: Direct Inject Analysis	Finding an analytical method that provides fast and reliable PFAS results with meaningful detection limits has been a missing piece of the puzzle for many PFAS investigations, particularly when quick decisions in the field are needing to be made. This presentation will describe a novel technique that complements established EPA methods by saving time and costs associated with more traditional methodologies while delivering results for up to 63 PFAS analytes.	11/18/24	9:30 AM	10:30 AM	Jamie	Fox		Enthalpy Analytical
PST01-07	Modern Analytical Technologies in RO Membrane Applications: Dechlorination Optimization, Monitoring and Control	For efficient RO membrane operation, it is important to accurately monitor and control residual chlorine after dechlorination. Currently, such monitoring and dechlorination control is mostly done using grab sample analysis, or its combination with non-ideal continuous measurements. This paper presents an overview of the current state of chlorine monitoring technologies and their ability to detect and quantify chlorine at Ultra-Low levels. The concept of LOD & LOQ presented in a visual and practical manner facilitates understanding of these specifications' importance. Case studies illustrate the use of the ULR methods, and the ROI elucidated by the right instrumentation via better control and optimization of dechlorination processes.	11/18/24	9:30 AM	10:30 AM	Vadim	Malkov	Principal Product Applications Manager	Hach Company
PST01-08	Beyond Hardware: Exploring Soft Sensors for Enhanced Process Monitoring and Control Through Data-Driven Redundancy	Discover how soft sensors revolutionize sensor redundancy in critical industries like water and wastewater management. This paper presents experimental findings showcasing the role of soft sensors as reliable backups to hardware sensors, mitigating sudden failures and minimizing downtime. Embracing digital advancements, soft sensors employ data-driven methodologies, bolstered by computational models and machine learning algorithms. They not only enhance operational efficiency but also empower predictive analytics, facilitating informed decision-making. Through their deployment, significant improvements in system performance, cost reduction, and sustainability are achieved, marking a transformative shift in process monitoring and control.	11/18/24	9:30 AM	10:30 AM	KARTHICRAJA	V M		CDM SMITH

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST01-09	STREAM - A Satellite analysis Tool for Rapid Evaluation of Aquatic environMents	We have developed a near-real-time satellite data processing system that ingests, processes, and displays water quality (WQ) maps (i.e., chlorophyll-a, Secchi, total suspended solids) from high-resolution images (10 – 30 m) of Landsat and Sentinel-2 missions. This web application, STREAM, offers globally validated WQ products developed using a processing engine that relies on a machine-learning model.	11/18/24	9:30 AM	10:30 AM	Nima	Pahlevan		Science Systems and Applications Inc. (SSAI)
PST01-11	Leveraging Water Quality Data to Assess an Aquifer Storage and Recover Facility	Aquifer Storage and Recovery (ASR) projects are being implemented nationwide as a means of water resource planning, but a lot of unknowns around their practical use still exist. The San Antonio Water System (SAWS) has been in operation for 20 years and the demand and resource needs have continued to change. This has required SAWS to reassess the injecting/pumping strategy to fully support demand needs. An extensive evaluation of the wellfield water chemistry was completed. The results highlighted areas where blending with native water was greater as well as areas with stronger injected water characteristics. This presentation will discuss these data and how this information gives SAWS a proactive approach to managing the ASR facility.	11/18/24	9:30 AM	10:30 AM	Kirstin	Eller		San Antonio Water System
PST01-13	Potable Reuse Technologies: Biofiltration and MXene Membrane Tandem Approach	The suitability of biofiltration and membrane treatment in series for potable reuse scenarios was investigated through their removal of DOC and caffeine. Polyamide and MXene membranes were both analyzed in tandem with the biofilters. The results of this study indicate 1) the suitability of a biofiltration-membrane system for incorporation into potable reuse treatment trains and 2) advantages of MXene membranes over conventional membranes within the biofiltration-membrane system.	11/18/24	9:30 AM	10:30 AM	Jonathan	Clayton	Research Assistant	University of Alabama
PST01-14	A Tale of Two Waters: Navigating the Depths of Groundwater Scarcity versus the Surface Tensions of Policy and Supply	Water scarcity is a national concern particularly for small utilities grappling with investing in water infrastructure to combat scarcity, navigating population growth, and implementing new water quality regulations, on small budgets. This presentation will explore the challenges and potential solutions one small utility in rapidly growing eastern Virginia, is facing as their exclusively groundwater sourced water supply is no longer a sustainable option for the future. Examples of approaches that have been considered to secure this utility's future water supply include: purchasing water, increasing reclaim water system capabilities, acquiring abandoned surface water mines, and a proposed surface water treatment plant on a tidal river.	11/18/24	9:30 AM	10:30 AM	Jamie	Griles		Arcadis
PST01-15	Investigation of Removal of Per- and Polyfluoroalkyl Substances from Aqueous Solution using Modified Biochar	In this study, three types of biochar [unwashed biochar (UWB), acid-washed biochar (AWB), and super-activated biochar (SAB)] were evaluated for their efficiency in removing selected long- and short-chain perfluoroalkyl and polyfluoroalkyl substances (PFAS) from aqueous solutions. Batch adsorption experiments were conducted to determine the capacity of removal of the long-chain [perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS)] and short-chain [perfluorobutanoic acid (PFBA) and perfluorobutanesulfonic acid (PFBS)] PFAS by the unmodified and activated biochars. Furthermore, the effects of water matrix on the adsorption of long- and short-chain PFAS by biochar were investigated.	11/18/24	9:30 AM	10:30 AM	Masoumeh	Akbarpour		University of Central Florida (UCF)
PST01-17	PFAS Removal in Surface Water Versus Groundwater: A Comparison of Media Performance and Operational Challenges	In this work, the removal of PFAS by various media are being compared in two pilot-scale systems, one treating groundwater and another treating surface water. At both pilots, three media are being investigated including one anion exchange resin, one granular activated carbon, and one surfactant modified clay. Ultra-short PFAS are being used to predict the behavior of their longer chain analogs and intermediate ports are employed to represent breakthrough in the effluent. The operational challenges associated with operating a treated surface water vs. a groundwater pilot will be discussed.	11/18/24	9:30 AM	10:30 AM	Caitlin	Glover	Senior Environmental Designer	Stantec
PST01-19	Park City, Utah Promotes Ski Fluoro Wax Free Due to PFAS Contamination in Drinking Water Wells	In a high mountain aquifer Park City's drinking water wells have been contaminated with PFAS compounds above EPA's proposed MCLs for PFOS and PFOA. Eleven PFAS compounds used in fluoro ski wax match the compounds found in the local aquifer and at regional water reclamation plants. Park City banned fluoro ski waxes in its Drinking Water Source Protection Ordinance citywide and promotes a local fluoro ski wax recycle collection program. This presentation is intended to help other ski communities in the US and Canada understand that they may be at risk of watershed and aquifer PFAS contamination from fluoro ski wax and should actively ban it from their communities to mitigate continued adverse environmental impacts.	11/18/24	9:30 AM	10:00 AM	Michelle	De Haan	Water Quality & Treatment Mgr.	Park City Municipal Corporation

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST01-20	Continuous Flow in-liquid Plasma Discharge for PFAS Destruction in Drinking Water	PFAS has become a major national and global issue that requires immediate attention. Compared to the current remediation process, which involves the removal of PFAS from water, plasma-based treatment is an emerging technology that can effectively destroy PFAS in water. A novel, continuous-flow, in-liquid plasma reactor was developed for the applications of PFAS decomposition. The reactor generates plasma discharge directly inside the water stream, providing fast, simultaneous oxidation and reduction at ambient pressure and temperature. The experiments demonstrate great promise with high conversion and process efficiencies of PFAS destruction in drinking water.	11/18/24	9:30 AM	10:30 AM	Shaobo	Deng		University of Minneosata
PST01-21	Batch Kinetic Testing as a Predictor for RSSCT Performance	The selection of appropriate sorbents for removal of PFAS is a relatively resource-intensive process due to requirements for performance testing in packed-bed configuration. Batch kinetic testing could offer an alternate testing method that predicts the relative performance of media in packed beds with less time and resources than traditional methods, such as RSSCTs. The project's objective is to evaluate whether PFAS removal in batch configuration is a good predictor of the relative performance of different sorbents or of diverse PFAS in packed beds as determined by RSSCTs. Initial findings suggest that batch removal results are not a reliable predictor of PFAS removal in packed beds.	11/18/24	9:30 AM	10:30 AM	Abigail	Sveen		University of North Carolina
PST02-01	Two birds, One stone: Solving a Manganese & Arsenic Treatment Challenge in Lincoln, NE	Lincoln Water System's (LWS) Ashland Water Treatment Facility has observed increasing concentrations of arsenic and manganese in their groundwater supplied from the Platte River Aquifer. LWS has established aggressive yet achievable finished water treatment goals of 4.5 ppb arsenic and 10 ppb manganese, which require implementation of new treatment facilities. From 2022 to 2024, LWS undertook an extensive evaluation of oxidation, coagulation, and filtration to effectively address arsenic and manganese. This presentation will provide a comprehensive review of bench and pilot-scale evaluations and techniques used to evaluate effectiveness of alternative coagulants and polymers on As/Mn removal, impacts to filter productivity, recommendations	11/18/24	3:15 PM	4:15 PM	Ashton	Rohrich	Process Engineer	Black & Veatch
PST02-02	Development of Method 562 for the Analysis of Select Pesticides in Drinking Water by Solid Phase Extraction and LC/MS/MS	The presentation describes the development of a U.S EPA drinking water method for chemicals that are found on the Contaminant Candidate List 5 (CCL 5). A finished drinking water method could be used in the future to collect national occurrence data on these chemicals. Occurrence data would help inform decisions regarding regulatory determination to protect human health.	11/18/24	3:15 PM	4:15 PM	Daniel	Tettenhorst	Chemist	US EPA
PST02-03	Balancing Act: Achieving Pre and Post Lead Service Line Replacement Compliance in Programs	Chicago Department of Water Management (CDWM) supplies nearly 750 million gallons of water daily to Chicago and 41% of Illinois. Within the city, it serves 2.7 million residents through 4300 miles of water mains and 480,000 service lines, many lead. Chicago's Lead Service Line Replacement (LSLR) programs are notable for their tailored approach and digital resources. To meet pre-LSLR notification laws, Chicago developed a comprehensive portal using customer data, service line inventory, CIP database, tax parcel info, and USPS data. For post-LSLR compliance within 90 days, an automated water testing program is in place. Chicago plans up to 10000LSLR replacements yearly, underscoring the need for robust compliance	11/18/24	3:15 PM	4:15 PM	Neeraj	Nair	Management Consultant	
PST02-06	Demonstrating Treatment of Waterborne Protozoa: New Methods and New Insights Increase Confidence	Waterborne protozoa remain a key driver of drinking water risk management. Pilot-scale performance demonstrations are foundational to confirming sufficiency of treatment. Despite decades of study, consensus regarding the reliability and consistency of different methods remains elusive, however. Recent advances in understanding of uncertainties and opportunities related to laboratory analyses and piloting protocols coupled with increased threats from climate shocks underscore the need to revisit risk management approaches and provide guidance that reflects contemporary scientific understanding. Here, new guidance for evaluating removal of waterborne protozoa in rapid filters will be demonstrated using a case-study approach.	11/18/24	3:15 PM	4:15 PM	Kalani	De Silva	Graduate Research Assistant	
PST02-07	Use of a Novel Nucleic Acid Crosslinking Reagent for PCR Detection and Quantification of Viable Legionella in Water Samples	The presentation describes work on a new viability qPCR reagent and how it is used to develop Legionella qPCR kits and presents results from several collaborators who analyzed a range of water samples for Legionella.	11/18/24	3:15 PM	4:15 PM	Timothy	Deschaines	Global Product Manager	Promega Corp

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST02-08	Microplastics and Nitrogenous DBPs in Drinking Water: A Complex Interaction Beyond Adsorption	This study examines the interactions between toxic nitrogenous disinfection by-products (DBPs) and microplastics (MPs) in drinking water. Given the global efforts to assess microplastics' health risks, understanding the dynamics between MPs and attached chemicals is crucial. The potential of various DBPs to adsorb onto MPs is concerning and underexplored. This research employs bench-scale experiments to explore this interaction within drinking water systems.	11/18/24	3:15 PM	4:15 PM	Yi	Li	Student	University of Toronto
PST02-09	Monitoring Natural-Organic Matter in Drinking Water Treatment with Photoelectrochemical Oxygen Demand	Appropriate monitoring of natural organic matter (NOM) in drinking water treatment is critical for responsive operational decisions. Photoelectrochemical oxygen demand (peCOD) technology enables rapid detection of NOM reactivity by quantifying the oxygen required to oxidize organic material in a water sample. Compared to conventional NOM metrics, we found that peCOD measurements were more sensitive to changes in water quality, which could improve fine-tuning of treatment operations. Further, peCOD technology provided enhanced resolution for monitoring oxidation-based treatment processes, where changes in NOM were not always recorded by conventional metrics, thus strengthening the basis of operational decisions.	11/18/24	3:15 PM	4:15 PM	Isobel	Demont	PhD Student	
PST02-10	The Fast and The Furiously Floatable: A Pilot Plant Adventure for Optimized Coagulation, DAF and Filtration	For better control of a source water impacted by algae, color, and elevated dissolved organics, DAF is being considered as a replacement to an existing sedimentation process. Although DAF upgrades could be straightforward from a clarification point of view, a pilot program was desired to better understand how the entire process, including pH control and filtration could be optimized to provide better process resilience. A three-month trial of a UV spectrometry instrument installed on both the raw water line and DAF clarified water line collected a breadth of performance data. This presentation includes 6-months of pilot data to inform detailed design. The story of operator training and experience with the pilot will unfold.	11/18/24	3:15 PM	4:15 PM	Nicole	McLellan		
PST02-11	Enhanced Removal of Algal Cells and Algal Organic Matter through Optimized Coagulation in Dissolved Air Flotation Process	Cyanobacterial harmful algal blooms (cHABs) in freshwater pose a challenge to maintain drinking water quality due to the release of algal organic matter (AOM). Due to the low cyanobacterial cell density, high chemical dosages are required to remove their cell and associated AOM. However, despite the significant efforts, conventional treatment processes are still challenging. Dissolved air flotation (DAF) emerges as an economical solution primarily because of its reduced coagulant requirement. This study evaluates three common coagulants (alum, ferric sulfate, and PACl) combined with two coagulant aids (chitosan and PDADMAC) for removing cyanobacteria cells and their AOM from cHAB-affected Lake Erie water.	11/18/24	3:15 PM	4:15 PM	Haniehsadat	Barikbin	PhD student	University of Toledo
PST02-12	St. Charles, MO - Emergency GAC Implementation to Remove Volatile Organic Compounds from the Drinking Water Supply System.	The City of St. Charles, MO has experienced groundwater contamination migration through the raw water supply well field of the drinking water system. The contaminants are vinyl chloride (VC) and Cis-1, 2-dichloroethylene (Cis-1,2 -DCE). This presentation will begin by framing the project issues, goals, and emergency action plan, then will dive deeper into the technology alternatives evaluation, bench testing, regulatory collaboration, GAC system design, expedited construction sequencing, as well as startup and commissioning challenges encountered during construction.	11/18/24	3:15 PM	4:15 PM	Ryan	Saffels	Drinking Water Section Manager	HDR
PST02-14	A Balancing Act: How CT Calculation Methods for Crypto Inactivation with Ozone Impact System Design, Operation, and DBP Formation	While the concentration-time (CT) calculation method is well understood in the drinking water industry to determine compliance with inactivation regulations, the ways to determine the disinfectant residual concentration vary in degree of difficulty, accuracy, practicality, and overall acceptance by regulatory agencies. This paper will present the results of applying 6 different CT calculation methods on design, operation, bromate formation, and the status of regulatory approval for each method. This analysis will assist municipalities determine the best CT method for their application, whether that involves system upgrades, changing source water quality, meeting regulatory compliance, and/or enhancing public health protection.	11/18/24	3:15 PM	4:15 PM	Christine	Ngan	Environmental Engineer	CDM Smith
PST02-15	Effect of Premise Plumbing Systems on Drinking Water Quality: Disinfectant Residuals and Microbial Communities.	Our study focused on microbial patterns in copper premise plumbing within a large academic building, examining how they are affected by water age and occupancy. This is the first report that followed up on water quality stability more than 6 years after plumbing installation, in a large-scale monochloraminated piping network with changing cold drinking water use patterns. Using a variety of physicochemical metrics, we correlated water quality changes with heterotrophic bacteria abundance. Initial results showed higher HPC within older pipes characterized by both elevated and more consistent levels of monochloramine, highlighting the contrasting impacts that copper premise plumbing exhibits on bacterial exposure.	11/18/24	3:15 PM	4:15 PM	Mila	Otegui		

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST02-16	Biofilm Ecology Modeling Methodology for Legionella pneumophila in Drinking Water	Biofilms are complex microbial ecologies that present complicated sets of challenges to model the effects on surrounding matrices and infrastructure they impact. Plumbing pipes have typically been modeled as engineered systems, which is how they start, but after growing biofilms make a unique microbial ecology. For opportunistic pathogens, biofilms present a safe harbor to persist and grow, and for Legionella making progeny that are more infectious and likely to cause disease. Subsequently, our research hypothesizes that building a method to account for this ecology support network for Legionella improved assessments of realistic Legionella growth, persistence and risks can be estimated.	11/18/24	3:15 PM	4:15 PM	Mark	Weir	Assistant Professor	Ohio State University
PST02-17	Methods and Uncertainty in Predicting Arsenic Exposure and Health Outcomes for Private Well Users in Massachusetts	In Massachusetts ~500,000 people have been estimated get their drinking water from private wells which do not have the same monitoring and reporting requirements as public water systems. Records of these private well locations are incomplete, and we know even less about the water quality in the well water. We outline different methods for locating domestic wells in the state, mapping groundwater arsenic concentrations at these wells, and estimating the statewide attributable health burden from exposure to arsenic in drinking water. We examine the uncertainty in our estimates and which variables have the greatest impact in this uncertainty.	11/18/24	3:15 PM	4:15 PM	Liam	Amery	Student	University of Massachusetts
PST02-18	Evaluation of Algaecide Effectiveness for Cyanobacteria Inactivation and Toxin Reduction in Cyanobacteria-Laden Waste Stream	Cyanobacterial harmful algal blooms (cHABs) are a global concern due to their potential to release toxins that disrupt the aquatic ecosystem and threaten human health. Purification of cyanobacteria-laden water in water treatment facilities often results in the generation of a substantial amount of water treatment residuals laden with concentrated cyanobacteria and toxins. Prior to disposal of these residuals into the environment, disinfection is necessary to mitigate the risk of soil and water contamination. This study evaluates two EPA and NSF certified hydrogen-peroxide based algaecides to control the cyanobacteria and their toxins in the cyanobacteria-laden waste stream.	11/18/24	3:15 PM	4:15 PM	Taruna Alam	Tresha	Masters Student	University of Toledo
PST02-19	Evaluation of Fluence in a Flow-through UV-LED Tubular Reactor with UV-reflecting Material Using Actinometry	A novel flow-through UV-LED tubular reactor, made with UV-reflecting material, has demonstrated remarkable enhancements in antimicrobial efficacy, potentially leading to improved energy efficiency. Unlike low-pressure UV lamps, the precise determination of UV-LED fluence poses challenges, mainly attributed to its broader spectrum. To address this, a semi-empirical model, biodosimetry, and actinometry were employed to evaluate fluence in the flow-through UV-LED reactor. The discrepancies among these methods and practical challenges will be discussed.	11/18/24	3:15 PM	4:15 PM	Yoontaek	Oh	Postdoctoral Fellow	Pegasus Technical Services, Inc.
PST02-20	Revolutionizing Water Treatment, Conservation, and Management: Harnessing the Power of AI-driven ChatGPT Solutions	This initiative aims to transform water treatment, conservation, and management through the innovative integration of AI-driven ChatGPT solutions. By leveraging advanced artificial intelligence, the project seeks to enhance efficiency, responsiveness, and decision-making processes in the realm of water-related practices, contributing to sustainable and intelligent water resource management.	11/18/24	3:15 PM	4:15 PM	Abel	Egbemhenghe		Texas Tech University
PST02-21	Water Quality in Quarry Lakes: Utility Perspectives and Research Directions	Water utilities are interested in using quarries and gravel pits as alternative or supplemental water sources, but there are many knowledge gaps and challenges in managing these systems. This presentation will share the results of a collaborative project that involved literature review, data analysis, and interviews with utilities that have experience with these sources. It will also highlight the priorities and recommendations identified by partner utilities in two workshops and suggest research directions to address the utility needs and improve our understanding of the evolution of water quality in these systems.	11/18/24	3:15 PM	4:15 PM	Billy	Raseman		Hazen and Sawyer
WED21-06	Investigating the Removal Mechanisms of Per- and Polyfluoroalkyl Substances in a Surface Water Filtration System	This study assessed the application of two green sorption media (GSM), clay–perlite and sand sorption media (CPS), and zero-valent iron and perlite green environmental media (ZIPGEM) to remove long- and short-chain PFAS at field scale under varied environmental conditions. The study involved the installation of four GSM filter cells by the C-23 canal in St. Lucie County, FL, which connects the environmentally sensitive St. Lucie River estuary to the Atlantic Ocean. This study not only advances our understanding of PFAS removal mechanisms but also furnishes valuable insights for optimizing treatment processes under real environmental conditions when treating waters with varying water quality parameters.	11/18/24	9:30 AM	10:00 AM				

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
MON04-03	Effect of Premise Plumbing and Water Utility on Drinking Water Quality in Marginalized Communities	Drinking water samples were collected from homes in marginalized communities to assess the effect of water provider (small vs. large utility) and household premise plumbing on drinking water quality. Sample analyses include: pH, temperature, TDS, ORP, turbidity, disinfection residual, disinfection byproducts, metals, TOC, TTHM, HPC, E. coli, Legionella, and the microbiome present (via 16S sequencing and selected pathogen quantification). Results to date indicate that variation in premise plumbing or water provider cause a significant difference in water quality properties such as disinfectant residual, TTHM, TOC, and HPC.	11/19/24	11:30 AM	12:00 PM	Evan	Williams		University of Texas At Austin
PST01-04	Identifying PFAS Surrogate(s) for Improved Design and Monitoring of Granular Activated Carbon and Ion Exchange Resin Processes	This study explores the effectiveness of a number of NSF/ANSI certified granular activated carbons (GACs) and ion-exchange resins (IXRs) towards the removal of PFAS in drinking water. As the list of regulated PFAS increases, it becomes more challenging to monitor all the target PFAS. We aimed to identify certain PFAS to be used as surrogate(s) for assessing/monitoring the efficacy of GAC and IXR treatment processes. Using isotherm, kinetic, and rapid small-scale column test (RSSCT) studies, we examined 3 types of GACs (coal-, coconut shell-, and wood-based) and 2 types of PFAS-specific IXRs, 16 PFAS (PFCAs, PFSAs, PFECAs, FTSAs, and FASAs) with chain lengths C3-C9, and 4 challenge waters with varying dosages of water constituents.	11/19/24	9:30 AM	10:30 PM	Ehsan	Banayan Esfah	Graduate Research Assistant	University of British Columbia
PST03-01	Advanced Oxidation and Granular Activated Carbon Treatment for 1,4-Dioxane and PFAS: A Cross-Sector Collaborative Pilot Study	We are examining the treatment of source water with 1,4-dioxane and PFAS by an ozone/hydrogen peroxide advanced oxidation process (O3/H2O2 AOP) followed by granular activated carbon (GAC) filtration. Specifically, we are comparing contaminant removal and water quality in parallel O3 - GAC and O3/H2O2 AOP - GAC pilot treatment trains over a one-year period. Using this AOP process, it is unknown if shifts in PFAS speciation to shorter chain compounds may affect GAC performance. The pilot study involves utility members, academic researchers, and consultants. Results will guide operational setpoints, treatment optimization, technical constraints, and removal expectations that can be referenced by stakeholders in the drinking water industry.	11/19/24	9:45 AM	10:45 AM	Seth	Sandoval-Skee	Researcher	University of Michigan
PST03-02	Predicting Fluidized Bed Clarifier Performance Using Filtration Theory	Sustainable access to clean water is a pressing global challenge. AguaClara Reach is a nonprofit whose efforts focus on providing drinking water treatment solutions at the community scale in highly-constrained environments, where electrical and mechanical infrastructure is limited. The suspended floc blanket within hydraulic fluidized bed clarifiers afford AguaClara plants greater particle removals than would be possible through traditional sedimentation and filtration alone. The focus of this presentation is to examine a hypothesized floc filter mechanism that is thought to govern particle removals within the floc blanket of fluidized bed clarifiers.	11/19/24	9:45 AM	10:45 AM	Andrew	Pennock		

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST03-04	Upflow Slow Sand Filtration – Turning Filtration On Its Head!	Upflow Slow Sand Filtration (USSF) is a new concept where untreated water is introduced into the bottom of a filter, flowing upwards to discharge. The upflow filtration concept was initially researched in the 1980s at Louisville Water Company (LWC) with positive results as a biological reactor. The benefit is that surface clogging and required backwashing (of scraping for Slow Sand Filtration) is eliminated. This idea has recently come forward as a potential method to address small system needs, particularly in developing countries. A demonstration system has been installed and operated at LWC since May 2023 to further develop the concept. The system has been successful in consistently reducing turbidity, total coliforms, and E. coli in the Ohio River source to near-potable quality, with turbidity approaching 1 NTU and E.coli near 1 prior to chlorination. The system has operated for over 10 months and continues to operate with minimal attention and no power requirements. The basic science of filtration predicts the potential success of upflow filtration, as particle capture is not limited to surficial sedimentation. The system consists of an upflow “roughing filter” of course rock, followed by an upflow sand filter operated at 0.1 gpm/sq ft, producing about 400 gallons per day. The system is constructed out of common materials easily sourced in rural areas: two 55-gallon drums, PVC pipe, and roughly graded sand and rock. The total cost for the 400 gallon per day system is about $100 US. Operational requirements are minimal. Given a gravity-fed system, the system operates on less than 1 foot of head loss (3 to 5 inches is typical. The roughing filter removes approximately half of the suspended sediment and is consistent across wide turbidity swings in the Ohio River. The upflow filter removes turbidity to near 1 NTU and after 10 months of operation. While this does not meet US standards, it is far better than many water supplies in the smaller communities of developing countries. The filters are cleaned by “downflushing”, using the head in the freeboard (approximately 12 inches). The roughing filter was downflushed after 6 months of operation. The upflow slow sand filter has not yet shown any signs of particle breakthrough after 10 months and has not yet been downflushed. USSF is being researched with the intention of field testing this technology in Accra, Ghana, Ecuador in 2024	11/19/24	9:45 AM	10:45 AM	Steve	Hubbs		
PST03-05	Water Main Likelihood of Failure (LoF) Analysis Using Machine Learning Model Case Study: City of Virginia Beach	Machine learning empowers utilities to process, analyze, and cross-reference datasets efficiently. and more thoroughly than traditional mechanistic model by elucidating variable interrelations. ML can accelerate analysis and insights on high-risk assets resulting in enhanced service reliability, informed investment decisions and improved utility operations. This project implemented several machine learning (ML) models to predict the likelihood of failure (LoF) for water main failure. Model results informed what LoF criteria to include in the City’s likelihood and consequence risk framework. Predictive models were trained on data from historical main breaks, hydraulic modeling, land subsidence, and weather.	11/19/24	9:45 AM	10:45 AM	Reid	Cagir		Hazen and Sawyer
PST03-06	Securely Harnessing Cloud Solutions for Enhanced Water Data Analytics, Case Study, Loudoun Water, VA	•The presentation focuses on Loudoun Water's transformative shift from traditional methods to AI and machine learning-enhanced data-driven modeling in water management, particularly total phosphorus management. •Using the Cloud for secure data storage and predictive modeling, Loudoun Water has been able to optimize operations, improve service delivery, and underline the value of cloud-based solutions in the water industry. •The presentation will also discuss the challenges and opportunities of this digital transition, highlighting how such approaches can help navigate data 'noise' and deliver real-world benefits for communities and water utilities.	11/19/24	9:45 AM	10:45 AM	Javad	Roostaei		Hazen and Sawyer

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST03-07	Climate Event Driven Increases in Natural Organic Matter: Implications for the Sustainability of Drinking Water Treatment	This study presents an updated analysis spanning over two decades (1999-2023) of climate, water quality, and operational data from two drinking water facilities in Atlantic Canada. In 2023, unprecedented climate events caused NOM in the water supplies to increase by > 65%. To adapt, alum dosing nearly doubled in 2023 compared to 2022. DBPs in both distribution systems were elevated following the event but remained within compliance levels. Equivalent CO2 emissions were estimated for the production and transportation of alum, which increased by 3 to 7-fold in 2023 compared to when the plants were commissioned decades prior. The plants were not only adversely impacted by climate change but also contributed to the global CO2 burden.	11/19/24	9:45 AM	10:45 AM	Lindsay	Anderson	Research Engineer	
PST03-08	Hexavalent Chromium Removal Alternatives Process Comparisons and Lifecycle Costs	This is an presentation comparing commercially available treatment alternatives to remove hexavalent chromium from groundwater. Three treatment alternatives, including multiple sub-alternatives, were analyzed for effectives and suitability at two of City's well stations. The unique water quality at these two locations allowed for early deletions of some sub-alternatives, and the remaining options were evaluated against a wide range of criteria, including capital cost, lifecycle cost, and O&M flexibility.	11/19/24	9:45 AM	10:45 AM	Sifang	Shan		HDR
PST03-09	Investigating Quaternary Ammonium Surfactants as Disinfection Byproduct Precursors	This study investigates the formation potential of disinfection byproducts (DBPs) from quaternary ammonium surfactants (QAS) during water treatment. Ten QAS were studied for their DBP-forming potential when exposed to ozone and subsequent chlorination or chloramination. Trichloromethanes were the dominant DBPs formed, with varying yields among QAS. Notably, N-nitrosodimethylamine (NDMA) formation occurred exclusively during chloramination. Despite DBP concentrations remaining within regulatory limits, QAC contribution emphasizes the need for careful removal before water disinfection.	11/19/24	9:45 AM	10:45 AM	GABSON	BAGUMA		University of Nevada Las Vegas
PST03-11	Inclined to Change? Piloting Inclined Plate Settlers to replace Solid Contact Clarifiers at a Surface Water Treatment Plant	This presentation presents a pilot study that was part of planning efforts for a surface water treatment plant's expansion. Results from the study aided the utility's decision to select a coagulation, flocculation, and sedimentation technology different to their existing process. Audience members will learn how a pilot program for highly variable raw water quality is organized and executed, as well as lessons learned that can be applied to any treatment pilot program. The presentation will cover the background, motivation, and objectives of the study, provide information on pilot configuration and operating conditions, review water quality data, discuss operational challenges, and share the decision-making process for technology selection.	11/19/24	9:45 AM	10:45 AM	Pei-Shin	Wu		Brown and Caldwell
PST03-12	Removal of Cyanotoxins with Powdered Activated Carbon in a Wildfire-degraded Water Quality Matrix	In the last several years wildfire activity has increased in the Pacific Northwest region and posed concerns for water systems. Powdered activated carbon (PAC) is commonly used to remove cyanotoxins during harmful algal blooms, but competition with wildfire-derived dissolved organic matter (DOM) for sorption sites is not well understood. Cyanotoxins were mixed with ash slurries from multiple 2023 wildfires with different DOM characteristics. Wildfire-derived DOM competition with cyanotoxins for removal with PAC was then tested. This study describes PAC's efficacy in removing cyanotoxins post-wildfire and how variations in DOM character from different burned regions influence performance.	11/19/24	9:45 AM	10:45 AM	John	Heneghan	Environmental Engineering Graduate Research Assist	
PST03-13	Solar Light-driven Eco-friendly Photodegradation of MC-LR using Platinum Ditelluride (PtTe2) Nanofilms	In this study, novel two-dimensional (2D) platinum ditelluride (PtTe2) nanofilms were developed for rapid and solar light-driven photodegradation of microcystins (MC-LR) in water. The UV-Vis light-driven photocatalysis using the newly fabricated PtTe2 nanofilm successfully degraded the MC-LR concentrations (2 ppm) with 5.24 mg MC-LR/g material-h which is a 3.8 – 7.7 times greater rate compared to other studies. XTT assay was conducted to show that the MC-LR degradation is primarily based on the reaction between MC-LR and reactive oxygen species produced using the PtTe2 nanofilms. PtTe2 can be a promising material for cost-effective and eco-friendly means of MC-LR degradation in harmful algal blooms (HABs) experiencing water.	11/19/24	9:45 AM	10:45 AM	Jonghyun	Baik		University of Central Florida Libraries

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
PST03-14	From Paper to Digital: Digitizing Chicago Department of Water Less Impact to Operations	The Department of Water Management (DWM) is responsible for overseeing the maintenance and enhancement of an extensive network of assets, including over 4,300 miles of water mains and 4,400 miles of sewer mains. To effectively manage these assets, the City of Chicago employs a work order management system to document efforts in maintaining or replacing aging infrastructure. Additionally, the city relies on 311, a service request system that also allows citizens to check the status of previous water quality service requests. On average, the DWM processes over 100,000 work orders annually. This presentation will detail the data analytics, integration and workflow of an integrated service-request-driven work order system for the DWM.	11/19/24	9:45 AM	10:45 AM	Kiran	Udayakumar		AECOM
PST03-15	Bye-bye By-products: Transforming Disinfection Strategies at the Warren Water Filtration Plant	The City of Warren's Water Filtration Plant (WFP) aims to mitigate Disinfection By-product (DBP) formation through modifications to their current disinfection strategy. This study evaluated simultaneous compliance impacts of DBP formation potential on Giardia inactivation based on adjustments to free chlorine concentration, pH, and contact time through both desktop study and laboratory bench scale experiments. Seasonal DBP Formation Potential testing and profiling of DBP formation throughout the entire treatment train was performed to inform recommended steps to reduce DBP formation through disinfection strategy changes.	11/19/24	9:45 AM	10:45 AM	Bernardo	Vazquez Bravo		
PST03-16	Fuzzy Random Variable Analysis of Chlorine Residuals in Distribution Systems	Water distribution systems (WDS) are a critical control point for the protection of public health. Modelling can be used to estimate disinfectant residuals in a WDS based on flow and water quality. However, the significant uncertainties regarding inputs (e.g. demand) limits the value and use of current WDS approaches. Often experts must make assumptions without explicitly using monitored data. A novel modelling approach will be presented that includes clustering of observed data to build expected distributions of disinfectant residuals at any WDS node. The distributions represent uncertainties regarding flow, temperature, and daily demand patterns to present a more holistic view of the possible conditions within the WDS.	11/19/24	9:45 AM	10:45 AM	Biniam Abrha	Tsegay		
PST03-18	Assessing Harmful Algal Blooms and Water Quality Trends in the Maumee River and Reservoir: Insights from Five Years of Study'	Addressing eutrophication, this five-year study scrutinizes phytoplankton dynamics and HABs in the Maumee River and Defiance Reservoir, using biweekly sampling from 2019 to 2023. It shows significant HAB peaks during warmer months, associated with nutrient increases. Particularly in the reservoir, longer-lasting blooms suggest specific ecological drivers. Statistical analyses reveal the critical role of nutrients in shaping phytoplankton communities. This research highlights the urgency of continuous monitoring and strategic management to combat eutrophication's effects, emphasizing phytoplankton's ecological importance.?	11/19/24	9:45 AM	10:45 AM	Shadman Saki	Sayem	Masters Student	
TUE01	TUE01 - Improving Our Understanding of Manganese Management	This session will explore issues surrounding Mn treatment including, the impact of DOC/Mn interactions on treatment, advances in treatment technologies and controlling Mn by management of Mn sources.	11/19/24	8:15 AM	9:45 AM	Helene	Baribeau	Representing self	Representing self
TUE01-01	Potential DOC Impacts on the Speciation of Manganese in Water Treatment Plants	Present evidence of the ways that DOC and plant operating conditions (e.g., coagulation pH) impact soluble Mn levels and how observed Mn++ generation impacts finished water quality and water discoloration outcomes.	11/19/24	8:15 AM	8:45 AM	William	Knocke	Professor	Virginia Tech University
TUE01-02	Advanced Approaches to Manganese Treatment	Present bench and pilot scale data demonstrating use of novel oxidants for Mn oxidation. These emerging oxidation approaches are effective and may be an attractive option for manganese management, especially for small and rural public water systems.	11/19/24	8:45 AM	9:15 AM	Joseph	Goodwill	Assistant Professor	Univ. of RI, Fascitelli Eng. Cntr. #312
TUE01-03	Management of Manganese Through Better Source Control	Present methods for identifying and characterizing the sources of Mn and illustrate how this information can be used to assist in managing finished water Mn levels via blending, reservoir aeration or recycle stream management.	11/19/24	9:15 AM	9:45 AM	Philip	Brandhuber	Owner	Brandhuber Wtr. Quality/Trtmnt LLC

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE02	TUE02 - Microfiltration & Ultrafiltration	This session covers optimization techniques to enhance membrane filtration performance. Topics include optimizing coagulation to reduce ultrafiltration fouling, integrating ozonation with ceramic microfiltration for advanced treatment, exploring the microbial ecology of gravity-driven membrane filtration systems, and using electrically conductive membranes for improved water recovery and self-cleaning efficiency.	11/19/24	8:15 AM	9:45 AM	Judith	Herschell Cole	President & CEO	Herschell Environmental, LLC
TUE02-01	Optimization of Coagulation as Pre-treatment to Reduce Ultrafiltration Fouling and Increase Organic Matter Removal	Coagulation is commonly applied prior to ultrafiltration (UF) to reduce fouling and/or increase organic matter removal. A lack of guidance exists regarding the selection of coagulation conditions (dosage, pH) to achieve treatment objectives. This study evaluated coagulation conditions which are associated with specific destabilization mechanisms, as well as the impact of subsequent mixing on UF performance. Conditions which favour adsorption destabilization resulted in reduced hydraulically irreversible fouling, while sweep coagulation provided trade-offs between fouling control and organic matter reduction. Inclusion of flocculation reduced hydraulically irreversible fouling when compared to use of rapid mixing alone.	11/19/24	8:15 AM	8:45 AM	Tyler	Malkoske	PhD Student	University of Toronto
TUE02-02	Ozonation and Ceramic Microfiltration in an Integrated Treatment Approach for Surface Water and Advanced WWTP Effluent Treatment	When ozonation is integrated with ceramic microfiltration to establish a robust barrier against pathogens, it offers substantial enhancements in flux rates, consequently reducing the plant's footprint and minimizing the need for cleaning chemicals. Moreover, ozonation extends its effectiveness beyond flux enhancement to address treatment objectives concerning water quality, such as higher virus removal, organic micropollutant degradation and taste and odor control. This paper presents multiple pilot-scale results for surface water treatment for drinking water production and advanced treatment of WWTP effluent for reuse.	11/19/24	8:45 AM	9:15 AM	Martin	Spruijt		PWNT
TUE02-03	Microbial Ecology of Gravity-driven Membrane Filtration (GDMFs) Systems for Water and Wastewater Treatment	Gravity Driven Membrane Filtration (GDMF) systems offer sustainable, low-energy water and wastewater treatment alternatives with minimal chemical usage and operational complexity, making them ideal for low- to middle-income and remote communities. Low hydrostatic pressure drives filtration, while the absence of pre-disinfection promotes microbial migration from the source water, resulting in biofilm formation, which aids in organic matter degradation and flux stabilization. The effluent water quality, which is vital for public health and further disinfection systems selection, is the focus. This study presents biological activity and microbiome, across scales and feedwater in GDMFs to identify the key factors influencing water quality.	11/19/24	9:15 AM	9:45 PM	Leili	Abkar	Postdoctoral Fellow	University of British Columbia
TUE03	TUE03 - Risk Assessment and Management of Antibiotic Resistance in Water and Water Reuse Systems	Wastewater, water reuse and drinking water systems are important barriers to the spread of antibiotic resistance, but also harbor ecological niches that contribute to proliferation of antibiotic resistant bacteria (ARB) and antibiotic resistance genes (ARGs). This session will highlight options for water utilities to engage in monitoring, management, and risk assessment of antibiotic resistance.	11/19/24	8:15 AM	12:00 PM	Ishi	Keenum	Assistant Professor	Virginia Tech University
TUE03-01	Antibiotic Resistance in Water Systems: Methods, Challenges, and Emerging Research	The presentation will provide an overview of methods in antibiotic resistance measurement in water systems.	11/19/24	8:15 AM	8:45 AM	Emily	Garner		
TUE04-01	Spatial Variability in Dissolved Organic Matter and DBP Precursor Treatability by PAC Across a Burned Watershed	Wildfires produce partially combusted materials that release dissolved organic matter (DOM) and disinfection byproduct (DBP) precursors to drinking water sources following storms. Powdered activated carbon (PAC) can remove DOM and DBP precursors. However, little is known about fire-derived DOM treatability by PAC or how DOM characteristics that vary spatially in burned watersheds impact PAC performance. In our study, we are characterizing DOM optical properties, DBP formation potential, and treatability by PAC in stream water samples collected seasonally from ~50 sites varying in burn severity. This study will inform how water systems can better prepare for challenges posed by wildfire-derived DOM that vary spatially in burned watersheds.	11/19/24	8:15 AM	8:45 AM	Kyle	Shimabuku		

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE04-02	Spatial Variability in Dissolved Organic Matter and DBP Precursor Treatability by UF Membrane Across a Burned Watershed	The occurrence of large, high-severity wildfires has increased in the Pacific Northwest, potentially degrading source water quality and challenging drinking water treatment (DWT) facilities. In the past decade, the use of membranes for DWT has experienced accelerated growth due to their effectiveness in producing high-quality water, small footprint, and relatively low costs. We used lab-scale experiments to investigate how increased particles and dissolved organic matter in postfire source water affect (1) membrane fouling, which reduces the effectiveness and increases DWT costs, and (2) removal efficiency of disinfection byproducts formation potential, which is an important parameter to consider in assessing drinking water safety.	11/19/24	8:45 AM	9:15 AM	XUE	JIN	Assistant Professor	Oregon State University
TUE04-03	The Impact of Natural Organic Matter on PFAS Removal Pathways During Electrochemical Water Treatment	The goal of this research was to evaluate peroxi-electrocoagulation (EC:H2O2) as a destructive and non-destructive process for PFAS mitigation in laboratory waters and real natural organic matter (NOM) containing waters. As NOM is complex and a frequent occurrence for water and wastewater utilities, it is important to study how real NOM characteristics can shift the removal pathways during treatment. Accordingly, these findings will help to advance understanding of electrochemical treatment processes and discuss how NOM impacts PFAS removal for water and wastewater treatment based on a range of NOM characterization parameters to describe multiple aspects of NOM beyond conventional metrics.	11/19/24	9:15 AM	9:45 AM				
TUE05	TUE05 - AI/ML - State of the Arts. Implementation & Ethics	This session features talks on the current state and case studies of machine learning and advanced data solutions in the water industry, preparedness for data system integration, the laws and ethics of using AI in utility operations, and the digitization of the Chicago Department of Water with minimal operational impact. 	11/19/24	8:15 AM	9:45 AM	Billy	Raseman		Hazen and Sawyer
TUE05-01	WRF 5189 - State of Machine Learning and Advanced Data Solutions in the Water Industry and Case Studies	Want to learn more about the current state of machine learning and advanced data solutions such as model predictive control in the water industry? Come join us during this presentation where we present the results of the industry wide study led by Water Research Foundation and gain ideas to plan and implement your initiatives focused on driving data driven decisions and actions.	11/19/24	8:15 AM	8:45 AM	Prabhushanka	Chandraseker	Intelligent Water National Practice Leader, Arcadi	Arcadis
TUE05-02	You’re Ready for the Data but is Your System	It's no secret that analyzing data from your Operational Technology system enhances utility staff insight into system and equipment performance. There has been a large number of software applications introduced into the market to analyze and display this data for a multitude of managerial and organizational purposes. With data becoming more valuable it is driving utility executives to ask how data can be transmitted from the Operational Technology system to the enterprise system in a secure reliable methodology. As data-driven solutions have evolved so have industrial control system architectures. The architectures now need to allow the passing of data from the field level to the enterprise system and beyond expanding to the automation	11/19/24	8:45 AM	9:15 AM	Robert	Ivanovic	Vice- President and Automation Practice Leader	CDM Smith Inc
TUE05-03	Laws and Ethics of Using AI in Utility Operations and Management	This presentation will present a brand new summary of a project documenting laws and ethics of AI in the water sector and feedback from all 50 states on impacts to certified operators and uses in utility management.	11/19/24	9:15 AM	9:45 AM	James	Cooper	Global Director, Water	Arcadis
TUE06	TUE06 - Lead Corrosion Control Strategies I	This session will be the first of two sessions to examine methods to address lead corrosion control methods and related factors. 	11/19/24	8:15 AM	9:45 AM	Alex	Mofidi	Sr. Project Manager	Confluence Engineering Group

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE06-01	Lead Corrosion Control in a Water System with Unique Magnesium Silicate Scale	A unique magnesium silicate scale was found in a public water system's (PWS) distribution system with three unique water quality zones. Following discovery of lead service lines (LSLs) in their distribution system, the PWS has taken proactive steps to evaluate the impact of current and potential future water quality as well as corrosion control treatment strategy on the scale stability and lead corrosion through sequential sampling and pipe rig testing. This presentation will present details on sequential sampling, LSL harvesting, scale analysis, and pipe rig construction, and preliminary results on pipe rig conditioning and testing using harvest LSLs.	11/19/24	8:15 AM	8:45 AM	Jerry	Yan		Carollo Engineers
TUE06-02	The Effects of Free Chlorine, Orthophosphate, and Sodium Silicate on Galvanic Tin-Lead Solder Corrosion in Premises Plumbing	Orthophosphate, sodium silicate, and free chlorine are chemicals used in drinking water. These additives are less understood for galvanic systems with lead-containing solder, and these systems are sensitive to changes in the chloride-to-sulfate mass ratio (CSMR) greater than 0.5. Simulated tin-lead solder joints with copper pipe were used to assess the effectiveness of these chemicals in reducing lead corrosion at a high CSMR ratio by assessing lead release, mineralogy, and scale formation. This study helps address the gaps in research for the treatment of lead-containing solders and provides solutions for control of lead release from premises plumbing.	11/19/24	8:45 AM	9:15 AM	Naomi	Lewis	MASc Student	
TUE06-03	Conversion from Blended Phosphate to Orthophosphate for Corrosion Control Optimization on the Great Lakes	This presentation shares two corrosion control optimization studies on Lake Michigan in Illinois and Wisconsin and summarizes testing results when converting from blended phosphate to orthophosphate. Harvested lead flow-through pipe loop testing studies will be presented summarizing lead testing data (over changing water quality, temperature, phosphate data and other test conditions), including sequential sampling results for comparison with the pipe loop studies. This presentation provides valuable guidance to utilities that will undertake pipe loop studies or need to achieve corrosion control optimization, as well as provides information on key considerations when converting from blended phosphate to orthophosphate.	11/19/24	9:15 AM	9:45 AM	Amrou	Atassi	Senior Vice President	CDM Smith Inc.
TUE07	TUE07 - PFAS Updates: Occurrence, Methods, and Regulations.	This session is designed to educate and update the audience about the current state of knowledge about the occurrence of PFAS in drinking water, current regulatory landscape, the latest advancements in monitoring methods, and how these three topics are connected and their impact on utilities. 	11/19/24	8:15 AM	12:00 PM	Ruth	Marfil-Vega		Shimadzu
TUE07-01	Setting the Stage – Regulatory Drivers for PFAS	Regulatory updates about PFAS	11/19/24	8:15 AM	9:45 AM	Chris	Moody	Regulatory Technical Manager	AWWA
TUE07-02	PFAS Occurrence: What We have Learnt in UCMR5	Summary of outcomes from PFAS monitoring during UCMR5	11/19/24	9:45 AM	10:15 AM	Yongtao	Li		Eurofins Eaton Analytical, LLC
TUE07-03	PFAS: A Utility Perspective from UCMR3 Until Now	Approaches for monitoring PFAS and lessons learned at a utility since UCMR3	11/19/24	9:15 AM	9:45 AM	Christiane	Hoppe-Jones	Senior Scientist	American Water
TUE07-04	EPA Drinking Water Targeted PFAS Analytical Method Development	New methods for PFAS analysis in drinking water being developed at EPA	11/19/24	10:30 AM	11:00 AM	William	Adams	Chemist	U.S. EPA
TUE07-05	Development of SM 6910B for PFAS Analysis in Waters	Updates about the new Standard Method for PFAS analysis	11/19/24	11:00 AM	11:30 AM	Lily	Sanchez	Supervising Chemist	Orange County Water District
TUE07-06	Are There Other PFAS to Worry About in Drinking Water: A Look at Volatile PFAS	Analysis of volatile PFAS by GCMS	11/19/24	11:30 AM	12:00 PM	Ruth	Marfil-Vega		Shimadzu

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE08	TUE08 - Iron, Manganese, and So Many More	Metals play a critical role in our industry. This session will discuss metal treatment and removal from various points of view.	11/19/24	10:30 AM	12:00 PM	Daniel	Haddock	Director of Water Utility Services	INTERA
TUE08-01	A Mechanistic Study of Iron Sequestration by Phosphates	Polyphosphate is widely used as a low-cost means of reducing iron related aesthetic issues. But, a lack of research on sequestration mechanisms and identification of optimal doses causes utilities to rely on trial-and-error or chemical vendors for decision-making. To fill gaps in understanding, we examined reaction mechanisms to explain trends identified in empirical data from utilities. Results indicated that increased phosphate chain length, phosphate concentration, and silica concentration caused more effective sequestration, while calcium, magnesium, and increased pH interfered with its effectiveness. Quantifying these effects will enable utilities to maximize benefits and of polyphosphate while minimizing negative impacts on corrosion.	11/19/24	10:30 AM	11:00 AM	Christian	Lytle		Virginia Tech
TUE08-02	Park City's 3Kings WTP Conquers Removal of Eight Heavy Metals and Tackles Pathogen Log Reduction Credit with MnO2 Media	Park City, Utah recently started up the 3Kings WTP to remove eight heavy metals (Sb, As, Cd, Fe, Pb, Mn, Tl and Zn) to ultra-low levels to achieve future stream discharge limits, to comply with drinking water MCLs and to achieve pathogen log reduction credit from historic mine drain tunnel sources. After extensive research these goals were accomplished with a conventional surface water treatment plant that utilizes MnO2 filter media, TiO2 adsorption media and three pH swings. This presentation will highlight operational start-up challenges, optimization efforts and successes in addition to proactive strategies designed to mitigate potential adverse reactions in the distribution system upon introduction of this new source.	11/19/24	11:00 AM	11:30 AM	Michelle	De Haan	Water Quality & Treatment Mgr.	Park City Municipal Corporation
TUE08-03	Reuse of Fe and Mn Precipitates for Heavy Metal Removal	Iron and manganese removal is a common treatment process at drinking water treatment facilities to prevent operational difficulties due to precipitation and ensure drinking water is palatable for the consumer. The basic process involves the oxidation of Mn2+ to Mn4+ and Fe2+ to Fe3+ to form MnO2 and Fe(OH)3 precipitates, respectively. The residuals generated from this process are then dewatered and disposed of. Because Fe and Mn removal is a necessary step for many drinking water treatment plants, a reduction in costs related to the disposal of residuals would be beneficial. To this end, we are investigating the reuse of residuals generated from the removal of Fe and Mn as adsorbents for the removal of heavy metals.	11/19/24	11:30 AM	12:00 PM	Cameron	Oden	Assistant Professor	University of New Haven
TUE09	TUE09 - Evolution in UV Technologies	Mercury based UV technology has been an effective tool in the water treatment toolbox. As the industry evolves, krypton chloride excimer lamps and LED based UV are being researched and evaluated. This session will discuss UV technology and the evolution of the sector.	11/19/24	10:30 AM	12:00 PM	Christine	Cotton	Vice President	Arcadis
TUE09-01	Balancing Rewards and Risks with Low Wavelength UV Applications in Water Treatment	Krypton chloride excimer lamps that emit at 222 nm, hold promising potential for UV-driven contaminant degradation in water treatment and reuse, due to more efficient photolysis and oxidation at this low wavelength compared to conventional UV advanced oxidation (UV/AOP) at 254 nm. However, the effects of UV222 on disinfection byproducts (DBPs) has not been investigated, and previous research raised the possibility for increased DBP formation from low-wavelength UV/AOP. This project found that at fluences below 500 mJ cm-2, at which UV222 can achieve significant contaminant degradation, the overall toxicity of formed DBPs is comparable between UV254 and UV222 AOP.	11/19/24	10:30 AM	11:00 AM	Karl	Linden	THU01	University of Colorado Boulder- Envir. Eng.

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE09-02	UV LEDs vs Mercury UV for Reuse Disinfection and 1,4-Dioxane Destruction	A LED-based UV system capable of dose-pacing between 40-1000 mJ/cm2 was piloted alongside a traditional mercury UV system at the Anne Arundel County Water Reclamation Facility in Maryland for pathogen disinfection (12/10/10) and UV/AOP 1,4-dioxane destruction. 1,4-dioxane reductions ranged from 1.11- 2.55 µg/L depending on oxidant and concentration. The same UV skid is now being tested at the Piedmont Triad Regional Reservoir Authority in North Carolina for UV/AOP 1,4-dioxane destruction during RO-concentrate treatment. This presentation discusses the system efficacy and operational considerations at pilot-scale. In addition, cost modeling data will be compared for capital and O&M costs for UV at 1-50MGD.	11/19/24	11:00 AM	11:30 AM	Tara	Randall		
TUE09-03	Are UV LED Reactors Ready to Replace Conventional UV Reactors? Performance Comparisons with Bioassay Data	This presentation will compare the bioassay performance of currently available UV LED reactors, both absolute disinfection performance (log reduction per unit electrical power), and RED Bias for common test and target microbe pairs. By testing over a wide range of operating conditions, UV LED reactors will be compared to each other and to conventional LP reactors of various scale.	11/19/24	11:30 AM	12:00 PM	Brian	Petri	Sr Research Scientist	Trojan Technologies Group ULC
TUE11	TUE11 - Legionella 7 Premise Plumbing	This session will address the characterization of microbial water quality in home plumbing systems, assessing the efficacy of filtration, heat treatment, and residual disinfectants to ensure safe water quality.	11/19/24	10:30 AM	12:00 PM	Chad	Seidel	President	Corona Environmental Consulting
TUE11-01	Disinfectant Decay Kinetics in Building Plumbing and Effects on Microbial and Legionella Control	Secondary disinfectant is commonly used to control the growth of pathogens in drinking water distribution systems. Characteristics of building plumbing pose unique challenges for maintaining disinfectant residual past the building point-of-entry. This study uses complementary bench-scale glass jar and at-scale premise plumbing rig experiments to investigate decay kinetics of chemical disinfectants and implications for control of microbial and pathogen regrowth. Key factors influencing decay order were identified over a range of conditions. Over 90% of disinfectant decayed within 4 hours, with Legionella pneumophila growth occurring at water ages corresponding to stagnant water with low CT values.	11/19/24	10:30 AM	11:00 AM	Tolulope	Odimayomi		Virginia Tech University
TUE11-02	Quantitative Microbial Risk Assessment Framework for Integrating Water Ages with Legionella pneumophila Growth Rates	This study links water age in premise plumbing systems to Legionella pneumophila concentrations using a published growth model, facilitating a quantitative microbial risk assessment (QMRA) for showering-associated infection probabilities. Purging devices, which reduce water age, were evaluated for risk reduction. Median annual infection probabilities exceeded the 1 in 10,000 benchmark, but clinically severe illness probabilities remained significantly lower. Homes with two occupants exhibited lower illness probabilities due to reduced water ages from more frequent fixture use. Purging strategies reduced illness probabilities by up to 43%, with smart devices offering further water conservation benefits.	11/19/24	11:00 AM	11:30 AM	Katherine	Crank	Research Microbiologist	Southern Nevada Water Authority
TUE11-03	Novel Control of Legionella Pneumophila in Premise Plumbing through Probiotics and Nutrient Limitation	Legionella pneumophila (Lp) has a high propensity for growth in building plumbing when municipal water is warm, stagnant, and depleted in chemical disinfectant residuals relative to water main distribution systems. Here we examine how probiotics and nutrient limitation can alter microbial ecology and growth of opportunistic pathogens such as Lp. This is achieved using off-the-shelf materials for replicable simulation of distal premise plumbing and testing the effect of biologically active granular activated carbon (BGAC) filtration as a practical means to manipulate the influent microbial and nutrient composition.	11/19/24	11:30 AM	12:00 PM	Madeline	Deck	Graduate Research Assistant	Virginia Tech
TUE12	TUE12 - Oh No? Ozone!	Ozone is a powerful reagent used in water and wastewater treatment facilities worldwide. This session will cover such aspects of ozone treatment as novel approaches in ozone disinfection with NBs, to system configurations in ozone biofiltration, ozone quenching in DWTPs, and design consideration fot ozone treatment of Cryptosporidium	11/19/24	10:30 AM	12:00 PM	Brock	Emerson	Chief Executive Officer	Intuitech

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE12-01	Enhanced Ozonation Efficiency and Novel Treatment Approaches using Ozone Nanobubble	Nanobubble (NB) have been the subject of increasing research in the science and engineering community due to their unique properties: interfacial properties, small size (50-100 nm), high mass transfer resulting from large gas-liquid interfaces, long-term stability (up to months), and their capability to generate reactive oxygen species. Ozone (O3) NBs are particularly promising for water treatment due to their enhanced mass transfer and efficiency compared to conventional methods. This study investigates the application of O3 NBs for removing toxins and taste/odor compounds from water. It also explores innovative O3 NBs applications in treatment plants by proposing a novel advanced oxidation technology that combines NB with UV254 and H2O2.	11/19/24	10:30 AM	11:00 AM	Meryem	SOYLUOGLU	Graduate Research Assistant	Clemson University
TUE12-02	Microbial Community Adaptation to Changing Ozone-biofiltration Operations	The effectiveness of ozone-biofiltrations systems is dependent upon the microbial communities that are promoted to grow and remove contaminants. This study aims to utilize cutting-edge tools for assessing microbial community data spanning 12-months for a drinking water ozone-biofiltration system. Findings from this study can be used to establish guidance for responding to changes in water quality and adapting operational conditions to optimize treatment. Better understanding the impacts of operations and water quality on biofiltration systems is important for advancing water treatment technologies and promoting high quality, biostable drinking water.	11/19/24	11:00 AM	11:30 AM	Kara	Cunningham		West Virginia University
TUE12-03	Dissolved Ozone Residual Quenching Efficiency with Varying Reagents and Water Quality Conditions	Chemical reducing agents are applied to quench residual ozone in the last contactor chambers or effluent chambers at full-scale drinking and wastewater treatment facilities. Conventional quenching agents, calcium thiosulfate, sodium bisulfite, and hydrogen peroxide were evaluated against novel alternatives, sodium thiosulfate, sodium sulfite, sodium metabisulfite, potassium metabisulfite, and ascorbic acid. The quenching efficiency and kinetics for each agent under varying temperature and pH will be presented along with their respective practical benefits and limitations, including storage and handling requirements.	11/19/24	11:30 AM	12:00 PM	Hannah	Ray	Process Systems Engineer	Southern Nevada Water Authority
TUE13	TUE13 - Lead Corrosion Control Strategies II	This session will be the second of two sessions to examine methods to address lead corrosion control methods and related factors.	11/19/24	10:30 AM	12:00 PM	Simoni	Triantafyllidou		US EPA
TUE13-01	Preparing for the LCRI - A Corrosion Inhibitor Evaluation Framework	The objective of this presentation is to provide an overview of the different type of corrosion inhibitor products used for lead and copper corrosion control. The presentation also discusses recommended best practices and testing methodology in selecting a corrosion inhibitor product and dose, and considerations while making changes in corrosion inhibitor products.	11/19/24	10:30 AM	11:00 AM	Baljit	Sidhu	Principal Scientist	Hazen and Sawyer
TUE13-02	Blended to Orthophosphate Corrosion Control: Impacts on Consumer Lead Exposure, Pipe Scale Mineralogy, and Microbial Ecology	The Chicago Department of Water Management (DWM) is converting from a blended phosphate to orthophosphate to proactively protect public health and for compliance with lower lead action levels proposed under the Lead and Copper Rule Improvements. To better understand the impact(s) of this conversion, a comprehensive research plan was developed by DWM, EPA, and CU-Boulder. The objectives of the plan are to (1) assess consumer exposures, (2) evaluate CCT mechanisms, and (3) determine shifts in microbial community composition and structure. Preliminary baseline data from 15 homes and from 5 harvested lead service lines will be presented.	11/19/24	11:00 AM	11:30 AM	Jennifer	Liggett	Global Principal for Drinking Water Quality	Jacobs
TUE13-03	Assessing Distribution System Impacts in Advance of Treatment Changes to Address Source Scarcity &Emerging Contaminants of Concern	Three Utilities in the Mountain West area of Colorado have or are in the process of changing water sources and treatment schemes. One utility is adjusting treatment to meet upcoming PFAS regulations. Another is changing treatment to incorporate reuse water, while a third is trying to blend with a neighboring utility to reduce radium levels in the water. The potential for existing pipe-scale destabilization exists in each utility that could create esthetic and/or public health issues. This paper talks about the process each utility did to investigate their distribution system and their findings.	11/19/24	11:30 AM	12:00 PM	Richard	Giani		CDM Smith

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE15	TUE15 - After the Smoke Clears- A Treatment Paradigm	This session will focus on the impact of wildfires on the waterworks. Specifically, it will explore the characterization and treatibity of source waters impacted by wildfires, the vulnerability of drinking water treatment plansts against such threats, and their implications for utilities and water professionals.	11/19/24	1:30 PM	3:00 PM	Monica B.	Emelko		
TUE16	TUE16 - Characterization and Challenges of Source Water for Reuse Applications	This session will present the challenges faced and specific considerations required when treating wastewater for reuse. Methods for the elimination of pathogenic and indicator organisms in feed waters will be discussed and unique hurdles faced by Reuse operations will be highlighted.	11/19/24	1:30 PM	3:00 PM	Eric	Wert		
TUE16-01	When the Source Water is not as it Seems: The Unique and Challenging Moments of Water Reuse Piloting	Anne Arundel County, Maryland is assessing the validity of IPR to enhance long-term water supply resilience through carbon-based advanced water treatment (AWT) pilot testing. The pilot treats tertiary denitrification filter effluent and has experienced numerous atypical treatment challenges throughout the 14+ months of testing due to the source water quality and upstream biological growth carryover. The presentation addresses the challenges and solutions found during piloting and provides lessons for achieving water quality goals. Attendees will gain an understanding of the process of optimizing reuse pilots with challenging circumstances and the importance of understanding source water quality impacts on AWT goals.	11/19/24	1:30 PM	2:00 PM	Kelsey	Kenel		HDR Inc.
TUE16-02	Identifying High Impact Chemicals for Mitigation of Human Health Risk in Potable Reuse	Existing regulation on chemicals of concern in drinking water may not fully capture chemical risks for potable reuse because of differences in source water composition. A comprehensive list of chemicals of interest was compiled from existing databases and a literature review was conducted to obtain wastewater occurrence data. Human health risk from water reuse was evaluated for over 250 chemicals using the relative health indicator method, a qualitative framework to compare risk associated with different “cups of water” and chemical concentrations from literature. Data on removal capabilities of advanced treatment technologies for chemicals identified as high-risk were evaluated and knowledge gaps were identified for future pilot studies.	11/19/24	2:00 PM	2:30 PM	Jessica	Steigerwald		SNWA
TUE16-03	Pathogen and Indicator Abundance and Trends in Wastewater from Southern Nevada for Informing de facto Reuse	This study investigates pathogen trends in Southern Nevada's wastewater from 2020-2024, focusing on Norovirus GI & GII, Enterovirus, Adenovirus, Cryptosporidium, and Giardia. Treated wastewater is discharged to Lake Mead, the region’s primary drinking water source. Using methods such as qPCR, microscopy, and culture-based techniques, we analyze the impact of seasonal variations and the COVID-19 pandemic on pathogen abundance, and suggest how community factors drive concentrations of pathogens in drinking water source water. We proport integrating these data into water treatment decisions, particularly in the context of water reuse and regulatory rule development, to ensure public health and sustainable water management practices.	11/19/24	2:30 PM	3:00 PM	Katherine	Crank	Research Microbiologist	Southern Nevada Water Authority
TUE17	TUE17 - HAB Monitoring and Management of Treatment Residuals	Rising temperatures and eutrophication promote harmful algal blooms dominated by cyanobacteria (cHABs) resulting in water quality and health concerns. This session covers different aspects of cHAB management including the latest in monitoring technology, and best management practices for dealing with an HAB event as well as safe disposal of cyanotoxin laden drinking water treatment residuals.	11/19/24	1:30 PM	3:00 PM	Tracy	Kump	Chemist/Microbiology Lab Manager	Greater Cincinnati Water Works

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE17-01	Long-term Study on the Fate of Cyanotoxins in Drinking Water Treatment Residuals across Three Drinking Water Treatment Plants	Eutrophication and rising global temperatures have increased the occurrence of cHABs in freshwater sources. DWTR generated from the treatment of cHAB-infested water contain intact cyanobacteria cells which could release cyanotoxins during long-term storage. Application of cyanotoxin-laden DWTR on agricultural soils could result in the bioaccumulation of toxins at higher trophic levels. Studies on the fate of cyanotoxins during long-term storage are limited due to the lack of optimized methods for cyanotoxin recovery from these matrices. Therefore, firstly, this study evaluated methods for cyanotoxin recovery from DWTR matrices. Additionally, the fate of cyanotoxins in three DWTPs with chronic cHABs was examined in the DWTR storage lagoons.	11/19/24	1:30 PM	2:00 PM	Mudit	Bhatia	Doctoral Student	University of Toledo
TUE17-02	Early Warning of Cyanobacterial Harmful Algal Bloom: Validation of Fluorescence Sensor Measurements with Microbial Signatures	Cyanobacterial harmful algal blooms (CyanoHABs) pose a global threat, contaminating freshwater and impacting health and economies. The 2014 Lake Erie crisis underlined the need for efficient monitoring. Our study evaluated the multi-spectral fluorescence sensor (MSFS) technology-based instruments for early detection, by comparing sensor-based pigment and algal data with extracted algal pigments and toxin concentrations, along with 16S and 18S rDNA-based microbial profiles. Results confirmed unbound phycocyanin's significance, correlating with microbial markers like Sphingobium and Polaromonas, underscoring MSFS's value in early warning systems to safeguard drinking water.	11/19/24	2:00 PM	2:30 PM	Mashuk	Siddiquee	Graduate Research Assistant	
TUE17-03	Considerations of a Surface Water Treatment Facility Proactively Preparing against Harmful Algal Blooms	This presentation provides an overview of surface water treatment considerations for dealing with a Harmful Algal Bloom (HAB) from two perspectives – the impact on finished water quality in terms of cyanotoxins as well as the impact on filtered water production capacity. Information included in this presentation will cover a brief overview of HABs, associated regulations, and general best operational management practices when dealing with an HAB event. This presentation will also cover results from a desktop HAB study performed by Hazen and Sawyer on New Jersey American Water's Canal Road Water Treatment Plant.	11/19/24	2:30 PM	3:00 PM	Daniel	Whalen	Senior Principal Engineer	Hazen and Sawyer
TUE18	TUE18 - Controlling Disinfection By-Products	This sesssion will focus on innovative approaches to manage DBPs in drinking water systems. BAC treatment for controlling HAA5 levels in consecutive systems, efficacy of GAC and BAC treatments in reducing brominated DBPs in distribution systems, and pilot testing for DBP reduction in groundwater sources will be discussed.	11/19/24	1:30 PM	3:00 PM	Alice	Fulmer	Regional Liaison	Water Research Foundation
TUE18-01	Use of BAC to Treat Potable Water for Controlling HAA5 Levels in Consecutive Systems	A County in Maryland is planning a new interconnecting pipeline with a neighboring utility to purchase up to 5 mgd of potable water to address increasing water demand. Water quality analysis showed that DBP concentrations are near regulatory limits at the interconnection and the County could be in violation with elevated levels of DBPs in its own distribution system after boosting chlorine levels. Therefore, the County is planning to include a treatment facility in the interconnecting pipeline to reduce its HAA5 concentrations. This presentation highlights 6-months of pilot testing of biologically active carbon (BAC) to remove HAA5 and identifying ideal operating conditions of BAC.	11/19/24	1:30 PM	2:00 PM	Meric	Selbes		Hazen and Sawyer
TUE18-02	Efficacy of GAC and BAC Treatments in Mitigating Brominated DBPs in a Drinking Water Distribution System	This presentation will explore the use of granular activated carbon (GAC) and biologically activated carbon (BAC) treatment systems in reducing preformed disinfection by-products (DBPs) in municipal drinking water. With an emphasis on brominated trihalomethanes (THMs), haloacetonitriles (HANs), haloacetic acids (HAAs), and other DBPs, this study investigated GAC's and BAC's abilities to remove these DBPs up to 40,000 bed volumes. The presentation will also discuss post-chlorination DBP reformation and indicators for brominated DBP breakthrough in GAC adsorbers.	11/19/24	2:00 PM	2:30 PM	George Williar	Kajjumba	Post-Doctoral Researcher	
TUE18-03	Groundwaters can have DBPs too! DBP reduction pilot testing and full-scale trials	The presentation reviews pilot testing and full-scale trials related to disinfection by-product reduction measures at a 1 MGD groundwater treatment facility in Ontario, Canada. DBP reduction approaches were reviewed including: well sequencing to prioritize use of low carbon wells (full-scale trial); granular activated carbon and ion exchange (6-weeks of pilot testing); chloramination (desktop analysis). The site has some challenges, notably lack of sanitary sewer to receive waste streams. A conceptual design was developed for IX, including split-stream treatment and consideration for future plant capacity expansion.	11/19/24	2:30 PM	3:00 PM	Simon	Horsley	North American Distribution System Water Quality L	Stantec Consulting Ltd

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE19	TUE19 - Real-Time Water Quality Monitoring in Source Waters to Detect Contamination and Optimize Treatment	This session will share the latest information about real-time water quality monitoring capabilities that drinking water utilities have to monitor their source waters, as well as updates on the latest technologies that can be used for this type of monitoring.	11/19/24	1:30 PM	3:00 PM	Matthew	Umberg	Environmental Engineer	US EPA
TUE19-01	Tracking Turbidity Events and Potential Environmental Spills In and Around the Wachusett Reservoir	This paper presents MWRA's experience using monitoring stations and water quality buoys, to track flows through the Wachusett Reservoir, monitor turbidity after heavy rain events, and monitor potential environmental spills in or around the reservoir.	11/19/24	1:30 PM	1:48 PM	Geoffrey	Beyer	Manager, CMS	Massachusetts Water Resources Authority
TUE19-02	Using Machine Learning to Detect Higher Levels of De Facto Reuse at a Drinking Water Intake	De facto or unplanned water reuse may require additional treatment, so this study used machine learning to detect higher levels of de facto water reuse using online instruments measuring a variety of different water quality parameters.	11/19/24	1:48 PM	2:06 PM	Emily	Clements		Southern Nevada Water Authority
TUE19-03	Real-time Microbial Monitoring in Drinking Water	Automated online microbial monitoring technologies enable water utilities to access real-time microbial fluctuations. Together with chemical and physical sensor measurements, high-resolved microbial data allows efficient water quality management.	11/19/24	2:06 PM	2:24 PM	Marisa	Silva	Head of Customer Service	onCyt Microbiology AG
TUE19-04	Development of Infrared Sensor for Water Analysis	This presentation details the development of an infrared sensor designed for analyzing nitrogen-based contaminants, such as nitrate and ammonia, and per- and polyfluoroalkyl substances (PFAS) in water.	11/19/24	2:24 PM	2:42 PM	Katy	Roodenko		
TUE19-05	Online Instrument for Raw-Water THM Precursor Analysis	This presentation will detail how an innovative, online raw-water THM precursor analyzer can be used to adjust treatment processes to minimize production of THMs and, for some, reduce costs of producing water that satisfies THM regulations.	11/19/24	2:42 PM	3:00 PM	Rick	Bacon	CEO	Aqua Metrology Systems
TUE20	TUE20 - Service Line Inventories	This session will focus on experiences with building service line inventories. ? ? ? ?	11/19/24	1:30 PM	3:00 PM	Kira	Smith	Physical Scientist	
TUE20-01	Case Study - Development of a Lead Service Line Replacement Program for Both Private and Public Side	The City of Montréal has committed to eliminating all lead water service pipes on public and private property by 2032. The number remaining as of today is estimated at 44,000. In order to fulfil this commitment, the following approaches were adopted: communication strategies, interactive map online, accelerated screening campaigns to detect lead, mandatory replacement of the private side (at owners expense) and distribution of a free filtration device.	11/19/24	1:30 PM	2:00 PM	Alicia	Bannier		Ville De Montreal
TUE20-02	Using a Continuously Improving Machine Learning Model to Target Lead Service Line Inspections and Replacements - Case Study	Middlesex Water Company began LSL replacements on the customer-side at no direct cost to the customer in 2022 and implemented a town-by-town prioritization plan for identifications and replacements. Using the results from a machine learning model, MWC is inspecting every customer-owned side of the service line that has a probability of lead of over 10%. As the field work progresses, the model is rerun to calculate new probabilities with more and more service lines falling below the 10% probability threshold to be designated as "non-lead". With the pairing of inspections and up-to-date predictions, the goal is for MWC to optimize inspections and more quickly identify lead service lines for removal.	11/19/24	2:00 PM	2:30 PM	Sandra	Kutzing		CDM Smith
TUE20-03	10 Million Buildings and Counting: Evaluating Trends from the Largest Service Line Inventory Database in the United States	The Lead and Copper Rule requires water systems to submit initial service line inventories by October 16, 2024. Data extracted from submitted initial inventories representing over 10 million service addresses from thousands of water systems in almost every state will be shared. This presentation will provide an analysis of the data, highlight various trends, and serve as a benchmark for inventory progress across the U.S. In addition, recommended strategies that water systems can implement to reduce their unknown materials and prepare for future service line inventory submissions will be discussed.	11/19/24	2:30 PM	3:00 PM	Jonathan	Cuppett		120Water

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE21	TUE21 - PFAS Planet Planning, Design, and Operational Considerations	Planning, design, and operations are the three fundamental pillars of treatment implementation, applicable to every utility taking active steps to address PFAS contamination. This session explores these project aspects in terms of regulations, risk, economics, and lessons learned from operational facilities. A special addition presentation discusses a prize competition for PFAS advancements sponsored by the US Bureau of Reclamation.	11/19/24	1:30 PM	5:00 PM	Carol	Walczyk		Veolia
TUE21-01	PFAS Detection and Sampling: Prize Competition	There remains a need for cost-effective and rapid sampling methods for PFAS detection in areas beyond drinking water. There is a need for sampling and detection methods that are both highly sensitive and cost effective, while also offering rapid analysis turnaround times. Today's best available technologies for PFAS sampling and detection in water have several significant shortcomings. The objective of this prize competition is to drive innovation and develop practical solutions for advancing both sampling and detection of PFAS in various water matrices. Proposed solutions must be unique approaches or novel modifications to existing methods.	11/19/24	1:30 PM	2:00 PM	Anisha	Lamsal		Bureau of Reclamation
TUE21-02	PFAS Risk, Regulations, and Response	Significant resources have been invested in understanding PFAS over the last decade. As more toxicological information becomes available, more PFAS are anticipated to be regulated in the future (beyond the finalization of the MCLs in 2024), either individually or as part of the proposed hazard index approach. These rapidly evolving regulations pose a significant challenge to assessment, management, and communication for PFAS treatment, exposure, and risk. This presentation will discuss the evolution of PFAS toxicity values, highlighting the changes over time and the implications of our toxicological understanding of PFAS on the regulatory environment, and by extension, to the challenges faced in public facing communications.	11/19/24	2:00 PM	2:30 PM	Heather	Lanza		CDM Smith
TUE21-03	De-Risking Groundwater Supply Investments in the Age of PFAS	The USEPA will establish maximum contaminant levels (MCL's) for PFAS in 2024. Data on the occurrence and sources of PFAS is still limited. Transport of PFAS is complex and soils can act as reservoirs for PFAS precursors, releasing regulated end-products over long periods of time. Uncertainty with respect to sources introduces risk to mitigation efforts. De-risking these infrastructure investments is critical to preserving affordability. Creative solutions are needed to effectively mitigate risks using currently available data. We will present an innovative, systematic approach to evaluating PFAS risks using currently available hydrogeologic, water quality, and environmental site data for a utility in Southern California.	11/19/24	2:30 PM	3:00 PM	Daniel	Haddock	Director of Water Utility Services	INTERA
TUE21-04	The Impact of DOC on PFAS Treatment Feasibility and Economics—Who's in the Driver's Seat?	The objective of this study was to determine a threshold DOC concentration, beyond which PFAS treatability and cost-effectiveness could be limited. In this study, we collected and consolidated bench-scale testing data from over 20 GAC- and IX-rapid small-scale column tests (RSSCTs) across 5 different surface and ground water sources to evaluate GAC and IX treatment performance under various influent DOC scenarios. PFAS treatment costs were estimated based on RSSCT results and compared against DOC concentrations to identify the driving force for GAC and IX resin use rate. This presentation will discuss the importance of DOC control strategy for more cost-effective treatment of PFAS in drinking water.	11/19/24	3:30 PM	4:00 PM	Rosa	Yu		Carollo Engineers
TUE21-05	Moving the Chains: An Integrated PFAS Investigation for a Greenfield Water Plant in North Carolina	The WIP is facilitating the design of a new surface water greenfield RWTF. The WIP initiated a multi-prong approach to test PFAS removal media through parallel piloting (10-month duration) and rapid small-scale column testing (RSSCT) to account for the variability associated with the pilot intake location, PAC addition, and temporal source water variations and media lifecycle changes. Both pilot testing and RSSCTs included testing of GAC, AER, and NS. This presentation will review the RSSCT and pilot study optimization, logistics, design, results, 20-year lifecycle cost analysis, and proposed next steps.	11/19/24	4:00 PM	4:30 PM	Kara	Degroote	Environmental Engineer	CDM Smith

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE21-06	GAC: 10 Years of Full-Scale Lessons Learned at Two WTPs	This presentation will detail the experiences of two utilities that have built and operated Granular Activated Carbon (GAC) contactor facilities with production capacities of 15 and 44 MGD. Both utilities have accumulated 10 years of operating data and lessons learned. Presenters will explore GAC's general effectiveness, operational strategies, and capital and operating cost histories. Additionally, the utility presenters will offer tips to extend media life and improve process efficiency. Other communities considering GAC for contaminant removal will benefit from the practical knowledge.	11/19/24	4:30 PM	5:00 PM	Brent	Tippey		HDR Engineering
TUE22	TUE22 - Bipartisan Infrastructure Law (BIL) Funded Technical Assistance Programs	This session will discuss EPA's efforts in providing technical assistance to communities under funding provided by the Bipartisan Infrastructure Law (BIL) for upgrading drinking water infrastructure. These efforts are related to lead service line identification and replacement as well as addressing PFAS contamination.	11/19/24	3:30 PM	5:00 PM	Dienye	Tolofari		
TUE22-01	Overview of WaterTA at EPA	EPA's free Water Technical Assistance (WaterTA) supports communities to identify water challenges, develop plans, build technical, managerial, and financial capacity, and develop application materials to access water infrastructure funding.	11/19/24	3:30 PM	3:48 PM	Karen	Swetland-Johr	Senior Advisor	Office of Water
TUE22-02	ORD Emerging Contaminants Program	USEPA, Office of Research and Development's will discuss its effort to provide technical assistance to states, tribes, territories, and communities and to fill research data gaps with respect to treatment of emerging contaminants such as PFAS.	11/19/24	3:48 PM	4:06 PM	Thomas	Speth	Associate Director for Science	U.S. EPA
TUE22-03	ORD LSL Inventory Program	USEPA, Office of Research and Development's will discuss its effort to provide technical assistance to states, tribes, territories, and communities and to fill research data gaps with respect Lead Service Line Identification and Replacement	11/19/24	4:06 PM	4:24 PM	Simoni	Triantafyllidou		US EPA
TUE22-04	Advancing the Quality of LSLR Technical Assistance through Field-Tested Tools and Templates	Will discuss EPA developed and publicly available tools and templates including a funding source factsheet, sample community outreach materials, historical record review guides and more.	11/19/24	4:24 PM	4:42 PM	Rachael	Nielsen	NA	USEPA-OW
TUE22-05	Moving Towards the SRF: Technical Assistance and Engineering Support	We will focus this discussion on the expanded EFC program and the expanded WaterTA Engineering support. WaterTA Engineering Support services are meant to enhance existing Water TA Programs by filling in engineering gaps.	11/19/24	4:42 PM	5:00 PM	Rebecca	Reilly-Lott	NA	USEPA-OW
TUE23	TUE23 - Advancing Treatment	Due to the evergrowing need for higher standards of treatment for drinking water, researchers are exploring pathways to scale up advanced treatment technologies. This session delves into bench and pilot scale testing of cutting edge advanced water treatment techniques	11/19/24	3:30 PM	5:00 PM	Jeff	Swertfeger	Superintendent	Cincinnati Water Works
TUE23-01	Aligning Research Efforts with Operational Priorities: Enhanced Conventional Water Treatment for Removal of high Total Organic Car	In December of 2023, Great Lakes Water Authority's (GLWA) Water Works Park Treatment Plant was cited for a "treatment technique" violation for inadequate removal of total organic carbon (TOC). In response, GLWA's research team has undertaken a number of initiatives and collaborations to investigate and resolve the TOC removal issues. In this presentation we first provide an overview of GLWA's high-level collaboration efforts and then we detail the specific steps taken to evaluate and improve TOC removal at GLWA's treatment facilities. The presentation will also discuss lessons learned and the organizational steps taken in response	11/19/24	3:30 PM	4:00 PM	John	Norton	Director of Energy, Research, & Innovation	
TUE23-02	Pilot Testing to Avoid Unintended Consequences when Converting 840 mgd to Biofiltration.	The presentation will focus on developing strategies to limit manganese release during conversion to biofiltration, limit headloss after conversion, and provide an increased understanding of potential issues that may arise when converting from conventional to biological filtration.	11/19/24	4:00 PM	4:30 PM	Greg	Pope	Principal Technologist	Carollo Engineers

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE23-03	Assessing the Current State of Knowledge and Research Gaps Related to Advances, Challenges, and Opportunities for Point-of-use and	This project assessing the current state of knowledge and research gaps related to advances, challenges, and opportunities for point-of-use and point-of-entry water treatment in the US. This has been accomplished through a comprehensive literature review as well as survey data collection from scientific, industry, and community experts, to understand important trends and information gaps pertaining to point-of-use and point-of-entry treatment technology. Our analysis specifically focuses on: 1. Advances in drinking water treatment technologies applicable for home use (specifically: technologies in use, field performance/efficacy of technologies, novel technologies); 2. Challenges and opportunities in adoption and use of home water treatment	11/19/24	4:30 PM	5:00 PM	Emily	Kumpel	Assistant Professor	University of Massachusetts Amherst
TUE24	TUE24 - Under the (Microbial) Influence – Impact of Wastewater Discharges on Surface Water Quality	The importance of source water protection to prevent downstream costs of contaminant removal has received a lot of traction in recent years. Wastewater discharges upstream of the intake of drinking water treatment plants can introduce microbes including viruses and antibiotic resistant bacteria (ARB) into source water. Topics covered in this session include the estimation of microbial concentrations in surface water using qPCR, antibiotic resistance gene (ARG) classification, and quantitative microbial risk assessment (QMRA) to determine the safety of drinking water.	11/19/24	3:30 PM	5:00 PM	Thomas	Gaidish	Supervisor WQ Regulatory Compliance	Aquarion Water Co. of Connecticut
TUE24-01	How Quantitative is PCR? New Insights on Describing the Concentration of Low-abundance Microbial Targets in Water Surveillance	qPCR took centre-stage in wastewater surveillance for SARS-CoV-2, at times highlighting issues with interpretation of non-detects and results outside the linear dynamic range of the standard curve, how best to average replicate data, and how much of the variation in time series of data is due to imprecision of resulting concentration estimates. dPCR is an increasingly common alternative that can sometimes yield more precise data, but how well does it work for low-abundance targets? The talk will dig into these issues through the lens of classical statistics for quantitative microbiology, giving a seamless framework to describe how quantitative PCR is.	11/19/24	3:30 PM	4:00 PM	Philip	Schmidt	Research Assistant Professor	
TUE24-02	Using QMRA to Improve Response Capacity: Lessons from a Raw Sewage Discharge Upstream of a Drinking Water Treatment Plant Intake	In October 2023, a main sewer line break occurred in Cochrane (Alberta, Canada), causing an overland sewage discharge into the Bow River upstream of the Bearspaw Water Treatment Plant intake. This incident raised questions about drinking water safety, especially regarding virus contamination. This presentation describes the risk assessment conducted to critically review decisions that had been made about the safety of the drinking water supply. Several scenarios were analyzed to assess the effect on risk of the virus concentration in raw sewage, dilution of sewage in the river and treatment log reduction credits. This work shows how microbial risk assessment can be used to inform decisions during and after a source water quality incident.	11/19/24	4:00 PM	4:30 PM	Dafne	Cruz		University of Waterloo
TUE24-03	Dissemination of Antimicrobial Resistance Upstream and Downstream of a Wastewater Treatment Plant in Rural Southwest Virginia, USA	The global dissemination of antimicrobials, antibiotic-resistant bacteria (ARB), and antibiotic-resistance genes (ARGs) from human and animal waste into the environment significantly threatens public health. The prevalence of antimicrobial resistance (AMR) determinants in rural surface waters is often attributed to inadequate wastewater treatment, agricultural runoff, and the overuse of antibiotics in healthcare. To understand AMR dynamics within rural environments, we investigated ARB and ARG levels in surface water samples collected upstream and downstream of a rural wastewater treatment plant (WWTP) in Southwest Virginia. We evaluated seasonal and location-specific variations in microbial communities and ARGs.	11/19/24	4:30 PM	5:00 PM	Idowu	Okeshola	Doctoral Student	
TUE25	TUE25 - DBP Formation and Impacts of Pre-cursors	Understanding and managing precursors is crucial in minimizing DBP formation. This session will explore the impact of salinization, corrosion control products, and treatment by UV-LED on DBP formation and speciation.	11/19/24	3:30 PM	5:00 PM	Julian	Fairey	Associate Professor	University of Arkansas

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE25-01	Influence of Corrosion Products and pH on DBP Formation in Conventional and Potable Reuse Drinking Waters	The influence of distribution system and premise plumbing conditions including disinfectant residual, pH, and corrosion products on the speciation and quantity of disinfection byproducts (DBPs) was evaluated. This work quantifies the impact of these factors in potable reuse scenarios relative to that in conventional drinking waters. The primary goals of this work were to 1) understand the impact of pH and copper corrosion products on the formation and speciation of 52 DBPs (regulated and unregulated) in conventional and potable reuse water and 2) provide clarity to utilities, regulators, and consumers, on disinfection byproduct transformations that can occur in finished water between treatment plant effluent and consumer.	11/19/24	3:30 PM	4:00 PM	Kylie	Boenisch-Oak		
TUE25-02	Disinfection By-product Formation and Treatment of Pre-cursor Material in Natural Water Matrices by UV-LED/Chlorine	Increased environmental prevalence of recalcitrant micropollutants and more stringent water quality regulations have led to the growing popularity of advanced oxidation processes in drinking water treatment. The combination of ultraviolet light emitting diodes and chlorine (UV-LED/Cl) is an advanced oxidation process that has effectively degraded a wide range of micropollutants; however, it presents concerns of heightened disinfection by-product (DBP) formation. The aim of this work was to investigate the general mechanisms of regulated DBP formation and treatment of DBP precursor material due to UV-LED/Cl in natural water matrices, assessing the feasibility of the novel technology for drinking water treatment applications.	11/19/24	4:00 PM	4:30 PM	Isobel	Demont	PhD Student	
TUE25-03	Salinization of Source Waters, From Aquifers to Rivers: Impact on DBP Formation and Speciation	Sea level rise and extended droughts increase the risk of saltwater intrusion. Salinization can occur in aquifers and rivers, degrading drinking water source quality. In 2023, seawater intrusion in the Mississippi River threatened drinking water supplies in coastal Louisiana. Although resolved, events like these are expected to occur in the future with increasing severity due to climate change. Salinization can lead to elevated disinfection by-product formation (DBP) and influence DBP speciation with preferential formation of more toxic Br- and I-DBPs due to precursor availability. This research enhances understanding of DBP formation and speciation during salinization which can inform utility/regulator action and risk management.	11/19/24	4:30 PM	5:00 PM	Kylie	Boenisch-Oak		
TUE26	TUE26 - Optimization Filtration/Coag	This session will focus on process improvement and optimization of parameters pertaining to coagulation and filtration in drinking water treatment plants. Enhanced efficiency of flocculation using DAF, a comprehensive long term study of BAC filter performance, and a case study in polymer selection for coagulation and flocculation will be discussed. 	11/19/24	3:30 PM	5:00 PM	Rebecca	Venot		Jacobs
TUE26-01	Incorporation of Dissolved Air Flotation (DAF) into a Flocculation Process to Improve Filter Performance at Pilot-Scale	In this work, we evaluate an innovative approach of retrofitting dissolved air flotation (DAF) into the flocculation process of a direct filtration pilot plant. Results showed that DAF retrofit had higher effluent water quality and filter run time than direct filtration without DAF. Introducing a cationic polymeric flocculant significantly enhanced bubble-floc aggregation and increased filter run time with the DAF retrofit. Outcomes of this work will provide utilities and consultants with guidelines on the design and operation of fit-for-purpose DAF, incorporated within existing structures, to mitigate intermittent particle events on filter run time and water quality. This work is funded by the United States Bureau of Reclamation.	11/19/24	3:30 PM	4:00 PM	Bilal	Abada	Postdoctoral Researcher	Southern Nevada Water Authority
TUE26-02	Ensuring Water Quality: A 30-Year Filter Surveillance Program on Biologically Active Carbon Filters for Potable Water Treatment	This study will present findings from a comprehensive 30-year surveillance program aimed at evaluating the performance and aging characteristics of biologically active carbon filters in a potable water treatment plant. Research focuses on assessing carbon media age, performance, and softening over time to understand their impact on water quality and treatment efficiency. Through extensive monitoring and analysis, the study reveals insights into the long-term behavior of carbon media, highlighting trends in its degradation and impacts to filter capacity reduction, and efficiency decline. Findings underscore the importance of proactive maintenance strategies and filter replacement schedules to ensure consistent water quality and operation.	11/19/24	4:00 PM	4:30 PM	Melissa	Olenick	Laboratory Supervisor	Central Lake Cnty. Joint Action Water Agency

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
TUE26-03	The Dos and Don'ts of Polymer Use in Water Treatment: Lessons from a Comprehensive Case Study	Polymers play a vital role in water treatment, enhancing coagulation and flocculation to remove particles and organic matter. Choosing the right polymer type and dosage is crucial. Using the wrong type or excessive dose can lead to inefficiencies. This presentation emphasizes the importance of selecting the appropriate polymer for specific conditions and adjusting the dosage as needed. A case study at NTMWD's Wylie plants demonstrates how polymer optimization improves water quality. The study includes desktop research, bench-scale testing, and full-scale trials to evaluate polymer impact on settled water quality and filter performance. This case study offers insights into optimizing polymer use for effective treatment processes.	11/19/24	4:30 PM	5:00 PM	Seulki	Yeo		Hazen and Sawyer
TUE27	TUE27 - Lead Services Line Identification Methods and Considerations	This session will explore methods and approaches to identifying lead service lines.	11/19/24	3:30 PM	5:00 PM	Jian	Zhang		The Water Research Foundation
TUE27-01	Identifying Unknown Service Lines can be a Disturbing Task	This presentation will discuss potential water quality impacts following hydro excavation for service line identification.	11/19/24	3:30 PM	4:00 PM	Colin	White		US EPA Office of Research and Development
TUE27-02	Leveraging an Aggressive Inspection Program and Predictive Modeling to Develop an LSL Inventory for Jackson, Mississippi	This presentation will share Jackson, Mississippi's story of successes and lessons learned in building, and maturing, their LSL Inventory and Replacement Plan project. This program is just one important piece to rebuilding the community's trust in their water agency, all the while complying with the EPA's Lead and Copper Rule Revisions.	11/19/24	4:00 PM	4:30 PM	Katie	Chamberlain		Stantec
TUE27-03	Comparative Analysis of Acoustic Technologies for Lead Detection in Water Service Connections	The paper discusses the application of acoustic-based technologies as a non-invasive, non-disruptive alternative for detecting the presence of lead detection in water service connections. Acoustic technology exploits the propagated sound waves into water services to identify features that can differentiate among different pipe materials, thereby identifying lead. The paper discusses the theory of wave propagation and how it can serve to extract relevant material properties. Different sensor configurations are presented to measure the acoustic properties for both the customer and the utility side of the service connection. Experimental results from over 200 measurements are presented and discussed.	11/19/24	4:30 PM	5:00 PM	Bruce	Robertson		
WED01-01	Evaluation of the Mobilization of Organic Compounds from Wildland and Wildland-Urban Interface Fires: Impact to Source Waters and	Evaluation of the mobilization of organic compounds from wildland and Wildland-Urban Interface fires: Impact to source waters and public health	11/19/24	8:30 AM	9:00 AM	Fernando	Rosario-Ortiz		
WED02-01	Effluent Organic Matter Transformation Following UV Irradiation at 222 nm Emission from KrCl* Excimer Lamps	Research to date has shown that UV irradiation at 222 nm emission is highly effective at virus inactivation during UV disinfection and contaminant degradation during UV/AOP. However, significant research gaps on fundamental photochemistry at 222 nm remain, including the effect of 222 nm emission on dissolved organic matter (DOM) transformation. This research investigates the transformation of effluent organic matter (EfOM) following UV irradiation at 222 nm, compared to changes induced by conventional UV/AOP treatment at 254 nm.	11/19/24	8:30 AM	9:00 AM	Blair	Hanson	PhD Candidate	Corona Environmantal Consulting, LLC.
WED02-02	Developing Optical Sensors to Monitor and Predict Coagulation Performance for Water Reuse	Wastewater reuse will be a critical strategy to adapt to climate change. For non-membrane reuse processes, coagulation may be an essential pre-treatment to meet low dissolved organic carbon (DOC) targets. Jar testing of 17 diverse secondary wastewater effluents with alum demonstrates both the effectiveness of coagulation for non-membrane reuse and the power of fluorescence for predicting coagulation performance. Real-time monitoring of effluent organic matter will be essential for process control. This work challenges the transferability of specific absorbance (SUVA) to predict DOC removal from surface waters to wastewater and proposes that fluorescence metrics could be better monitoring surrogates.	11/19/24	9:00 AM	9:30 AM	Emma	Wilder		University of Colorado, Boulder

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED02-03	Risk Amidst Uncertainty: Evaluating Complex Chemical Risks for Water Reuse/recycling and Other Drinking Water Challenges	Water recycling/reuse represents a challenge for chemical risk assessment due to the many potential contaminants in wastewater streams. Similarly, complex mixtures of many chemical contaminants must be evaluated simultaneously to make decisions around drinking water treatment and supply planning. In response to these challenges, this presentation demonstrates a quantitative relative chemical analysis (QRCA) approach using stochastic Monte Carlo simulations to evaluate chemical risks through an advanced water recycling pilot. This work demonstrates the value of relative chemical risk modeling to inform crucial decisions and discusses key methodological challenges and solutions for dealing with complex censored data sets.	11/19/24	9:30 AM	10:00 AM	Riley	Mulhern	Associate Environmental Engineer	Brown and Caldwell
WED05-01	Is It a Model or Is It a Digital Twin? Results of the 2024 AWWA Survey on Water Distribution Technology	Once every 10 years, AWWA issues a wide-audience survey to gather insights on how water distribution models are being used, challenges, and trends. The results of this survey have been widely used to inform all AWWA members for decades. For the current survey, the Engineering Modeling Applications Committee teamed with the Digital Twins Committee to answer many of the common questions around the topics of modeling and digital twins.	11/19/24	8:30 AM	9:30 AM	James	Cooper	Global Director, Water	Arcadis
WED05-02	Decreasing Nonrevenue Water and Protecting Water Quality with Machine Learning	Aging infrastructure is a concern in the water and wastewater industry. Water main inspections and replacements are typically guided by pipe age, material, failures, statistical models, or a combination of methods. Greenville Water has been practicing traditional proactive acoustic leak detection for over a decade, however pipe failures remain steady. With over 3100 miles of water mains in an expansive distribution system, a more targeted approach was imperative. Greenville Water has turned to the use of advanced acoustic leak detection hydrant caps and two distinct machine learning-based tools (VODA.ai and Satellite Leak Detection) to reduce water loss and to plan water main replacement projects with a science-based approach.	11/19/24	9:00 AM	9:30 AM	Jane	Arrington	Director of Operational Technical Services	Greenville Water
WED05-03	Water Quality Modeling to Optimize Future Water Storage and Sampling Locations	Water quality models are a critical decision support tool for future system planning, and they can be used to both optimize infrastructure and to identify future sampling locations to maintain regulatory compliance. A water quality model for a medium sized utility in the Midwest was development and calibrated to evaluate the future water quality changes due to a planned increase in system storage. model shows that even with the additional storage volume and retention time, tank aeration may result in significant reductions in THM during peak conditions. The water quality model was also used to evaluate Stage 2 compliance monitoring locations to determine if any changes will be needed following implementation of improvements.	11/19/24	9:30 AM	10:00 AM	Ben	Chenevey	Senior Water Engineer	Arcadis
WED05-04	Experimental Use Cases of Machine Learning Modeling and Implementation for Real-Time Situation Awareness in Water and Wastewater Applications	This paper reviews the existing leak detection techniques in chemical tanks, focusing on the potential and challenges of incorporating machine learning into this area. Examples from machine learning applications in water networks and underground storage tanks demonstrate adaptability to chemical tanks. Chemical tanks, fundamental in the water and wastewater sectors, are susceptible to leaks due to damage, corrosion, or human error, which can result in significant environmental, economic, and safety concerns. It's imperative to have effective leak detection strategies to prevent and lessen the impact of chemical spills. The strategies are categorized into hardware-based and software-based approaches.	11/19/24	10:30 AM	11:00 AM	Francisco	Alcala		CDM Smith
WED05-05	AI-Driven Multi-Scale Modeling and Optimization of Water Quality in Drinking Water Distribution Systems	This presentation will provide an overview of the recent advances in developing AI-driven multi-scale modeling and optimization techniques to enable real-time management and control of water quality in drinking water distribution systems.	11/19/24	11:00 AM	11:30 AM	Ahmed	Abokifa	Assistant Professor	University of Illinois Chicago

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED05-06	AI as an Ally in LCRR Compliance	This presentation describes how Artificial Intelligence (AI) was used to develop the City of St. Petersburg's lead service line inventory for Lead and Copper Rule Revision (LCRR) compliance. The City maintains tabulated records of work orders which include valuable information for the inventory including service line materials and replacement dates. However, much of this information is stored in free-form text fields which are tedious to review manually. GeoAI was used to increase the efficiency and accuracy of text classification within these fields and provide a model to assess new records. This presentation demonstrates how utilities can leverage AI tools to extract useful information from large datasets for LCRR inventory development.	11/19/24	11:30 AM	12:00 PM	Carlee	Chaffin		HDR Engineering, Inc.
WED24-03	Composition of the Microbial Communities within Sediment and Water in Chlorinated Drinking Water Distribution System Storage Tanks	Distribution system storage tanks are a critical part of drinking water infrastructure because of their role in providing quality, finished drinking water to surrounding serviced areas, equalizing system pressure, and emergency response usage. The chemical composition and microbial community associated with drinking water distribution system tank sediments remains poorly understood; however, there is evidence suggesting that storage tank sediment is a potential source for the growth of opportunistic pathogens. The research described in this abstract focuses on an investigation of the composition of microbial communities within tank water and sediment under a range of conditions.	11/19/24	9:45 AM	10:45 AM	Eva	Bridges		West Virginia University
TUE15-01	Experiences Responding to Wildfire Events and Utilization of Advanced Organics Characterization Methods to Understand Treatability	Wildfire frequency and severity has been increasing in many regions globally with warming temperatures and shifting precipitation patterns due to climate change. As a part of Water Research Foundation project #5168, wildfire ash from five separate fires in Oregon, Washington, and British Columbia was harvested, mixed with surface water. This project examines the impacts of wildfire on source water quality and implications to treatability. This presentation will share source water quality impacts experienced by utilities from wildfire events and water quality impacts from bench-scale testing.	11/20/24	1:30 PM	2:00 PM	Lynn	Stephens	Northwest Drinking Water Leader	Brown and Caldwell
TUE15-02	Assessing the Vulnerability of Drinking Water Treatment Plants to Wildfire in the Pacific Northwest	Wildfires can create significant disruptions to source water quality resulting in challenges for downstream drinking water treatment operations. This presentation discusses the development of a framework to score individual drinking water treatment plants on their vulnerability to wildfire. A two-scenario model was used to include a framework for post-initial flush and long-term vulnerability. The framework encompasses characteristics of source water, treatment operations, and distribution system. The scores for each of these categories will be weighted to produce an integrated score for each DWTP in Washington and Oregon. This scoring system will be an accessible tool for policymakers, water utilities, and the public to assess existing.	11/20/24	2:00 PM	2:30 PM	Caroline	Martin	Graduate Student Research Assistant	Montana State University Bozeman
TUE15-03	Lessons from Wildfires Attacking Water Utilities: Implications for Engineering, Operations, and Water Quality Professionals	The most destructive, costliest, and deadliest wildfires have been recorded in recent U.S. history and these require an equally unprecedented response by water utilities. This presentation will share real-world lessons direct from frontline utilities impacted, offer a concept of operations plan (CONOPS) that all utilities can adopt, and researcher discoveries.	11/20/24	2:30 PM	3:00 PM	Andrew	Whelton	Asst. Professor	Purdue University, Environmental Engr.

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED01	WED01 - Wildfire Impacts to Drinking-water Source Quality	"Wildfires are expected to increase in frequency and intensity, and will affect forested areas that serve as sources of drinking water. Wildfires are complex events in which varying fuel types, heat transfer conditions, and wind conditions can influence the burn regime of soil organic matter. This includes combustion (heating in the presence of oxygen) and pyrolysis (heating in the absence of oxygen) and combustion (heating in the presence of oxygen) as soil oxygen is depleted by combustion. The influence of many characteristics of wildfire on drinking water source quality are poorly understood. This session will inform scientists and utilities of the potential impacts to source water quality after wildfire."	11/20/24	8:30 AM	12:00 PM	David	Hanigan	Associate Professor	University of Nevada
WED02	WED02 - Reuse Treatment	This session explores key aspects in wastewater treatment and reuse including UV irridation of organic matter, optical sensor monitoring for the prediction of coagulation performance, and evalution of chemical risks in water reuse.	11/20/24	8:30 AM	10:00 AM	Kenneth	Mercer	Editor-in-Chief, JAWWA	American Water Works Association
WED03	WED03 - UV Efficiency Impacts on Microbial Community	Microbial inactivation using UV irradiation is dependent on several factors including exposure time, UV dose, depth and turbidity of water, etc. Other considerations such as location of treatment (building versus full-scale drinking water treatment facility) and target organisms (bacteria, viruses, protozoa, biofilm communities) are also important when validating the use of UV for disinfection. This session includes topics such as the creation of bacterial log reduction credit (LRC) tables for on-site systems, bench-scale tests evaluating the effectiveness of UV inactivation of nontuberculosis mycobacteria, and the impact of low-dose UV treatment on microbial communities in distribution systems.	11/20/24	8:30 AM	10:00 AM	Sandhya	Parshionikar	Microbiologist	U.S. Environmental Protection Agency
WED03-01	Development of Bacteria Log-reduction Credit Tables Indicate Higher Required CT Values Compared to Virus and Protozoa	Bacterial log reduction credit tables for disinfection and membrane technologies were created for the Minnesota Department of Health from published research. Work included systematic extraction of over 5,000 dose-response datapoints for chemical & UV disinfectants and membrane filters for over 27 bacteria species (including enteric pathogens Campylobacter spp. & Salmonella spp. and environmental bacteria such as Legionella pneumophila & Mycobacterium spp.). For multiple disinfectants, results showed bacteria require up to 10- to 100-fold higher CT compared to SWTR CTs for virus and protozoan cysts.	11/20/24	8:30 AM	9:00 AM	Alex	Mofidi	Sr. Project Manager	Confluence Engineering Group

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED03-02	Assessing Viability of Nontuberculous Mycobacteria Following UV Treatment of Drinking Water by Monitoring Precursor-Ribosomal RNA	Certain nontuberculous mycobacteria (NTM) are opportunistic pathogens that are resistant to common water disinfectants and pose a significant global health challenge. We evaluated the effectiveness of ultraviolet (UV) treatment in inactivating NTM by measuring their pre-rRNA levels. Unlike cellular membrane integrity, commonly used for assessing microbial inactivation, pre-rRNA is a viability marker that is impacted by UV. Our results show that pre-rRNA levels in Mycobacterium avium decrease with increasing UV doses and correlate with log reductions. This study provides insights into UV inactivation of slow-growing NTM and offers a rapid method for assessing NTM infection risks and improving water treatment practices using UV disinfection.	11/20/24	9:00 AM	9:30 AM	Nuha	Alfahham		University of Michigan
WED03-03	Impact of Low-dose UV Treatment on Microbial Communities in a Full-scale Drinking Water Distribution System	Ultraviolet (UV) irradiation is widely used for drinking water disinfection. However, much of the current knowledge on its impact on microorganisms stems from pure-culture work with a particular focus on clinically relevant microorganisms. So far, the impact of UV on complex microbial communities in full-scale water treatment systems has not been studied. This research addresses this limitation by studying the impact of low-dose UV treatment on microbial communities at a full-scale water treatment plant and distribution system, with a focus on nontuberculous mycobacteria and nitrifying bacteria. The study aims to elucidate the benefits and challenges associated with UV treatment to improve distribution system management.	11/20/24	9:30 AM	10:00 AM	Sarah	Potgieter	Student	University of Michigan
WED04	WED04 - DBPs: M/DBPR and Beyond	EPA anticipates proposing revisions to the Microbial and Disinection Byproducts Rules in Summer 2025. This session will discuss utility challenges in meeting current DBP regulations and potential new requirements, integrated monitoring plans for wholesellers and consecutive systems, and going beyond regulations to improve public health.	11/20/24	8:30 AM	10:00 AM	Alice	Jariz		
WED04-01	Characterizing Challenges in Meeting Current and Potential Future DBP Precursor Removal Requirements to Inform MDBP Rule Revisions	The USEPA is currently committed to proposing revisions to Microbial and Disinfection Byproducts (MDBP) Rules. Future regulations could include more stringent requirements for total organic carbon (TOC) removal to reduce disinfection byproduct (DBP) formation. This study investigates TOC removal using available national data to characterize public water systems (PWSs) by TOC removal requirements or alternative compliance criteria (ACC) and the extent to which PWSs are meeting requirements. Impacts of potential regulatory changes are evaluated. PWSs found not to comply with current or potential future regulations are surveyed, followed by interviews with a select subset of systems to provide insight on challenges in achieving compliance.	11/20/24	8:30 AM	9:00 AM	Carleigh	Samson	Water Process Engineer	Corona Environmental
WED04-02	Upcoming Microbial and Disinfection Byproducts Rule Revisions: Integrated Monitoring Plans and Wholeseller's responsibility	The Microbial and Disinfection Byproducts (MDBP) Rule Revisions Working Group, directed by the National Drinking Water Advisory Council (NDWAC), delved into specific issues related to supporting the rule revisions. The working group provided recommendations for submission to EPA. The presentation will discuss in detail benefits of the proposed 'Integrated Monitoring Plan' and impact of the rule especially for wholesalers of water on sharing responsibility of consecutive systems violations. EPA is reviewing the recommendations and if deemed necessary, the draft MDBP rule revisions from EPA are anticipated by 2025/2026, with an anticipated date of final action being September 30, 2027.	11/20/24	9:00 AM	9:30 AM	Vishakha	Kaushik		Arcadis U.S., Inc.
WED04-03	DBP Mitigation Pilot Study for Small Water Systems – Going Beyond Regulations to Achieve Public Health Improvements	Small groundwater systems account for nearly all of Washington State's chronic DBP exceeders. These water systems go out of and return to compliance with DBP regulations on what appears to be a never-ending and random cycle. DOH initiated an effort to try a systematic, holistic approach toward achieving sustainable solutions for small systems that have complex DBP problems. DOH staff provided data-driven guidance on steps to find lasting solutions to 4 systems. The pilot study includes collecting individual well water quality data looking at primary drivers for DBP formation and DBP compliance samples over 4 quarters. Findings and successes to date will be shared.	11/20/24	9:30 AM	10:00 AM	Stephen	Deem		Washington Department of Health

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED05	WED05 - AI/ML – Applications in Distribution Systems Optimization	This technical session will cover AI and machine learning applications in water distribution, including digital twins, water quality optimization, leak detection, nonrevenue water reduction, LCRR compliance, and water main failure analysis.	11/20/24	8:30 AM	12:00 PM	Prabhushanka	Chandraseker	Intelligent Water National Practice Leader, Arcadi	Arcadis
WED06	WED06 - Post LSL Removal and Other Lead Sources	This session will examine lead release from lead sources other than LSLs and post LSL removal considerations.	11/20/24	8:30 AM	10:00 AM	Colin	White		US EPA Office of Research and Development
WED06-01	To Replace or Not to Replace: Understanding the Galvanized Service Line Conundrum	In this presentation we review different approaches used by water systems to distinguish between a galvanized service line and a galvanized service line requiring replacement. Getting this right not only protects public health, but also reduces the financial risk to the water system. Using examples, methods based on field work and predictive modeling are discussed for different state regulatory requirements. Attendees will learn about different strategies to carry out field work in support of lead service line replacement programs and support discussions with their primacy agency.	11/20/24	8:30 AM	9:00 AM	Quirien	Muylwyk	Americas Practice Director - Water Quality	AECOM
WED06-02	Impact of Lead Components on Household Lead Levels at the Tap	The SFPUC completed a pilot study to evaluate lead levels at residences with Lead User Service Lines (LUSLs) replaced within the San Francisco Water System (SFWS). Lead testing results for samples collected before, 1-week after, 1-month after and 3-months after LUSL replacement (LUSLR) are presented.	11/20/24	9:00 AM	9:30 AM	Alan	Wong	Engineer	San Francisco Public Utilities Comm.
WED06-03	Chicago Department of Water Management Post-LSLR Results	The presentation will present lead results from Chicago homes that has had their lead service lines replaced. Results are primarily paired before and after samples through Chicago's free lead kit testing program and sequential samples. The presentation will look at changes in concentrations, fractionization, impact of domestic plumbing to lead and other metals after a new copper service line is installed.	11/20/24	9:30 AM	10:00 AM	Patrick	Schwer		
WED07	WED07 - PFAS Planet: Modeling and Optimization	While the implementation of designated BATs for PFAS treatment are well-understood, modeling and optimization of these technologies remains critically important for both maintaining compliance scheduling and reducing both capital and operating costs. This session addresses these key aspects of PFAS treatment at multiple scales (bench, pilot, and full), technologies (IX and GAC), and applications (groundwater, surface water, and wastewater).	11/20/24	8:30 AM	12:00 PM	Mary	Smith	Research Program Manager	Water Research Foundation
WED07-01	Open-source Treatment Performance Modeling Tools for PFAS Removal Using GAC and IX Media	Treatment performance models for predicting removal of per- and polyfluoroalkyl substances (PFAS) using granular activated carbon and ion exchange resins are important for supporting system design. This presentation highlights the freely available, open-source modeling tools from the United States Environmental Protection Agency. Model functionality will be highlighted in the context of pilot- and full-scale system analysis and will demonstrate how data can be analyzed with these models and their use to inform full-scale media selection and cost predictions.	11/20/24	8:30 AM	9:00 AM	Jonathan	Burkhardt	Environmental Engineer	US EPA

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED07-02	Minimize PFAS Pilot Duration and Cost through Modeling to Achieve Compliance Deadlines	Piloting post-filter adsorptive media can require more than two years to observe breakthrough of longer-chain PFAS compounds that commonly control media replacement frequency at a high cost. A modeling approach will be shared that will allow PFAS pilot treatment objectives to be achieved in a fraction of the time for various types of media. This process will equip utilities to progress toward full-scale treatment more effectively in advance of the compliance deadline at a lower total pilot cost. This presentation will also outline an approach to apply this method at locations that insufficient concentrations of short-chain PFAS to observe breakthrough, and will elaborate on its applicability for RSSCTs.	11/20/24	9:00 AM	9:30 AM	Amanda	Canida		
WED07-03	Optimizing GAC Design for PFAS Removal using Bench, Pilot and Full-Scale Studies	This presentation will share results from Rapid Small Scale Column Testing (RSSCT) studies used for removal of PFAS and other emerging contaminants using GAC. RSSCT studies will be compared with pilot and full-scale applications in a water reclamation facility in Virgina and in an indirect potable reuse application in Anne Arundel County, MD. This study will provide tools to accurately scale-up RSSCT data and predict GAC media bed life prior to breakthrough of contaminants, thus reducing overall O&M costs related to media changeouts. This study will provide quick solutions for PFAS management in not only drinking water utilities but also wastewater facilities that would be impacted by the upcoming EPA proposed PFAS rule.	11/20/24	9:30 AM	10:00 AM	Ramola	Vaidya		HDR
WED07-04	Scaling of RSSCT to Pilot Results for PFAS Removal in Groundwater, Surface Water, and Wastewater	Pilot testing is the most reliable approach for determining treatment efficacy and bed life of different sorbents for per- and polyfluoroalkyl substances. However, pilot testing carries high costs and could last over a year, delaying important design and media selection decisions. Rapid small-scale column tests (RSSCTs) provide an alternative that enables testing of media in a laboratory setting in days or weeks, but the accuracy of scaling methods has been highly variable across different studies. In this work, we compare different RSSCT scaling methods for pilots operated at groundwater, surface water, and wastewater treatment plants. We present results for granular activated carbon, anion-exchange resins, and novel sorbents.	11/20/24	10:30 AM	11:00 AM	Nick	Chew	Postdoctoral Research Associate	
WED07-05	Assessing Impacts of Competing Co-Constituents on Commercial Ion Exchange Resin Performance	Anion exchange resins (AERs) offer more efficient removal of per- and polyfluoroalkyl substances (PFAS) from natural waters compared to granular activated carbon. However, removal by AER is affected by the presence of co-constituents such as natural organic matter (NOM) and inorganic ions. This study examines the performance of a commercial AER for removal of a diverse group of PFAS species at environmentally relevant concentrations from a variety of synthetic water matrices containing common competing ions found in natural waters. Bed volumes to 20% breakthrough and fitted curves produced from column tests are used to better understand how competing ions impact the removal of diverse PFAS by AERs.	11/20/24	11:00 AM	11:30 AM	Graham	Parker	Research Assistant	University of North Carolina
WED07-06	PFAS Intraparticle Diffusion Coefficient Determination for Single-Use Strong Base Anion Exchange Resins	This presentation will cover a USEPA research study on per- and polyfluoroalkyl substances (PFAS) treatment via strong-base anion exchange (SBA) resin. SBA resins are effective for PFAS treatment, but the necessary kinetic parameters that are crucial for simulating fixed-bed process performance are lacking in the literature. In this study, intraparticle diffusion coefficient (Ds) estimates were obtained via batch stirrer experiments and used to simulate column experiments.	11/20/24	11:30 AM	12:00 PM	Brooke	Gray	Student/ORISE Research Fellow	
WED09	WED09 - Reuse Development	This session highlights case studies in implementation of water reuse for varied source waters and water demands. Direct and indirect potable reuse cases in Mumbai India, Palm Beach County, and Inland Southwestern United States are discussed, with a focus on supplementing water supply in these communities. 	11/20/24	10:30 AM	12:00 PM	Carrie	Del Boccio	Practice Leader - Recycled Water	Woodard & Curran
WED09-01	First Direct Potable Reuse Project in India	Mumbai DPR project will provide current worldwide experiences in developing and implementing DPR projects as well as different treatment scenarios being adapted for removing various contaminants including PFAS and how these will be adapted in Mumbai’s pilot project based on extensive water quality analysis.	11/20/24	10:30 AM	11:00 AM	Viraj	deSilva	Sr. Treatment Process Leader	Freese & Nichols, Inc.

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED09-02	Green Cay Phase II - Palm Beach County Advances Water Reuse in the Sunshine State	Palm Beach County Water Utilities Department is implementing Green Cay Phase 2 (Green Cay Park and Learning Center), a visionary project, creating new opportunities for the public to connect with the local water environment and crafting a constructed “springs”-type ecosystem. This presentation shares results from the advanced water purification facility pilot study, completed in August 2022. The advanced water purification process train includes four-treatment barriers: ultrafiltration (UF), reverse osmosis (RO), ammonia oxidation, UV advanced oxidation, and water stabilization.	11/20/24	11:00 AM	11:30 AM	Hayden	Tse		CDM Smith
WED09-03	Agua Pura - Framework for Technology Decisions in Water Reuse for Resilient Inland Communities	With increasing pressures from both western water shortages and natural disaster events, arid southwestern communities are looking to technological one water solutions to improve water supply resiliency. This presentation will discuss a framework for process technology selection in water reuse for inland communities and the challenges of holistic management of design decision-making from identifying new or sustainably accessible water resources to treating complex water matrices to provide both indirect and direct potable reuse.	11/20/24	11:30 AM	12:00 PM	Heather	Tugaoen	Civil Engineer	
WED10	WED10 - Early Detection and Monitoring of Algal Blooms and Cyanotoxins	Early detection and monitoring of harmful algal blooms (HABs) is essential for proactive management and protection of public health and the environment. It can provide insight into the causes, dynamics, and trends of HABs as well as strategies for bloom prevention, prediction, and management. This session will highlight and present cutting edge monitoring techniques for HABs.	11/20/24	10:30 AM	12:00 PM	Hunter	Adams	Environmental Laboratory Supervisor	City of Wichita Falls - Cypress Environmental Lab.
WED10-01	Determining the Role of Spectral Imaging as an Early Warning System for Presence/significance of Algal Blooms	Algal blooms present considerable operational, public health, taste & odor and aesthetic issues for the community and its water providers. Existing methods are time consuming, cumbersome or require advanced analytical expertise, leading to reactive responsiveness for impacted utilities. Simpler methods exist, but do not reliably differentiate nuisance organisms from toxin producers that pose public health impacts. Planning, treatment and risk mitigation requires proactive monitoring. Rapid detection is key to improving response and management. This study has been assessing benefits of different spectral image acquisition platforms (i.e., satellite to aircraft/drone to hyperspectral microscope) on improving early identification of blooms.	11/20/24	10:30 AM	11:00 AM	Zia	Bukhari	Senior Environmental Scientist	American Water
WED10-02	Defining Quality Control Criteria for Flow Imaging Microscopy.	Greater Cincinnati Water Works (GCWW) is a surface drinking water treatment plant with the Ohio River as its raw water source. The Water Quality and Treatment division actively and continuously monitors the overall concentration and types of algae to determine operational changes. This presentation will cover the development of quality control measures for implementation of flow imaging technology in GCWW's algae monitoring program.	11/20/24	11:00 AM	11:30 AM	Eric	Johnson		Greater Cincinnati Water Works
WED10-03	Advancing Rapid Microcystin-LR Detection using Antibody-based Biosensors with a Simplified Calibration Curve for Early Action	Microcystins (MCs) including MC-LR are cyanotoxins commonly found in water bodies experiencing harmful algal blooms. Thus, early detection of MC-LR in water is essential for safeguarding public health and the environment. In this study, a novel cost-effective screen-printed carbon electrode (SPCE) biosensor was developed for rapid detection of MC-LR. Two commercially available SPCE sensors were modified with antibodies along with different cleaning procedures. The developed biosensors successfully measured various MC-LR concentrations in three different real water samples using a simplified calibration curve with a detection limit of 0.45 ng L-1 (RSD of 1.0–4.4%), reducing the need for separate calibration efforts for each water body.	11/20/24	11:30 AM	12:00 PM	Samuel	Adjei-Nimoh	Phd. Student	
WED11	WED11 - Harnessing Distribution System Physical Attributes to Improve Water Quality	This session will cover the critical importance of distribution system water age targets, the impact of cured-in-place pipes on drinking water quality, and unidirectional flushing methods for mobilizing iron oxide particles in municipal drinking water pipes.	11/20/24	10:30 AM	12:00 PM	Alice	Fulmer	Regional Liaison	Water Research Foundation

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED11-01	How Old is Too Old? Distribution System Water Age Targets and Why They Matter	Increasing access to dynamic hydraulic models by utilities means that system water age data is now a routine component of modeling studies and master plans. However, there is consistent confusion on how to interpret water age data – how old is too old? And what is the expectation of designers and operators to respond to this data? The presentation will take a system designer and operator-eye view of water age data, through discussion of three key points: 1) how to develop a meaningful system-specific water age target; 2) how and why to visualize water age data, and 3) what it means to mitigate high water age at a practical level. The author will draw on projects experience and in drafting the new water age chapter for M68.	11/20/24	10:30 AM	11:00 AM	Simon	Horsley	North American Distribution System Water Quality L	Stantec Consulting Ltd
WED11-02	Cured-In-Place-Pipes are Being Used for Drinking Water Pipe Repairs: How Do They Impact Drinking Water Quality?	Cured in place pipe (CIPP) technology is being used for drinking water pipes and this study provides new insights into its drinking water quality impacts. If you are interested in what chemicals are present in the resins, what chemicals leach out and at what concentration, this presentation will be of interest to you.	11/20/24	11:00 AM	11:30 AM	Samuel	Spears	Research Assistant	
WED11-03	Reverse Unidirectional Flushing (R-UDF) to Mobilize Iron Oxide Particles from Municipal Drinking Water Pipes	The presentation reports on controlled experiments that examined the effect of reversing the unidirectional flushing (UDF) direction on the effectiveness of material removal in drinking water pipes. The results indicated that when drinking water pipes are flushed in the opposite direction to that of normal daily flows, (UDF) has an enhanced removal potential. The results are important to water utilities as they show that the choice of flushing direction relative to normal flows can result in enhanced cleaning of drinking water mains, improve water quality in water networks, and reduce customer complaints.	11/20/24	11:30 AM	12:00 PM	Yves	Filion		Queen's University
WED13	WED13 - Lead in Schools and Daycares	This session will present lead testing, monitoring, and mitigation strategies in schools.	11/20/24	10:30 AM	12:00 PM	Christina	Devine		
WED13-01	Water Quality Testing & Mitigation Strategies - Chicago Public Schools	Chicago Public Schools is the fourth largest school district in the country with 640 schools on 530 campuses. Since 2016, CPS has taken a proactive stance and been a national leader on Water Quality testing and mitigation and are actively testing 25% of our schools this year. This session will review the history of our Water Quality program, current status, issues and testing standards, including mitigation programs and preventative flushing to ensure water quality in all schools. It will also touch upon the importance of communications and transparency.	11/20/24	10:30 AM	11:00 AM	Robert	Christlieb	Director of Operations-Facilities	Chicago Public Schools
WED13-02	Ensuring a Healthy Future for America: Texas Water Company's Proactive LCRR Compliance Approach for School & Childcare Monitoring	The presentation will discuss Texas Water Company's (TWC) successful approach in proactive planning for school and childcare monitoring for LCRR compliance. This presentation will share TWC's lessons learned including a unique sampling schedule, utilizing school districts as allies, selecting a data management solution, and taking advantage of WIIN grants.	11/20/24	11:00 AM	11:30 AM	Vishakha	Kaushik		Arcadis U.S., Inc.
WED13-03	Navigating Compliance and Community Engagement: Lessons from PWD's School and Childcare Pilot Study	PWD, supported by Arcadis, initiated a school and childcare facilities lead sampling pilot to evaluate the best way to meet federal requirements and provide value to their community. This presentation will share strategies to building school and childcare sampling programs, including key topics such as stakeholder engagement and sampling logistics.	11/20/24	11:30 AM	12:00 PM	Karen	Casteloes	Water Quality Engineer	

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED15	WED15 - Opportunistic Pathogens	To mitigate the risk of opportunistic pathogens in premise plumbing, regular maintenance and monitoring of water quality are essential. This session will explore the dynamics, monitoring, and inactivation of opportunistic pathogens in distribution systems.	11/20/24	1:30 PM	3:00 PM	Grace	Jang	Research Manager	Water Research Foundation
WED15-01	Establishing an Opportunistic Pathogen Monitoring Program for A Large Drinking Water Utility	The EPA's MDBP rule revisions aim to enhance water standards, targeting pathogens and DBPs with risk-based monitoring in public systems. These revisions suggest improved detection for pathogens/DBPs and prioritizing vulnerabilities. Since the DBP Stage 2 rule, WSSC faced challenges in managing DBP levels by reducing chlorine, potentially compromising microbial safety. In response, WSSC launched its Opportunistic Pathogen Monitoring Program, aiming to pinpoint vulnerabilities and protect sensitive groups. This initiative highlights WSSC's commitment to a balanced approach in managing chlorine residuals, addressing both DBP and microbial risks, and ensuring the delivery of safe, quality drinking water while anticipating future regulations.	11/20/24	1:30 PM	2:00 PM	Monica	Lee-Masi	Sr. Water Quality Specialist	WSSC
WED15-02	Understanding the Dynamics of OPs in U.S. Drinking Water Distribution Systems – a Study under the EPA CODOWN Project	Drinking Water Opportunistic pathogens (OPs) are the leading cause of severe waterborne infections, especially in developed nations like the United States (US). While disinfection is essential for microbial inactivation and growth prevention in the Drinking Water Distribution System (DWDS), it can result in harmful disinfection by-products (DBPs). The Consortium On DBPs and OPs in Water Networks (CO-DOWN) project aims to provide a better understanding of the dynamics of OPs and DBPs in different DWDSs. This presentation will outline the methods and findings from the early-stage OP assessments of the project. Specifically, it will show the state of Legionella targets and their free-living amoebae (FLA) vectors in 50 DWDSs across the US.	11/20/24	2:00 PM	2:30 PM	Nowrina	Rahim		University of Texas At Austin
WED15-03	Inactivation of Biofilm-bound Opportunistic Pathogens in Water Supply Systems with UVC LEDs	Light emitting diodes (LEDs) that emit germicidal UV irradiation (200-290 nm) are a promising new technology to minimize biofilm formation and disinfect biofilm-bound opportunistic pathogens (OPs) within drinking water distribution systems and premise plumbing. In this study, both pre-treatment and in situ treatment with UV LEDs were tested as potential options for the prevention of biofilms and disinfection of biofilm-bound OPs. Various irradiation wavelengths and pipe materials were tested to inform if and how UV LEDs can be used in this manner.	11/20/24	2:30 PM	3:00 PM	Madison	Ferrebee		
WED16	WED16 - Bridging the Gap: Innovative Frameworks for Safe and Sustainable Direct Potable Reuse	Traditional water sources are strained, and we need innovative solutions. Direct potable reuse (DPR) offers a sustainable approach by recycling treated wastewater to drinking water standards. However, public perception, regulations, and ensuring long-term safety remain hurdles to widespread implementation. This STS aims to provide practical alternatives to current pathogen crediting frameworks.	11/20/24	1:30 PM	5:00 PM	Joe	Hernandez	Microbiologist	City of Scottsdale
WED16-01	Bacteriophages as Indicators of Enteric Virus Removal for Potable Reuse Applications	A sampling campaign was conducted by a utility in Scottsdale, AZ with the aim to evaluate the fate of human viruses, viral surrogates and the parasites Cryptosporidium and Giardia through a reclamation plant and advanced water treatment facility.	11/20/24	1:30 PM	2:00 PM	Joe	Hernandez	Microbiologist	City of Scottsdale
WED16-02	Demonstrating Pathogen Removal by Secondary Membrane Bioreactor (sMBR) Treatment for Potable Reuse	Two MBR systems were evaluated and challenge tested; although the pathogen and indicator microbe reductions differed significantly under baseline conditions, results demonstrated that both systems achieved >4 LRV for Cryptosporidium and Giardia.	11/20/24	2:00 PM	2:30 PM	George D.	Di Giovanni	Microbiology Unit Manager	The Metropolitan Water District of Southern California
WED16-03	Viral Surrogates for Reverse Osmosis Integrity Monitoring in California Reuse Applications	This presentation will provide an overview of the available viral surrogates in use for reverse osmosis integrity monitoring and associated pathogen log reduction credits for recent California potable reuse projects.	11/20/24	2:30 PM	3:00 PM	Eileen	Idica	Principal Engineer	Trussell Technologies

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED16-04	Developing a Surrogate-Based Virus Crediting Framework for Coag/Floc/Sed	A set of data from bench-scale experiments will be presented to engage regulators to maximize pathogen inactivation crediting of each unit process for widespread implementation of potable reuse that is both economical and protective of public health.	11/20/24	3:30 PM	4:00 PM	Brian	Pecson	Director of Engineering	Trussel Technologies
WED16-05	Fit-for-Purpose QMRA Framework for Water Reuse Applications	This presentation will provide an overview of the conceptual framework underpinning these approaches followed by a detailed discussion of current state-of-the-science assumptions for conducting the associated QMRA.	11/20/24	4:00 PM	4:30 PM	Michael	Jahne		U.S. EPA Office of Research and Development
WED16-06	Developing a Surrogate-Based Crediting Framework for Secondary Biological Treatment Processes in Potable Reuse Applications	This presentation will focus on efforts to develop a surrogate-based LRV crediting framework for a critical treatment process that is often overlooked and under-credited in potable reuse applications—secondary biological treatment.	11/20/24	4:30 PM	5:00 PM	Daniel	Gerrity	Principal Research Microbiologist	Southern Nevada Water Authority
WED17	WED17 - Predictive Modeling for Microbial Water Quality Investigations	This special session will focus on the use of predictive models for microbiological investigations. Fundamentals of predictive modelling and examples/cases studies will be discussed.	11/20/24	1:30 PM	3:00 PM	Melina	Bautista		Carollo Engineers, Inc.
WED17-01	Introduction to Modeling for Microbial Water Quality Investigations	This presentation will include types of models, definition of common terms used in the modeling space, and key factors for model implementation.	11/20/24	1:30 PM	2:00 PM	Kerry	Hamilton	PhD Student	
WED17-02	Modeling Near Real-time Chlorophyll and Other Parameters within Cincinnati's Miller Plant	GCWW is moving further into digital transformation and data-driven solutions. The algae modeling initiative attempts to assimilate multiple data streams to guide treatment decisions, save personnel time, improve monitoring and capture staff knowledge	11/20/24	2:00 PM	2:30 PM	Patricia	Klonicki	Chemist	Greater Cincinnati Water Works
WED17-03	Use of Computational Intelligence (CI) Tools for Drinking Water Safety	This presentation will explore the use of Computational Intelligence (CI) tools (machine learning and neural network) to enable more accurate, fast, and predictive models for drinking water safety.	11/20/24	2:30 PM	3:00 PM	Vicente	Gomez-Alvare		
WED18	WED18 - Stagnant Plumbing and Mitigation Efforts	This session will explore the presence and implications of sulfate-reducing bacteria in stagnant plumbing and evaluate the effectiveness of flushing in pilot-scale systems affected by stagnation. Additionally, this session will address the characterization of microbial water quality in home plumbing systems, assessing the efficacy of filtration, heat treatment, and residual disinfectants to ensure safe water quality. 	11/20/24	1:30 PM	3:00 PM	Alex	Mofidi	Sr. Project Manager	Confluence Engineering Group
WED18-01	Sulfide, pH, and Sulfate-Reducing Bacteria Dynamics in Stagnant Plumbing	This presentation will cover how water quality changes in abandoned plumbing. Controlled plumbing systems that had been stagnant for periods of time ranging from 0.5-1.5 years were sampled. pH, total chlorine, TOC, metals, and microbial levels were quantified at each sampling location (copper piping, water heaters, and water softeners). Additional samples were taken from the water heaters to create a washout curve for sulfide concentrations as a septic odor was detected during preliminary sampling of the water heaters as well as high water pH. These conditions were hypothesized to be the result of sulfate-reducing bacteria producing hydrogen sulfide and hydroxide ions.	11/20/24	1:30 PM	2:00 PM	Stephanie	Heffner	Environmental Engineer	

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED18-02	Effectiveness of Flushing on Controlled Pilot-Scale Systems Impacted by Stagnation	During the COVID-19 pandemic, national research studies observed water quality degradation within the stagnated plumbing of buildings shut-down due to stay-at-home orders. Despite the prevalence of building vacancies due to holidays or sales, evidence-based guidance for plumbing management is lacking. This study evaluates the effectiveness of two flushing protocols aimed at restoring water quality: (1) a large recommission flush followed by weekly flushing and (2) direct implementation of weekly flushing. This research addresses a critical gap in building water management practices during periods of stagnation, aiming to inform evidence-based recommendations balancing safety, energy efficiency, and water conservation.	11/20/24	2:00 PM	2:30 PM	Aliya	Ehde	Graduate Student Researcher	
WED18-03	Characterizing Microbial Water Quality in A Model Home Plumbing System: Assessing the Efficacy of Filtration and Heat Treatment	Waterborne outbreaks and infections in the US, caused by opportunistic premise plumbing pathogens such as Legionella spp., Pseudomonas aeruginosa, and non-tuberculosis mycobacteria, have been on the rise over the last 15 years. These organisms are known to form biofilms, making them difficult to treat upon colonization. They are often associated with amoeba, which may offer protection from typical water treatment. This project aimed to characterize the microbial water quality and determine the efficacy of filtration and heat treatments against these organisms by studying their occurrence in a simulated home plumbing system. The results suggest that a combination of treatments may be necessary to achieve optimum microbial water quality.	11/20/24	2:30 PM	3:00 PM	Morgan	McNeely		USEPA AWBERC
WED19	WED19 - AI/ML – Applications in Treatment Optimization	This technical session will address interoperability in water treatment modeling, deploying data analytics and machine learning, PFAS modeling for GAC optimization, and secure cloud solutions for water data analytics, featuring a case study from Loudoun Water, VA. 	11/20/24	1:30 PM	3:00 PM	Javad	Roostaei		Hazen and Sawyer
WED19-01	Addressing the Interoperability Crisis in Water Treatment Modeling	Although there are several water treatment models available, there is no universal tool for applying the models to a complete treatment train. Lack of modeling access leads to wasted time and lost opportunity for treatment optimization and future planning. The tidywater R package aims to remove these barriers by centralizing water treatment models in one modular format. The package is open source, which means the code can be viewed and modified by users. This provides an opportunity for collaboration and innovation, while providing a reliable modeling foundation that is transparent and freely available to all.	11/20/24	1:30 PM	2:00 PM	Sierra	Johnson	Environmental Engineer	
WED19-02	Data Analytics and Machine Learning Tools—Navigating Development to Deployment	Data analytics and ML applications are in-demand in the water sector as utilities take on their digital transformations. This presentation explores how to select data analytics and visualization tools based on end deployment goals. Platform selection depends on the use case and desired deployment format. Examples are given to illustrate the different data analytics and visualization platforms' use cases. Tool deployment can be cloud-based or the often less discussed, non- cloud options, such as PLC and HMI/SCADA based solutions, or a combination of the two. This presentation will introduce when and where to apply free, open-source-language based solutions vs low-cost Microsoft based tools vs vendor solutions or a combination of these.	11/20/24	2:00 PM	2:30 PM	YOKO	KOYAMA		Carollo Engineers
WED19-03	Adaptive PFAS Modeling to Optimize GAC Changeout and Operational Complexities	The EPA's proposed PFAS MCLs will require many utilities to achieve tight control of PFAS breakthrough in GAC or IX systems, but minimizing risks and costs is complicated by factors such as variable source water quality, extended lab turnaround times, and long media replacement lead times. This project developed an adaptive PFAS breakthrough modeling framework that incorporates facility timeseries data to track day-to-day GAC effluent concentrations and make critical operations predictions (GAC replacement intervals, costs, and likelihood of non-compliance) under present conditions and future scenarios.	11/20/24	2:30 PM	3:00 PM	Eric	Peterson		Hazen and Sawyer
WED20	WED20 - Source Changes and Lead: Concerns and Considerations	This session will raise lead considerations and issues associated with making source water changes. 	11/20/24	1:30 PM	3:00 PM	Darren	Lytle	Research Engineer	USEPA

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED20-01	Conducting a Representative Comprehensive Corrosion Control Study for a Complex System – Part 3: Optimizing Corrosion Control	GLWA conducted a study to ensure corrosion control treatment is optimized and ready to address pending state and federal regulatory changes. The study consisted of pipe rigs placed throughout GLWA's system to test several treatment strategies on harvested and constructed materials. This presentation will discuss the outcome of the study and the implementation challenges.	11/20/24	1:30 PM	2:00 PM	Nichole	Sajdak		Great Lakes Water Authority
WED20-02	Back to the Future: The Dangers of "New" Lead Solder in Old Homes Following Source Water Changes	Lead-tin solder can be a major contributor to water lead contamination in homes and buildings built before 1986. Recent problems with elevated water lead levels arose in three communities after changing from a non-corrosive groundwater to a water source that was later discovered to be more corrosive to lead solder. Through field analysis and complementary laboratory experiments for each case study, we demonstrate that lead solder can be maintained in a relatively pristine state, analogous to new lead solder, after decades of exposure to relatively non-corrosive water. This poses a "worst case" risk for lead contamination upon changing source water.	11/20/24	2:00 PM	2:30 PM	Frank	Mazzola	Graduate Research Assistant / PhD Student	Virginia Tech
WED20-03	WSTP in Illinois for Members of the New Grand Prairie Water Commission: Moving from Well Water to Lake Michigan Water	The Grand Prairie Water Commission (GPWC) is being established to supply treated Lake Michigan water purchased from the City of Chicago to six water systems in Illinois. IEPA requires that all Members prepare a water source transfer plan (WSTP). The first task of the WSTP is development and completion of a lead and copper corrosion control study. After the OCCT, each Member must then complete the rest of the WSTP including: DBP control and chlorine residual maintenance, an implementation plan, iron pipe assessment, public education plan. The presentation will provide an overview of all requirements and the harvested pipe flow testing for OCCT and highlight key findings.	11/20/24	2:30 PM	3:00 PM	Dave	Cornwell		
WED21	WED21 - PFAS Planet: Novel Treatment and Destructive Technologies	Despite the numerous challenges for implementing destructive technologies for PFAS treatment at municipal scale, research and practical advancements remain a critical part of the PFAS landscape for drinking water applications. This session profiles innovative work in both destructive treatment, as well as novel separation technologies that may complement the array of best available technologies (BATs) designated by USEPA.	11/20/24	1:30 PM	5:00 PM	Brent	Alspach	VP and Director of Applied Research	Arcadis
WED21-01	The Beginning of the End; Piloting Electrochemical Oxidation for PFAS Destruction in New Mexico	PFAS destruction in drinking water residuals remains a critical hurdle in the adoption of PFAS treatment strategies. Hazen led a 2-month continuous pilot program investigating the electrochemical oxidation of PFAS impacted membrane concentrate on brackish groundwater in Alamogordo, NM. This project highlights the technology readiness of electrochemical oxidation with lessons learned on PFAS destruction efficiency, electrode longevity, and the impact of water quality including PFAS concentration, hardness, and salinity.	11/20/24	2:00 PM	2:30 PM	Conner	Murray	Assistant Engineer	Hazen and Sawyer
WED21-02	Evaluating the Impact of Defoamer on Electrochemical Destruction of PFAS-Laden Foam	PFAS are harmful chemicals that are difficult to remove from water. This study looks at a new method to remove PFAS from wastewater using a process called electrochemical advanced oxidation (EAOP). The main goal of this study is to understand the removal of PFAS-laden foam, resulting from application of dissolved air flotation in wastewater treatment operations, using Electrochemical Advanced oxidation process (EAOP).This study proposed a unique method for accelerating the degradation of PFAS using a defoamer-assisted electrochemical advanced oxidation process (EAOP)	11/20/24	2:30 PM	3:00 PM	Mohamed	Ali		University of North Dakota

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED21-03	Evaluation of KrCl* 222 nm Irradiation for the Reductive Defluorination of Per-and Polyfluoroalkyl Substances	Treatment technologies that accomplish reductive defluorination of per- and polyfluoroalkyl substances (PFAS) are needed to treat ancillary waste streams resulting from physical treatment processes and prevent future PFAS contamination of aquatic environments. This presentation will present experimental results from a comparison of different UV sources (KrCl* vs. LP-Hg) for reductive defluorination of PFAS in different matrices, including degraded water qualities (i.e., a reverse osmosis concentrate) and a system with relatively little background water matrix constituents (i.e., diluted aqueous film-forming foam).	11/20/24	3:30 PM	4:00 PM	Garrett	McKay	Assistant Professor	Zachry Dept. of Civil and Environ. Engineering
WED21-04	Case Study Using Photo-activated Reductive Defluorination to Destroy PFAS in Groundwater Concentrate	This case study illustrates a commercial-scale pilot test where PFAS was destroyed on site using an energy-efficient and economic approach while treated effluent met regulatory discharge criteria. PFAS destruction was completed using photo-activated reductive defluorination (PRD), an emerging technology that received an award from U.S. Environmental Protection Agency and Department of Defense. The presentation will summarize lessons learned during system operations that lead to optimal performance. Data presentation will include field observations, real-time data, and chemistry data from independent laboratory analysis which indicated that greater than 98 percent PFAS destruction was repeatedly achieved.	11/20/24	4:00 PM	4:30 PM	Meng	Wang		
WED21-05	Destruction of PFAS with a Closed Loop Microwave Plasma System	6K will review the use of microwave plasma to destroy PFAS in various forms. With an ultra-high temperature, equivalent to the sun, 6K's system is capable of processing material in 1-2 seconds with no environmental exhaust. Low energy consumption and small system footprint make this an attract destruction technology.	11/20/24	4:30 PM	5:00 PM	JP	Majcher	Technology Manager	6K Inc
WED22	WED22 - Taste and Odor Testing	Taste and odor are important aesthetic water quality parameters. This session will highlight advancements in testing and identifying taste and odor components. Topics will include cutting edge sensory and analytical methods to detect T&O compunds, investigating sources of taste and odor in regions like Bow River in Calgary and practical experieces from Portland on integrating taste and odor testing to assess wildfire impacts.	11/20/24	3:30 PM	5:00 PM	Trevor	Voegele		Crist Engineers, Inc.
WED22-01	Identification of Uncommon T&O Compounds in Water Treatment Processes Using Recent Advances in Sensory and Analytical Techniques	This presentation will describe how the City of Wichita Falls Cypress Environmental Laboratory (CEL) has adapted its HAB-driven T&O monitoring program to identify uncommon T&O compounds in water treatment, describe their modes of production, and mitigation strategies. Haloanisoles were detected in 2021 and 2023 in filter media and in raw water disinfection processes using sensory and analytical chemistry methods. It will also provide an update to the SM 6040D revision.	11/20/24	3:30 PM	4:00 PM	Hunter	Adams	Environmental Laboratory Supervisor	City of Wichita Falls - Cypress Environmental Lab.
WED22-02	Investigating the Source of Taste and Odour Episodes in the Bow River, Calgary, Alberta	Since 2020, the citizens of Calgary have experienced annual taste and odour events in their drinking water. An investigation was launched to identify the source of the geosmin in the water supply. Micro studies indicated no presence of known geosmin producing cyanobacteria, which therefore pointed to the reservoir's sediments as most likely source of geosmin. With no existing method for sediment analysis, a novel extraction technique using water as a solvent to identify and quantify several taste and odour compounds from sediments using SPME-GC-MS was developed. This method was successfully used to explore spatial and temporal changes of geosmin that could be released from the sediments into the source water supply.	11/20/24	4:00 PM	4:30 PM	Jian Fu	Deng		The City of Calgary - WQ & Regulatory Assurance
WED22-03	Portland's Experience Incorporating Taste and Odor Testing to Assess Wildfire Impacts and Inform Treatment Changes	The Flavor Profile Analysis (FPA) and Flavor Rating Assessment (FRA) methods offer a simple, inexpensive, semi-quantitative approach to monitoring the taste and odor of drinking water. As part of implementing filtration on the currently unfiltered Bull Run supply, Portland incorporated FRA and FPA into its pilot study program to evaluate taste and odor of alternative treatment approaches. In 2023, following a historic wildfire in the Bull Run watershed, Portland began monitoring FRA and FPA to assess aesthetic changes following the fire. This presentation will provide an overview of the FPA and FRA methods and provide examples of how these methods can enhance water quality monitoring and treatment evaluations.	11/20/24	4:30 PM	5:00 PM	Anna	Vosa		Portland Water Bureau

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED24	WED24 - Assessment and Mitigation of HABs	Harmful algal blooms (HABs) damage aquatic ecosystems, threaten water supplies, and are increasing in frequency and intensity due to climate change. Effective monitoring of HABs is important for developing approaches to minimize the occurrence, severity and impact of HABs. This session will focus on HABs assessment and mitigation strategies. 	11/20/24	3:30 PM	5:00 PM	Christine	Owen	Director of Water & Reuse Innovation	Hazen and Sawyer
WED24-01	Assessing Harmful Algal Blooms and Water Quality Trends in the Maumee River and Reservoir: Insights from Five Years of Study	Addressing eutrophication, this five-year study scrutinizes phytoplankton dynamics and HABs in the Maumee River and Defiance Reservoir, using biweekly sampling from 2019 to 2023. It shows significant HAB peaks during warmer months, associated with nutrient increases. Particularly in the reservoir, longer-lasting blooms suggest specific ecological drivers. Statistical analyses reveal the critical role of nutrients in shaping phytoplankton communities. This research highlights the urgency of continuous monitoring and strategic management to combat eutrophication's effects, emphasizing phytoplankton's ecological importance.?	11/20/24	3:30 PM	4:00 PM	Shadman Saki	Sayem	Masters Student	
WED24-02	Combined Algicide-Activated Carbon Use For Mitigation of Harmful Algae Blooms	Harmful algal blooms can grow to be several miles wide and cause millions of dollars in damages to fisheries, tourism, and public health. Mitigation tools are of critical important and must contain measures to disrupt bloom growth, along with removing harmful toxins that are released. This presentation describes a novel all-in-one mitigation tool using a naturally derived algicide and activated carbon that has been shown effective to reduce healthy cell counts and adsorb relevant toxins of Florida Red Tide causing algae Karenia brevis.	11/20/24	4:00 PM	4:30 PM	DOMENIC	Contrino	Engineer	C12 Environmental Services
WED25	WED25 - Practical Considerations for Water Managers	Water managers are confronted with a barrage of decisions. From the selection of water source to their chemical supplier, these decisions have short and long term tradeoffs. Come and learn how others have approached these decisions 	11/20/24	3:30 PM	5:00 PM	Mary	Smith	Research Program Manager	Water Research Foundation
WED25-01	Applying Robustness Framework Analyses to Water Treatment Plants Subject to Highly Variable Source Water Quality	Drinking water treatment plants (DWTPs) with surface water supplies may expect increased variability in source water quality caused by extreme weather events exacerbated by climate change. High turbidity creates challenges for clarification and filtration, whereas high natural organic matter (NOM) may create greater challenges for subsequent treatment steps, including UV disinfection. The turbidity robustness index, first applied to filtration, was extended to all critical treatment steps to assess overall plant robustness. The framework approach, now incorporating indices for both turbidity and NOM removal, has been applied to assess robustness of two DWTPs subject to highly variable source water quality.	11/20/24	3:30 PM	4:00 PM	Wendell	James	Manager, Process Development Team	EPCOR Water Services, Inc.
WED25-02	The Price is Not Right – The Rise in Chemical Costs and Methods to Optimize	Chemicals are a significant portion of the operating costs of a water system. Chemical costs have risen significantly. There have also been issues with the availability of chemicals. Along with the increase in price and supply chain issues, utilities are faced with degradation in source water quality along with more stringent finished water requirements. These issues are resulting in the need to enhance optimization efforts by adopting a wholistic approach to the entire water system. This presentation will provide detailed information on the price changes of the major classifications of chemicals, an approach for mitigating these impacts and a case study from a utility that operates a large surface water plant with multiple wells.	11/20/24	4:00 PM	4:30 PM	John	Civardi	Vice President	Mott MacDonald
WED25-03	Reservoir Risk Assessment Framework for Tailored Source Water Monitoring	Managing a diverse drinking water supply poses challenges, particularly in determining where to allocate time and resources, highlighting the need for defensible, data driven, decision support to ensure effective and targeted monitoring efforts. By employing a risk-driven strategy, Denver Water conducted a high-level system-wide assessment, that accounted for harmful algal blooms, taste and odor issues, wildfire impacts, climate influences, and potential disruptions to water treatment operations, to better prioritize source water management resources.	11/20/24	4:30 PM	5:00 PM	Alex	Gerling	Senior Principal Scientist	Hazen and Sawyer

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED26	WED26 - AI/ML – Applications in Source Water Monitoring	This technical session will cover using machine learning for detecting de facto reuse at drinking water intakes, an interactive tool for WWTP discharge impacts, phycocyanin fluorescence probes for predicting cyanobacteria blooms, and forecasting adverse source water quality as a step towards climate adaptation. 	11/20/24	3:30 PM	5:00 PM	James	Cooper	Global Director, Water	Arcadis
WED26-01	Interactive Tool for WWTP Discharge Impact on Downstream Source Water Intakes	The City of Burlington (NC) Water Resources Department has been required to notify downstream communities when their drinking water supplies might be compromised by contaminants of emerging concern, such as 1,4-dioxane and PFAS, passing through its wastewater facilities. This presentation details an interactive tool that leverages USGS streamflow data, wastewater treatment plant monitoring, and FEMA stream transect information to predict time of travel and contaminant concentrations at downstream locations. Additionally, successful case studies and the processes needed for adapting the model to other utilities will be described	11/20/24	3:30 PM	4:00 PM	Reed	Palmer	Senior Associate	Hazen and Sawyer
WED26-02	Exploring the Potential of Phycocyanin Fluorescence Probes in Predicting Cyanobacteria Blooms: A Machine Learning Approach	Many utilities seek innovative tools for early detection of harmful algal blooms (HABs). Several monitoring tools are available, however, each come with a limitation. The proposed work will showcase how machine learning models can be utilized on data from phycocyanin-based probes, a widely used monitoring tool for HABs. The performance of four different ML models is evaluated based on their F1 score, the harmonic mean of precision and recall, using historical data collected from North American utilities over three years for detection and prediction of HABs. The final models selected can be integrated into commercially available phycocyanin-based online probes to serve as an alerting tool for the detection of incoming or impending HABs.	11/20/24	4:00 PM	4:30 PM	Mennatallah	Alnahas	PhD Candidate	
WED26-03	Forecasting Adverse Source Water Quality Using Machine Learning - One Step Towards Climate Adaptation	Addressing climate change poses a substantial obstacle for water treatment, necessitating consideration of its projected effects on source waters to ensure the resilience of water infrastructure design and operation. For instance, increasing frequency of extreme weather events and altered precipitation patterns will result in pronounced short-term effects, such as spikes in turbidity and contamination from surface run-off that dictate a need for rapid operational responses. This presentation will cover our recent efforts to utilize sequence-based ML methods to forecast quality changes in source waters and inform proactive treatment control and planning. The research presented contributes to developing intelligent water systems that can opti	11/20/24	4:30 PM	5:00 PM	Edison Xiang	Li	Reseracher	UBC
WED27	WED27 - Lessons Learned from Environmental Protection Agency's (EPA) Voluntary School and Child Care Lead Testing and Reduction Grant	"This study will illustrate leading best management practices (BMPs) factors learned from U.S. EPA's Voluntary School and Child Care Lead Testing and Reduction Grant Program to successfully implement lead testing and reduction programs to reduce lead in drinking water at schools and child care facilities. The EPA will demonstrate the common BMPs of state programs in conducting lead testing and remediation (e.g., focused marketing and communication strategies, thorough mitigation technical supports, legislation assistances, and strong collaboration efforts). In addition, the presentation will showcase state program implementation data and lessons learned on program implementation (e.g., developing communication plans to build trust)." 	11/20/24	3:30 PM	5:00 PM	Ying	Tan		Environmental Protection Agency
WED27-01	Reducing Lead with U.S. EPA Funding Opportunities and Resources	Come and learn about the US EPA's multi-billion funding programs, BMPs for implementing programs and projects, lessons learned on program implementation, and the sharing of implementation tools to tackle EC and reduce lead.	11/20/24	3:30 PM	4:00 PM	Ying	Tan		Environmental Protection Agency

Code	Session Title	Details	Date	Start Time	End Time	Speaker 1 Firs	Speaker 1 Las	Speaker 1 Title	Speaker 1 Company
WED27-02	Tackling Emerging Contaminants with U.S. EPA Funding Opportunities and Resources	The EPA will present the multi-billion funding opportunities and resources available to help public water systems, states, territories and tribes, tackle ECs and reduce lead exposures in drinking water systems.	11/20/24	4:00 PM	4:30 PM	Lida	Daly	Program Officer	EPA