AWWA Webinar Program: Microplastics in Drinking Water: Key Issues and The Frontier of Contaminant Knowledge April 6th, 2022

Webcast Description

# Overview:

Although microplastics are an increasingly important emerging water quality issue, industry awareness of these contaminants remains limited. This webinar will help close this knowledge gap, articulating the key issues and challenges from leading researchers in the field.

With the state of California mandating a drinking water monitoring program and environmental advocacy groups continuing to sample supplies across the country from source to tap, the need for water professionals to be well informed about microplastics is becoming increasingly acute. This webinar will identify the primary issues associated with microplastics in drinking water and discuss both their importance and efforts to resolve the key questions that impede a fuller understanding of the risk profile. Accordingly, an introductory presentation providing an overview of the issues will be followed by a series of leading researchers discussing their respective advancements in microplastics sampling, analysis, occurrence, and treatment process efficacy.

Microplastics are an important emerging contaminant in drinking water that could be regulated in several states within about five to seven years. Moreover, as has been the case with PFAS, monitoring and subsequent consumer awareness of occurrence is likely to substantially precede regulatory action. However, with the benefit of experience with PFAS, it is understood that the industry must be more proactive about building institutional knowledge about microplastics before customer concerns, media coverage, and third-party stakeholder interests exert undue influence on the rhetoric.

Very few water industry professionals—not only utility staff but also consulting engineers, regulators, manufacturers, and many academics—have sufficient knowledge of microplastics in drinking water. Although this is certainly understandable in the face of many other important challenges (e.g., lead, PFAS, infrastructure repair, workforce capacity, resilience), the need is nevertheless growing in importance. This webinar will help establish a foundational understanding of microplastics in drinking water and the associated issues, enabling attendees to better build on this knowledge and prepare for a future that may include customer concerns, media inquiries, combating misinformation, and/or regulatory compliance.

# Learning Objectives:

- Respond to customer and media inquiries on microplastics.
- Assess ability of treatment processes to remove microplastics.
- Evaluate microplastics literature with an informed and critical eye.
- Report on microplastics issues to senior leadership for planning as needed.

**Presenter Biography Information** 

#### Brent Alspach; Director of Applied Research, Arcadis

Brent Alspach holds both BS and MS degrees in Civil and Environmental Engineering from Cornell University. Brent joined Arcadis in 1997 and serves as the company's Director of Applied Research. He is the Chair of the AWWA Water Quality & Technology Division Board of Trustees and also serves on the advisory / editorial boards for Journal AWWA, Opflow, and AWWA Water Science. In 2021, he was the recipient of both the AWWA's Volunteer of the Year and George Warren Fuller awards.

# Robert Andrews, Ph.D.; Professor and Senior Chairholder in Drinking Water Research, University of Toronto, Drinking Water Research Group

Professor Andrews has over 25 years of experience in the field of drinking water treatment, both as an academic researcher as well as a consultant. He holds a Natural Science and Engineering Research Council (NSERC) Senior Industrial Chair in Drinking Water Research at the University of Toronto, Department of Civil and Mineral Engineering, and regularly collaborates with researchers across Canada, the United States and internationally.

#### Nicole Fahrenfeld, Ph.D.; Associate Professor, Rutgers, The State University of New Jersey

Nicole Fahrenfeld, PhD, is an Associate Professor of Civil & Environmental Engineering at Rutgers, The State University of New Jersey. She earned her BS at Johns Hopkins, MS at Clemson, and PhD at Virginia Tech. Her research team works on applied environmental microbiology and chemistry across water matrices including projects on pathogen fate / source tracking / disinfection, antibiotic resistance, and microplastics.

#### Yongli Wager Ph.D.; Associate Professor, Wayne State University

Dr. Yongli Wager is an Associate Professor in the Department of Civil and Environmental Engineering at Wayne State University. Her research focuses on water treatment and water quality that has been funded by NSF, EPA, NIEHS, Microsoft, Great Lakes Protection Fund, and Great Lakes Water Authority. Her group's microplastic research includes understanding the fate and transport of microplastics in natural and engineered water systems, developing high throughput microplastics detection technologies, developing assessment tools to identify sources and pathways of plastic emissions to the environment, and conducting community outreach campaigns to reduce plastic pollution.

AWWA Webinar Program: Buy, Treat, Sell, Repeat—A Comprehensive Look at the Value of Water April 13th, 2022

#### Webcast Description

Overview:

This webinar will explore water resource economics and policy trends, and highlight the challenges and considerations communities are facing as they evaluate water rates and fees.

As competition for the world's most critical resource increases, many often question the value of water. Water markets across the United States are diverse and complicated. New and growing communities are challenged with obtaining water rights and balancing the cost of those capital investments with competitive water rates and fees. This webinar will explore water resource economics and policy trends, and highlight the challenges and considerations communities are facing as they evaluate water rates and fees. In addition, successful examples of water efficiency rates and tap fees will be examined to round out this comprehensive look at the value of water.

Water scarcity, climate variability, and population growth are worries that keep water providers up at night. This webinar will give participants insight on water markets and the policies and practices that influence water supply and demand. It will also outline tools and strategies that consultants and water providers are using to help set water rates and fees that will support growth and promote water efficiency.

Rate-setting is a challenging effort for most utilities. Balancing the needs of the community, financial resources, regulatory impacts, and aging infrastructure, along with political pressures, is difficult. Add to that: rapidly growing communities, climate change, water, scarcity and skyrocketing raw water costs. Creativity and determination are crucial to success. Learn what tools and strategies are being used to help manage costs while balancing efficient water use, and understand how water markets influence the value of water.

### Learning Objectives:

- Learn about the fundamental characteristics of water markets in the Western United States.
- Understand water market drivers and what influences the value of water.
- Learn about tools and strategies being used to help set municipal water rates and fees.
- Evaluate how water rates can promote water efficiency and reduce demands.
- Communicate the value of water to leadership and customers alike.

### **Presenter Biography Information**

### Brett Bovee; Rocky Mountain Regional Director, West Water Research

Brett Bovee is the Rocky Mountain Regional Director for West Water Research and leads the Colorado office in Fort Collins. Brett brings over 17 years of experience conducting a variety of engineering, economic, and water rights studies across the Western states. Brett brings a unique perspective to projects, combining a background in water resources engineering with a developed knowledge of water rights and economics

### Todd Fessenden; Public Works Director, Town of Erie, Colorado

Todd Fessenden is the Director of Public Works for the Town of Erie, a fast growing community in the Denver North Metro Area. He has 25 years experience in utilities and has filled roles such as Director of Operations and District Manager in Colorado before coming to Erie. He is a licensed Water Treatment and Distribution Operator in Colorado and California and holds a degree in Water Science from Ventura College.

## Todd Cristiano; Senior Manager, Raftelis Financial Consultants, Inc.

Todd has over 20 years' experience in the utility industry both as a consultant and a former utility professional. He has a BS in Chemical Engineering from University of Tulsa and a MBA from University of Colorado. Todd spends his free time building Legos with his two daughters.

AWWA Webinar Program: Establishing and Maintaining an Effective Valve O & M Program April 20th, 2022

# Webcast Description

# Overview:

The effective operation, maintenance, and management of water distribution system valves is critical to meeting regulatory requirements, achieving organizational goals, and providing a quality product to customers. Whether on a transmission main, a fire or service line, or at critical remote locations, valves are used to appropriately control water movement throughout the system. Valves also help service providers maintain established pressures, prevent mains from collapsing, reduce the amount of loss when isolating an area, and help release air that could potentially damage important components. Knowing how, when, and why to service these essential valve assets can help your utility operate efficiently and save time and money.

Utilities want values to achieve—and possibly exceed—their life expectancy. This webinar presents tools to confirm the location of all the values within a system. It also provides guidance for prioritizing and assessing these assets to determine the best ways to maintain them. The use of this information could result in a better managed system, conveying a utility's competency to its customers.

Many utilities are challenged with budget issues, the lack of knowledgeable qualified staff, and the reality of aging infrastructure. When evaluating these difficulties, most utilities will take the path of least resistance, which is often a "run to failure" approach as it relates to their assets. The problems associated with this approach often result in water quality concerns, a greater loss of product, and less-than-desirable service to customers. An effective operations and maintenance program for valves, as presented in this webinar, offers utilities an ability to address some of these problems as part of an effort to improve their operation, which means improved service.

### Learning Objectives:

- Identify and confirm the locations of all distribution system valves.
- Prioritize distribution system valves.
- Assess, operate, and maintain distribution system valves.
- Repair, rehabilitate, and replace distribution system valves.
- Get the best life out of distribution system valves.

### **Presenter Biography Information**

# Kenneth (Ken) C. Morgan, PE; President/CEO, KCM Consulting Services, LLC

Ken Morgan has been involved in the water industry since 1985 and has been providing operator certification and development training for utility personnel throughout the US. He has

managed the day-to-day activities of wastewater collection and water distribution field staff with an emphasis on enhancing efficiencies, developing knowledgeable workers, and exceeding organizational goals in alignment with regulatory requirements. Ken is currently part of a team producing training content for utilities in parts of Africa and India.

# Steve Notch; Supervisor, Town of Gilbert, AZ

Steve has been in the water industry for thirty years including- water distribution, utility locates, water treatment, maintenance, wastewater, & infrastructure management. Steve is actively involved in AWWA, AZ Water, and the industry. Steve possesses operator certifications of grade 5 from CA, grade 4 from AZ, and a business degree from Pepperdine University

# Andrew Jackson; Chief of Water Operations, Otay Water District

Andrew Jackson has been a utility system professional for 19 years. His desire, leadership and experience in the areas of Water Distribution, Water Treatment, Wastewater Treatment and Wastewater Collections have made him a valuable resource in the utility industry. Andrew recently Joined Otay Water District as the Chief of Water Operations and was formerly Water Manager for the City of Gilbert Arizona. Andrew is a Trustee on the Board with AWWA's Distribution Plant and Operations Division, and he has held roles as Chair and Vice Chair for the AWWA Distribution Operations and Maintenance. Andrew is certified from the State of California Water Resources Board as a D3 and T3 Distribution and Treatment Operator. Andrew is also certified by the Arizona Department of Environmental Quality as a D4, T4 and C4. Andrew obtained his Master of Business Administration Degree from Grand Canyon University.

AWWA Webinar Program: PFAS Regulations and the Role of LC-MS/MS April 21<sup>st</sup>, 2022

# Webcast Description

# Overview:

This webinar will present an understanding of past, current and future EPA regulations for PFAS testing in water. There will be an emphasis on the critical role played by LC-MS/MS for routine PFAS quantitation in support of regulatory compliance, as well as how LC-MS/MS is being used to support PFAS discovery that will influence future regulations. These learnings will be tied together by hearing how (and why) Orange County Water District brought their PFAS testing in-house.

### Key challenges this webinar aims to resolve for participants are:

- The EPA's PFAS Roadmap and the Unregulated Contaminant Monitoring Rule 5 (UCMR5) can make it difficult to understand what the testing needs for PFAS is water are.
- Knowing how LC-MS/MS is used to support regulatory compliance around PFAS testing can be challenging if this type of testing is not currently done in house.
- Implementing new analytical methods (on new instrumentation) can be daunting, so hearing how one municipal testing lab successfully did it will provide scope for other institutions looking to do the same.

# Learning Objectives:

- Gain an educational perspective on PFAS testing in water that covers the current state and recently announced future of PFAS regulations.
- Receive an explanation of the instrumentation used to quantitate PFAS (and other environmental contaminants), with an emphasis on current and future EPA PFAS regulations.
- Hear first hand how PFAS testing can be implemented in-house, as described by a municipal water testing facility (Orange County Water District).

### **Presenter Biography Information**

### Dr. Karl Oetjen; Senior Scientist, SCIEX

Karl Oetjen is a Senior Technical Marketing Scientist for Food, Environmental, Forensic, Clinical and Cannabis applications at SCIEX. Before joining SCIEX, he completed his PhD at Colorado School of Mines (Golden, Colorado) in Hydrologic Science and Engineering under Dr. Chris Higgins. Karl's dissertation research focused on nontarget characterization of complex surfactant mixtures, including aqueous film forming foams. This work led to the discovery several novel per- and polyfluorinated alkyl substances (PFAS) that since have been found in variety of environmental samples and industrial chemicals. Since joining SCIEX, Karl has worked with numerous labs creating and implementing both regulated and unregulated quantitative and qualitative screening methods.

### Lily Sanchez; Organic Supervising Chemist, Orange County Water District

Lily Sanchez is the Organic Supervising Chemist for the Orange County Water District's (OCWD) Phillip L. Anthony Laboratory. During her 31-year career at OCWD, Lily has served in many different positions within the laboratory including management, project planning and training. Her focus and expertise are analytical drinking water methods; Environmental Protection Agency (EPA) 500 series using Gas Chromatography (GC), Gas Chromatography Mass Spectrometry (GCMS), High Performance Liquid

Chromatography (HPLC) and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS-MS) instruments. Since 2001, Lily has worked on all Unregulated Contaminant Monitoring Rule (UCMR) programs. In 2007, Lily's focus shifted to LC-MS/MS methods including method development and processing for Chemicals of Emerging Concern (CEC) which includes pharmaceutical, hormones and personal care products. Since UCMR3, she has been the Per- and polyfluoroalkyl substances

(PFAS) analysis project lead; bringing online EPA 537, 537.1 and 533; processing samples and providing training to her staff. Lily received her bachelor's degree in chemistry from California State University Long Beach and is proud to have spent her entire career at OCWD, contributing to the mission of providing reliable, high quality water supply for over 2.5 million people in Orange County, California.

AWWA Webinar Program: Power Resilience and Planning for Black Sky Events April 26<sup>th</sup>, 2022

Webcast Description Overview: While the U.S. water utility industry continues to improve its ability to respond to power outages, but new challenges continue to emerge – including an increase in severe weather events, cyber threats, and an aging electric grid. Would your facility be able to sustain operations during a severe outage lasting several days to several weeks?

According to the EPA Power Resilience: Guide for Water and Wastewater Utilities, "black sky planning" or disaster preparedness for extended outages is essential for the water industry. Ensuring uninterrupted power is a critical part this planning. The good news is that new strategies and modernized technologies are making full facility power resiliency more reliable and affordable than ever before.

For this webinar, we've assembled an industry panel to share lessons learned and best practices to ensure uninterrupted operations to ensure clean water to keep our communities and essential services such as hospitals operating safely even during extended outages.

The discussion will aim to provide an understanding of what resiliency options are available as water facilities integrate renewables, move away from diesel, and face more outages due to severe weather, an aging power grid, etc.

# Learning Objectives:

- Learn the new facility challenges in 2022 and operational resiliency lessons learned in 2021
- Learn how other water facilities are addressing potential risk from power outages due to severe weather or other events
- Outline the different options available for power resiliency and the pros and cons for each
- Evaluate the benefits of emerging technologies beyond traditional diesel generators

### **Presenter Biography Information**

### Melinda Silva, P.E., Dannenbaum Engineering, Public Works Senior Project Manager

Ms. Silva is a licensed engineer with over 23 years' experience. She has a Visual Art Studies degree and a Civil Engineering degree from University of Texas at Austin. The last 15 years she has been focused primarily on program management with the NFBWA and since 2013 with the WHCRWA. She has extensive experience with water resource planning, large diameter waterline design, budgeting, scheduling, and right of way acquisition support for construction among other things.

# Phil Martin, Senior Project Manager, Mike Stone Associates, Inc., and General Manager, Fort Bend County Levee Improvement District No. 2.

Phil Martin joined MSA in 2013 and is currently serving as Senior Project Manager with 15 years of experience in public administration, operations, and project management. Before joining MSA, he served as Park Superintendent for the City of Sugar Land and as Operations Manager for First Colony Community Association. He currently serves as the General Manager for Fort Bend County Levee Improvement District No. 2. Mr. Martin graduated from Texas A&M University with a degree in Recreation, Park, and Tourism Science. He is also a Certified Floodplain Manager (CFM) and Certified Park and Recreation Professional (CPRP). His areas of expertise include GIS mapping and data collection, public communications, project management, and budget administration. Mr. Martin is also a member of the Texas Floodplain Management Association and has presented on flood control projects at state and national conferences.

AWWA Webinar Program: What to Consider when Developing the Lead Inventory and LSL Replacement Plan May 4<sup>th</sup>, 2022

# Webcast Description

# Overview:

Learn how the decisions made and assumptions used to develop a lead inventory and lead service line replacement plan to comply with the Lead and Copper Rule Revisions have implications for water systems' efforts to implement them and how they are received by the customers they serve.

In this panel discussion, we bring together recognized experts in strategies for Lead and Copper Rule Revisions (LCRR) compliance. In time for the compliance due date of October 16, 2024, the panel will discuss real-world or practical considerations for preparing a lead inventory and lead service line (LSL) replacement plan. Water systems need to look critically at the assumptions used to develop their lead inventory and LSL replacement plans.

- How can you be sure that a service line is non-lead or galvanized, which can remain buried in the ground?
- What are the consequences if lead is mistakenly identified as non-lead?
- What policies can be used to help find lead and manage its replacement?

With the goal of avoiding pitfalls and making efficient use of limited staff and financial resources, our panel experts will share their experience in helping water systems develop lead inventories and LSL replacement plans.

As water systems build their inventory, they will need to decide how much "proof" is necessary to designate the material of a service line as lead or non-lead, or how to access information to describe conditions on private property. Similarly, as water systems prepare their LSL replacement plans, they will need to decide how to promote LSL replacement on private property or establish procedures to replace the public side when the customer initiates replacement on the private side. These questions serve as examples of decisions embedded in the lead inventory and LSL replacement plan.

Faced with a compliance deadline that is fast approaching, water systems need to prepare a lead inventory and LSL replacement plan with limited data and resources. There is a reluctance by some water systems to share with the public an inventory that includes a lot of properties identified as "lead status unknown." Water systems that suspect that they will exceed the LCRR's trigger level will face hefty bills to implement LSL replacement plans. The schedule to apply—and use—federal funds via the

Drinking Water State Revolving Fund adds to the pressure faced by water systems, particularly to use the funds efficiently and to direct benefits to historically undeserved communities.

With limited information available to guide the development of a lead inventory to meet the October 16, 2024, deadline of the Lead and Copper Rule Revisions, water systems are faced with simultaneous challenges of planning their inventory while managing customer expectations around the use of lead. Thoughtfully planned solutions are necessary to respond to compliance needs, engage with customers, and ultimately meet the goals of the LCRR to reduce lead exposure at the tap. In this webinar, water systems will benefit from the experience of our panelists and learn how to avoid common mistakes and accelerate their efforts to develop a lead inventory and LSL replacement plans.

# Learning Objectives:

- Evaluate the implications of assumptions used to develop an inventory and LSL replacement plan.
- Plan the steps to build an inventory and understand how this affects the LSL replacement plan.
- Employ the necessary skills and departments to develop an inventory and LSL replacement plan.
- Integrate environmental justice considerations into LCRR compliance efforts.

### **Presenter Biography Information**

# Quirien Muylwyk, P.Eng.; Practice Director for Water Quality, AECOM

Quirien has focused her career on helping water systems achieve regulatory compliance and seeks out opportunities to use water infrastructure projects to address public health inequity in communities. Well versed in drinking water treatment and distribution system water quality issues, Quirien is the National Practice Director for Water Quality with AECOM in Toronto and has been active with AWWA for over 20 years.

### Rebecca Slabaugh, PE, Drinking Water Practice Lead, Arcadis

Rebecca serves as the Drinking Water Practice Lead for Arcadis and has supported over 100 public water systems across the U.S on LCR compliance or corrosion related issues. She is a member of the AWWA Lead and Copper Rule Technical Advisory Workgroup and has provided technical support to AWWA, WRF, USEPA and multiple States over the past decade on a range of LCR issues, including treatment selection and implementation, corrosion control studies, and lead service line inventories and replacement guidance.

AWWA Webinar Program: Principles of Efficient Gravel Envelope Well Design: Optimizing Production and Minimizing Head Loss May 11<sup>th</sup>, 2022

Webcast Description Overview: This webinar will highlight the critical components of the well design process and demonstrate how wells can be operated with greater water production and cost efficiency. The topics covered in this presentation will include borehole sampling, sieve analysis, gravel pack selection, screen types and slot selection, and well development techniques.

The expectation of a water well is to provide a desired production rate at any given time. This performance expectation has been expanded to not only provide the maximum production rate, but also for the well to operate at its highest efficiency. Both internal and external design and hydraulic factors must be accounted for during the design, construction, operation, and maintenance phases of the well's life to maximize the well's production potential with minimal head losses.

The critical components of the well design process that will be covered are: formation sampling, gravel pack selection, screen slot size selection, and well development, and how these processes can maximize the well's production potential with minimal losses. In minimizing well losses, the well owner can operate the well with greater cost efficiency. It will also address how efficiency is calculated and how these components contribute to the well's efficiency.

### **Presenter Biography Information**

### Kevin B. McGillicuddy, P.G.; Chief Hydrogeologist, Roscoe Moss Company

Kevin McGillicuddy is the Chief Hydrogeologist for the Roscoe Moss Company. He joined the company in 1996 and serves as a technical liaison to municipal water agencies, groundwater consultants, and water well contractors in the U.S. and several foreign countries. Kevin was a founding member and Chair of the CA/NV AWWA Water Well Technology Committee, member of the AWWA A100 Well Standards Committee and is a current member of the CA DWR Well Standards Update Committee. Prior to joining Roscoe Moss Company, he worked as Director of Recharge Operations and as a Senior Hydrogeologist for the Orange County Water District in Fountain Valley, CA. He holds a Bachelor of Science Degree in Geology from Boston College and Masters of Science Degree in Geology from the University of Southern California. He is a Registered Geologist in the State of California. He is also the recipient of the 2022 National Groundwater Association's McEllhiney Distinguished Lecturer Award.

#### Mark Howard; Business Development Manager, Layne Christensen Company

Mr. Howard has over 44 years of experience in the water resource industry, specializing in well drilling aspects of groundwater development. His work has included drilling water production wells, well rehabilitation, well abandonments, pump sales/service, and installing pump systems for municipal, industrial, and agricultural applications. Currently, Mr. Howard works for Layne Christensen Company as the Business Development Manager of the Western Region & Area Manager in Santa Paula, CA

AWWA Webinar Program: Tracking Water Loss Control Progress Using the AWWA FWAS V6 and the new Water Audit Compiler May 18<sup>th</sup>, 2022

### Webcast Description

### Overview:

Join us to explore how the new Water Audit Compiler leverages enhancements in the FWAS V6, including the new suite of performance indicators, to help track and analyze water loss control progress. The compiler allows utilities and state and regional water resource agencies to easily aggregate audits from multiple utilities and/or years to view trends and help guide decisions. Speakers will include water loss control experts that helped build the new tools.

### **Presenter Biography Information**

### Will Jernigan; CFO, Director of Water Efficiency, Cavanaugh

Will Jernigan, PE is the CFO and Director of Water Efficiency with Cavanaugh, and has worked with over 1,500 water systems across North America where he is recognized as a leader in the water loss industry. Will is the chair and chief architect behind the AWWA Water Audit Software and the AWWA North American Water Loss Conference. He was also appointed as the US expert to an international task force developing the ISO Water Loss Standards. Will was Co-Principle Investigator for the Water Research Foundation Projects in 2016 and 2020 which formally codified the Level 1 water audit validation methodology.

### David Sayers; Manager, Black & Veatch

David has over 20 years of experience in advancing the development of water system auditing and water loss control. He is an active member of the national AWWA Water Loss Control Committee and is a key member of the development team for the AWWA Free Water Audit Software and Audit Compiler tool. David led the development and implementation of a regulatory water audit reporting program at the Delaware River Basin Commission utilizing AWWA methods and tools, and now helps clients across North America improve efficiency and sustainability through the management and reduction of water loss.

AWWA Webinar Program: POU Filtration Best Practices for Lead and Copper Ruling Compliance May 24<sup>th</sup>, 2022

#### Webcast Description

#### Overview:

The EPA's updated Lead and Copper Rule (LCR) mandates point-of-use filtration during lead service line replacement, but it can be complex to decide how to select and implement a program that best meets municipalities' and consumers' needs. This webinar will include best practices, case studies and unique insights to consider in your holistic LCR planning.

As a brand with product offerings for both municipalities and consumers, Brita uniquely understands the needs of both a municipality and its residents. Our world-class human insight capabilities will bring a differentiated perspective on a consumer's knowledge of the LCR and how to maximize filter adoption and compliance.

#### Learning Objectives:

- Best practices for implementing a POU filtration program that meets EPA's updated LCR POU filtration requirements.
- Insights and communication tools for building trust and confidence with affected residents

**Presenter Biography Information** 

#### Heather Kennedy, Director of Human Insights, Brita & Innovation Insights

Heather has 27 years of experience in consumer research/human insights across innovation and base, 23 of which have been at Clorox. She has worked across many of the businesses at Clorox, including Cleaning. Her expertise is in developing empathy for the consumer, consumer targeting and positioning. In her current role, Heather provides leadership for the Brita Leadership Team, as well as guiding Innovation insights across Litter, Grilling, Foods, in addition to Brita. Heather holds an MBA & BSBA from Bowling Green State University. Heather lives in Burlingame, CA with her 2 sons, Liam (19) & Patrick (17) and their dog, Oliver. Her interests include finding and cooking healthy meals and usually doesn't make the same recipe twice; travelling to see family in Chicago and Indiana (grew up in Ohio); as well as hiking/being outdoors.

### Elizabeth Knipmeyer, R&D Department Manager for Brita Water Filtration

Elizabeth has over 15 years of experience in Research and Development across innovation and execution. She has worked on multiple consumer product businesses including Brita, Home Care, and Litter with technical depth on product, process and packaging development. In her current role, Elizabeth provides leadership for Brita innovation. Elizabeth holds a PhD of Chemical Engineering from UCSB as well as a dual Bachelor's of Science in Chemical Engineering and Biomedical Engineering from The Johns Hopkins University. Elizabeth lives in San Ramon, CA with her husband Kurt Knipmeyer, their son Holden (11), and their sweet dog Okha. Her interests include traveling to see America's National Parks (34 of 63 visited), baking, and her son's various sporting interests and the volunteering that comes with that.