Work Space: 2nd Floor, access by Trillium
Quiet Work Space: Wintergreen
Collaborative Work Space: Willow
# ABOUT US

The Water Institute at UNC provides global academic leadership for sustainable management of water for health and human development. Based in UNC’s Gillings School of Global Public Health, one of the highest ranked public health schools, we work to solve the complex global water challenges through our four main strategic functions: research; teaching and learning; knowledge and information management; and networking and partnership development. We have seven focus areas to support these functions, which are: monitoring, evaluation and learning for WaSH; WaSH governance; sanitation for the 21st century; adapting to water scarcity and climate change; drinking water for all; national and regional WaSH challenges in the U.S.; and the water-food-climate-energy nexus.

Through all our endeavors, we work toward improving access to safe water, sanitation and hygiene for all. We unite faculty, students, practitioners and policymakers around this common purpose on a local, national and international scale.

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# ACKNOWLEDGEMENTS

The staff and faculty at The Water Institute appreciate the following individuals and groups for their time, effort and thoughtfulness dedicated to the 2019 UNC Water and Health Conference:

- Plenary Advisory Committee—Jan Willem Rosenboom, Joe Brown, Clare Battle, Sean Furey, Clarissa Brocklehurst
- Abstract reviewers
- Staff at the Friday Center

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# WATER & HEALTH

**OCTOBER 7-11, 2019**

UNIVERSITY OF NORTH CAROLINA CHAPEL HILL

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# TWITTER RAPPORTEUR

Saskia Nowicki joins us as the 2019 UNC Water and Health Twitter Rapporteur. She will highlight and start conversations on topics; highlight presenters and their work with content that encourages more clicks; and inform attendees of helpful conference information such as where to locate resources, good spot for coffee, etc. Follow her @SaskiaNowicki or view her content through the conference hashtag #UNCwaterandhealth.

Saskia works on water risks and trade-offs, especially those involving water quality and public and environmental health. She is currently undertaking doctoral research at Oxford’s School of Geography and the Environment, with an interdisciplinary approach to rural drinking water safety. She has an MSc in Water Science, Policy and Management, a BSc in Environmental Science, and has previously worked as a consultant in WaSH and mine waste geochemistry.
LOCAL INFORMATION

Conference Address
The Friday Center, 100 Friday Center Dr., Chapel Hill, NC 27517, (919) 962-3000. Conference attendees do not need parking pass.

Internet
Wireless network is “UNC Guest.” Click “Connect,” then “Agree to Terms.”

Website
See website for detailed information not in the program: www.bit.ly/waterandhealth2019

Conference Hotels
Courtyard Marriott, 100 Marriott Way Chapel Hill, NC 27517, (919) 883-0700 or (800) 321-2211
*Hampton Inn & Suites Chapel Hill, 6121 Farrington Rd. Chapel Hill, NC 27517, (919) 403-8700 or (800) 426-7866
*Holiday Inn Express Chapel Hill, 6119 Farrington Rd. Chapel Hill, NC 27517, (919) 489-7555 or (800) 465-4329
*Aloft, 1001 S. Hamilton Rd. Chapel Hill NC 27517, (919) 932-7772 or (866) 716-8143
*Shuttle service is provided to these hotels only. Please contact your individual hotel to inquire about alternative shuttle service.

MORNING SHUTTLE TO CONFERENCE CENTER

From Hampton Inn, Holiday Inn Express, and Aloft to Conference Center (NO SERVICE to other hotels)
Shuttle pick-up location: Outside main entrance of hotel  SHUTTLES DO NOT WAIT!!!

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<tr>
<th>Hotel</th>
<th>Departure Times from Hotel</th>
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<td>Holiday Inn Express</td>
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<tr>
<td>Aloft</td>
<td>7:05 a.m. 8:05 a.m. 9:05 a.m.</td>
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AFTERNOON & EVENING SHUTTLE TO HOTELS

From Conference Center to Aloft, Hampton Inn and Holiday Inn (NO SERVICE to other hotels)
Shuttle pick-up location: Under portico near registration end of conference center  SHUTTLES DO NOT WAIT!!!

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<thead>
<tr>
<th>Day of the Week</th>
<th>Departure Times from Conference Center</th>
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<td>Monday</td>
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<td>Tuesday</td>
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<td>Thursday</td>
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<td>Friday</td>
<td>12:00 p.m. 1:00 p.m. 2:00 p.m. -- --</td>
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Lost & Found
Please check at Conference Registration and The Friday Center information desk.

Luggage Storage
Store your luggage on arrival or departure days in the Grumman Auditorium hallways (look for signs).
Note: this is not a supervised “bag check” area and luggage is stored at your own risk.

Special Notifications
Please see the announcement board near conference registration for updates and sign ups. In the case of any situation requiring the delay or cancellation of any conference sessions or events, attendees will receive an email* by 6:30 a.m. the day of the event.
*NOTE: Email is based on registration information. If someone else registered you and listed their email instead of yours, you will need to contact them or check the conference website: www.bit.ly/waterandhealth2019

Special Services
Please check with the Friday Center main desk to make arrangements for special needs such as a private location for nursing moms or a room to pray. Information for nearby High Holiday services will also be posted.
OTHER TRANSPORTATION

Taxi Service
(before entering the taxi, confirm you are the intended passenger by providing your name)

- Uber – sign up for UBER at get.uber.com
- Lyft – sign up for Lyft at www.lyft.com/rider
- Chapel Hill Taxi and Shuttle (919) 933-9595 or chapelhilltaxi.com/index-3.html
- RDU Airport Taxi (919) 840-7277 or rdu胥taxiinc.com
- RDU Express Taxi (919) 771-8222, (800) 840-8098, or rduexpressstaxi.com

Bus Service
- Chapel Hill Transit (919) 969-4900, chtransit.org. The S, FCX, V and HU routes serve the Friday Center directly.
- Triangle Transit (919) 485-7433 or gotriangle.org

SPECIAL EVENTS & MEETING SPACE

Daily Lunch Sessions
Check the schedule for special lunch sessions taking place during the week:

- Spotlight on Careers in WaSH
- Special Sessions (topic changes daily—see schedule)

Seating is limited and is on a first come, first served basis. Be sure to go through the buffet line first and take your food with you!

Shopping Excursion (Thursday, Oct 10, 6:30–9:00 p.m.)
- Requires reservation! Sign up at the registration desk by noon on Wednesday, Oct 9
- A shuttle will be provided on Thursday for those who wish to shop at our local Walmart. See registration desk for details.
- The shuttle will leave from The Friday Center. The shuttle will return from Walmart and will stop at conference hotels and The Friday Center.
- If you miss the shuttle, you are responsible for your own transportation.

Quiet Work Area
- The Wintergreen room, located on the back hallway, is designated as quiet work space.
- Please do not hold meetings or discussions, or make phone calls, in this room.

Collaborative Work Area
- The Willow room, located on the back hallway, is designated as a collaborative space.
- Conversations, networking and phone calls are welcome in this area.

Reserved Meeting Space Available
- Tables are located on the 2nd floor (use stairwell across from the Trillium Dining Room).
- Tables can be booked in advance or booked on a first come first served basis. Inquire at the conference registration desk or check with the attendant on the 2nd floor for availability.
- Reservations are in 1 hour time slots.
<table>
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<tr>
<th>Time</th>
<th>MON. OCT. 7</th>
<th>TUES. OCT. 8</th>
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<td>- Health Care Facilities</td>
<td>- The New USAID, New Congress, and…the Same Administration</td>
<td>- Technology and Innovation Showcase</td>
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<td>PLENARY SESSION</td>
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<td>“You Can’t Handle the Truth”— Busting Myths and Driving an Evidence-based Approach in the WaSH Sector</td>
<td>Breaking Up is Hard to Do— Planning an Exit Strategy</td>
<td>Urban Sanitation and Integrated Urban Services Provision</td>
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SIDE EVENTS

8:30–10:00 a.m.

Planning for Success: Context-specific Programming for Rural Sanitation
Convened by USAID/WASHPaLS, UNICEF, WSSCC/GSF
Redbud

In their 2008 Handbook on Community-Led Total Sanitation, Kamal Kar and Robert Chambers identified a set of conditions that were posited to be associated with CLTS program success, conditions that were a reflection of implementer experience. With another decade of documented CLTS implementation experience to work with, USAID’s Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) project is examining the drivers of CLTS success (the so-called “performance envelope”) via a systematic, coupled quantitative-qualitative analysis. This proposed side event will examine the lessons of that research experience.

WaSH Systems Strengthening in 6 African Countries: The Journey so Far
Convened by IRC WASH, Conrad N. Hilton Foundation
Dogwood

We face a complex challenge in the WaSH sector. Every year, thousands of projects within and beyond the sector fail – the result of short-term targets and interventions, at the cost of long-term service solutions. Strong national and local systems are key to delivering safe and sustainable access to WaSH services, and achieving SDG 6. This session will share what it entails to build strong WaSH systems; the challenges, opportunities, and day-to-day practice.

The year 2018 saw a series of important findings and achievements which are worthwhile to share with other WaSH system players and partners. Key milestones include the establishment of government-led partnerships for collective action and the development of comprehensive district WaSH master plans. These district WaSH master plans are a result of the collective input of multisectoral actors in districts representing local political and technical leaders, religious leaders, CSOs, private sector actors, media practitioners, and various ministries. The plans articulate the long-term priorities of the District and provide a framework for planning, coordinating and guiding the implementation of water sanitation, and hygiene service delivery.

The success so far affirms that the attainment of universal WaSH for all, calls for a multisectoral and multi-stakeholder approach.

“Are We on Track?” Using Evidence to Adapt WaSH Programs for Sustainable, Inclusive Outcomes
Convened by CARE, WaterAid, Water for People
Bellflower

This side event explores how WaSH agencies are measuring and using evidence of systems change to adapt programs and ensure inclusive, sustainable access. The operating environment is complex. Working within such dynamic systems requires regular reflection to identify evidence of change. This evidence is needed to understand if we are on track to achieve outcomes...
and to inform course correction if necessary. This is often an iterative, highly contextualized process that involves examining the factors that contribute to changes in the strength of government leadership, citizen engagement, institutional processes, policy reform and accountability.

This session will present case studies from Ethiopia, Cambodia and Peru to highlight the experiences of and approaches used by three WaSH agencies to adapt programs based on evidence. The approaches will include acknowledging challenges and unknowns and programming studies to address them, and introducing sufficient flexibility to adapt approaches based on new evidence and learning as the program proceeds.

**Addressing Critical Challenges in Measuring Behavior: Identifying Gaps and Proposing Solutions in Programs and Research**  
*Convened by Emory University*

**Windflower**

There are critical gaps in the way in which the WaSH sector measures behavior. Imprecise measures limit our ability to accurately assess impact of behavior change interventions and the relationship between behaviors and health. The Joint Monitoring Programme, for example, focuses on the presence of a sanitation facility and reported location of one’s last defecation as a proxy indicator of defecation behaviors for an entire household. WaSH behavior measurement is riddled with challenges such as bias, time and cost of the assessments, and utility with regard to research or program monitoring (e.g., due to complexity of the measure or analysis).

However, there exists a need for behavioral metrics that are reliable (provide consistent results), valid (sensitive to the behavior), and easily rolled out (technically simple and low-cost). Ideally, such metrics should enable assessment of variable behaviors within households and reflect standard approaches and operational definitions that can be deployed to compare programs across contexts. In this session, we will discuss the limitations of the current suite of standardized measures and other indicators used in both programs and research. We will discuss the implications for how these measures lead to critical challenges in better understanding the impact of WaSH programs. The talks will focus on the development and testing of novel measures in households and institutions and will foster a robust group discussion about the types of measures needed for both research and programs and how to move the sector forward.

**Learning from Sierra Leone: How to Use Evidence to Improve Rural Water Services**  
*Convened by Ministry of Water Resources, Sierra Leone*

**Mountain Laurel**

Have you ever wondered how to use the data you’ve collected to improve the decisions you make on a regular basis? As the collection of WaSH data continues to accelerate around the world, the use of that data is not keeping pace. While this evidence can help governments make more efficient decisions and enable their partners to collaborate more effectively, much of the data collected remains unused.

In this session, the Sierra Leone Ministry of Water Resources will share how they have worked to address this challenge and transform their data into insights that are making rural water service delivery more efficient. From annual budgets to coordinating partners and much more, Sierra Leone is currently using evidence on a regular basis. The M&E Manager for the Ministry of Water Resources will share the country’s journey from data to decisions, including both the challenges faced and successes achieved. The session will conclude with an interactive training on how participants can access and use the same resources that Sierra Leone is using to bring evidence into their own work, and no data expertise is required.

**Estimating and Communicating Log Reduction Values for Drinking-water Treatment Technologies**  
*Convened by World Health Organization*

**Azalea**

The World Health Organization Guidelines for Drinking-water Quality (GDWQ) includes summary tables on log reduction values (LRVs) for bacteria, viruses and protozoa, that can be achieved by common water treatment technologies, for both large drinking-water treatment plants as well as at the household level. The need to update these tables have been highlighted by the GDWQ Expert Group and subsequently, work has been performed to revise these tables. A table on water treatment technologies for small water supplies was also developed. This proposed workshop will be one of the first presentations on the revised treatment tables.

This workshop will brief participants on the work conducted to update the LRVs and prepare revised treatment tables, including two systematic reviews. The session aims to bring together water utilities, regulators, donors and researchers, to discuss challenges in interpreting LRV data, identify further research needs, and discuss opportunities to improve water treatment efficacy studies. Feedback will be sought to increase their usefulness for policy makers and practitioners who use the GDWQ to inform their work.
**WaSH and Health Working Together: Examples from Collaboration on Neglected Tropical Diseases**

*Convened by World Health Organization*

**Redbud**

Collaboration between WaSH and health stakeholders is essential to ensure that WaSH interventions result in the health impact ascribed to them. Additionally, information on the burden and distribution of disease can help ensure that WaSH services are targeted to the areas and populations most in need in order to achieve equitable access. Despite this powerful rationale, cross-sector collaboration continues to be a challenge to WaSH and health stakeholders, due to differing and at times conflicting institutional and funding structures.

Developed by the World Health Organization and the Neglected Tropical Disease NGO Network, the toolkit “WaSH and health working together: a “how to” guide for neglected tropical disease programmes” tackles the challenges of collaboration head on, by providing a step by step guide for disease control programme managers to undertake joint planning and implementation with WaSH stakeholders. While the toolkit focuses on NTDs, its tools and principles apply across a range of issues and will be of interest to those aiming to enhance collaboration on nutrition, diarrhoeal disease control and WaSH in health care settings, among others. WaSH for all calls for a multisectoral and multi-stakeholder approach.

**NETWORKING BREAK**

10:00–10:30 a.m.

*Atrium*

**SIDE EVENTS**

10:30 a.m.–12:00 p.m.

**Existing Evidence on WaSH for Nutrition: Implications for Programming and Policy. Where to Now?**

*Convened by WaterAid, London School of Hygiene & Tropical Medicine, Bill & Melinda Gates Foundation, World Bank*

**Redbud**

The session will be a practitioner-led interactive discussion with academics, donors, government and NGOs. The session will seek to understand the implications of the existing WaSH for nutrition evidence base (including the findings from WaSH Benefits and SHINE trials) on policies and practice. Our target audience is a balance of WaSH and nutrition practitioners, policy makers, donors, and researchers to ensure a vibrant, interactive and solution-focused discussion.

The session will aim to explore questions such as:

- What are the implications of existing WaSH for nutrition evidence for practice and policy? How can the current evidence be used to maximise the health impact of WaSH investments?
- What should we stop doing on the basis of what we know now?
- How do we facilitate uptake of research findings and better translate evidence into policy and practice?
- How can research be more informed by practitioners? How can research be better embedded in existing programmes to examine real life situations?
- What are real life examples of current interventions that take into account the existing evidence on WaSH for nutrition?
- What are the opportunities to implement joint interventions that address other determinants of nutrition, such as food security (agriculture and irrigation)?

**Rethinking Rural Sanitation: Equitable, Flexible and Adaptive Rural Sanitation Programmes at Scale**

*Convened by World Bank, UNICEF, WaterAid, Plan International*

**Dogwood**

To meet the SDG targets and ensure that no one is left behind, the rethinking and evolution of conventional approaches to rural sanitation programming is an urgent priority. Based on global experiences and evidence of rural sanitation programmes at scale a shared strategic...
framework for rural sanitation services has emerged. Key to this framework are context specific area-based approaches that combine demand creation/behavioural change with strengthening of sanitation supply chains and improved governance capacity. To ensure that rural sanitation services are inclusive and bring prosperity to all, dedicated efforts are needed to reach vulnerable groups and to meet the specific needs of women. To make a lasting change, fecal sludge needs to be safely managed along the whole service chain.

This session will provide an opportunity to further familiarize practitioners with guidance on adaptive rural sanitation programming through specific examples and experiences. The audience will be engaged through group work in a wider discussion on the experience of participants in combining rural sanitation approaches (e.g. trade-offs and sequencing of strategies from an equity perspective) and how to best apply this new guidance in the field with a clear equity and sustainability focus.

**Menstrual Health Measures Workshop: Sharing New Measures of Menstrual Experience, Self-efficacy and Stigma**  
*Convened by Johns Hopkins Bloomberg School of Public Health, University of Sydney, Duke University, UNICEF*

**Bellflower**

Measurement in menstrual health research has often been inconsistent and disjointed, presenting challenges for comprehensive assessment and comparability across studies and sectors. Similarly, menstrual health practitioners have had few available tools with which to quantitatively appraise menstrual needs and intervention effects. This side event brings together recent measure development efforts and shares a range of new tools. Through presentations, researchers will define the constructs measured and describe their development process and validation. Through moderated discussion, the session will explore researcher and practitioner needs and highlight considerations for use of the new tools.

**Opening and Using Data for Programmatic Decision-making**  
*Convened by Akvo*

**Windflower**

Since moving into the SDG era, there has been an increased value placed upon improving data collection practices, particularly among Pacific Island governments. The acknowledgement of the power of data coupled with the pressure to report against SDGs has led to an increased demand for targeted data collection initiatives at national levels. However, collecting data is only part of the solution. Data also needs to be accessible, and have the ability to be merged with other similar datasets. Through our presentation, we will unpack work done in Fiji and the Solomon Islands addressing the challenges of data, focusing specifically on the visualization of data and sharing information.

**Getting Traction with Collective Action: Energizing and Empowering Local Systems for WaSH Services**  
*Convened by USAID, University of Colorado Boulder, Tetra Tech, IRC, Millennium Water Alliance, Conrad N. Hilton Foundation*

**Mountain Laurel**

There is growing recognition within the WaSH sector that challenges to sustaining services cannot be solved without improved alignment among diverse stakeholders. This is particularly true in contexts where many actors play complementary roles in service delivery, but cannot solve complex issues on their own (common in rural areas where WaSH services are delivered by a range of public and private).

To develop an evidence-base around the application of collective action within WaSH, both MWA and the USAID Sustainable WaSH Systems Learning Partnership are applying and learning about a variety of collection action approaches, ranging from informal forums and coalitions to highly structured and theoretically based methods, as vehicles for improving service sustainability. This session will build participants’ knowledge of collective action through (1) an introduction to collective action concepts, components, goals, and applications; (2) a facilitated role-playing exercise simulating collective action activities; and (3) discussion of early learning from current activities.

**Selling Sanitation to the Poor**  
*Convened by Whitten & Roy Partnership*

**Azalea**

Many organisations are working to deliver sanitation marketing. Some engage directly as players in the supply chain, whereas others are market facilitators, working with market actors to improve capability. Many are using human-centered design approaches to assure local appeal of their products, while some firms manufacture hygienic sanitation components. Intense focus is put on getting the supply chain right, but often these helping organisations are left stumped by lackluster sales. One major component of sanitation marketing that is misunderstood or missed entirely is customer engagement.

This session provides an experience about how NGOs and social enterprises can sell sanitation products in a way that is ethical and generate a greater impact on the population by employing a four-step problem-led selling approach.
LUNCH OPTIONS
First, go through the buffet line to pick up your lunch, then choose one of these locations to eat (details below):

- Networking Lunch, Trillium Dining Room
- Health Care Facilities, Sunflower
- Spotlight on Careers in WaSH, Magnolia

NETWORKING LUNCH
Trillium Dining Room
12:00–1:00 p.m.
Connect with colleagues old and new over lunch in the main dining hall.

HEALTH CARE FACILITIES
Sunflower
12:10–1:00 p.m.
In 2016, experts from the WaSH and health sectors met to discuss the WaSH in health care facilities research agenda and key areas requiring further research were identified. In the subsequent years, the WaSH in health care facilities space has propelled forward. However, the conversation around where the research agenda should now be directed has stalled. This lunch session seeks to consider the strides made in WaSH in HCF research since the initial agenda was set and the current research questions which should be prioritized moving forward, including issues of costing, sustainability and best practices. A summary of the key research topics discussed will be circulated among the community of practice following the conference for further input.

SPOTLIGHT ON CAREERS IN WaSH
Magnolia
12:10–1:00 p.m.

**Eleanor Allen, CEO, Water For People**
Eleanor leads Water For People, a global nonprofit working in nine countries in Africa, Latin America, and India to help develop sustainable water and sanitation services. Water For People is a recognized leader in WaSH through its innovative impact model called Everyone Forever. Eleanor is a professional engineer and has worked all over the world. Eleanor won the Schwab Award for Social Entrepreneurship, did a TEDx talk on Why Water Is A Women’s Issue and was named a Denver Outstanding Women in Business. She serves on several Boards and, prior to Water For People, she worked globally as an engineering consultant designing urban water/wastewater infrastructure.

**John Sauer, Senior Technical Advisor, WaSH Programs, PSI**
John provides support to PSI’s efforts, executing market systems development programs. John’s focus is on breaking down barriers to growth to achieve lasting, higher coverage and increased use of WaSH products and services. John has 20 years of program implementation, advocacy, and strategy development experience in the WaSH sector. Before joining PSI, John worked for Water For People, Water Advocates, and Action Against Hunger, with a recent focus on sanitation as a business in rural and urban contexts. John graduated from Fordham University in 1992 and holds a master’s degree in international and intercultural management from the School for International Training in Brattleboro, Vermont. John currently resides in Washington, D.C.
PLENARY SESSION
1:00–2:30 p.m.
Grumman Auditorium

“You Can’t Handle the Truth”—Busting Myths and Driving an Evidence-based Approach in the WaSH Sector

No Jack Nicholson, but an interactive—and perhaps slightly contentious—session exploring the myths driving the WaSH sector and our roles as Mythbusters.

**Aaron Salzberg, Director, The Water Institute at UNC**
As Director of The Water Institute at UNC, Aaron uses his experience as an international leader on global water issues to mobilize knowledge, expertise and resources to create a more water-secure world and build the next generation of water leaders. He formerly served as the U.S. Department of State’s first Special Coordinator for Water and Chief of the Water Division within the Bureau of Oceans and International Environmental and Scientific Affairs, where he led the development of U.S. foreign policy on drinking water and sanitation, water resources management and transboundary water issues to save lives, advance sustainable economic growth, and promote peace and security.

**Bruce Gordon, Coordinator of Water, Sanitation, Hygiene and Health, World Health Organization**
Bruce oversees a global portfolio of water and health-related work ranging from development of norms on drinking-water and wastewater/sanitation to global monitoring of access to WaSH and burden of disease. Prior to joining the water unit at WHO in 2004, he contributed to the Organization’s work on sustainable development with a focus on children’s health and environment. He has an academic background in biochemistry and environmental management.

VERBAL PRESENTATIONS
2:30 p.m.–3:30 p.m.

**DRINKING WATER QUALITY**

**Redbud**
Compromised Water Quality in Colonias of Nueces County, Texas: A Vicious Cycle
*Lewis Stetson Rowles*, Environmental and Water Resources Engineering, University of Texas at Austin

Occurrence of Metals from Aquifers and Drinking Water System Corrosion in Three West-African Countries
*Michael Fisher*, The Water Institute at UNC

Pilot-scale Investigation of Water Quality in Intermittent Water Supply
*Maria Alkattan*, University of Massachusetts Amherst

**ESTIMATING COSTS IN SANITATION**

**Dogwood**
An Evidence-driven Approach to Establishing Prices for Pit Emptying Services by Vacuum Truck Operators
*Bernard Elegbe*, ABMS/PSI

Estimating Economic Benefits of Market-based Sanitation Programs: Design and Application of a Novel Model
*Geoff Revell*, WaterSHED

Using Public Subsidy to Unlock Household Finance: Evidence from the Field
*Lesley Pories*, Water.org
Bellflower
Improving Outcomes for Girls through a Holistic MHM Approach: Evidence from Ghana
TATIANA REYES JOVÉ, Be Girl; ALBERTO WILDE, Global Communities Country Director, Ghana

Assessing Menstrual Hygiene Management (MHM) Among Female Students in Pastoral Regions of Ethiopia
NIKITA SALGAONKAR, DT Global

National Advocacy for Menstrual Hygiene Management in Uganda—Policy Achievements and the Role of Government
MULUMBA JANE NABUNNYA, IRC

Windflower
The Role of Cleaners in Promoting Health Care Facility Cleanliness: A Qualitative Study from Malawi
HAYLEY SCHRAM, The Water Institute at UNC

Randomized Controlled Trial of the CHoBi7 Mobile Health Program to Reduce Pediatric Diarrhea
CHRISTINE MARIE GEORGE, Johns Hopkins School of Public Health

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NETWORKING BREAK
3:30–4:00 p.m.
Atrium

VERBAL PRESENTATIONS
4:00–5:00 p.m.

DATA FOR DECISION MAKING

Redbud
How to Support Governments Monitor Safely Managed WaSH Services
Ethel Mendez, Akvo

Modeling WaSH-Related Enteropathogens and Interventions: A Tool for Applying Empirical Data to Policy Decisions
Elizabeth Sajewski, Emory University

Use of an Evidence-based Tool to Inform Action and Sanitation Investments in Kumasi, Ghana
Habib Yakubu, Emory University

HEALTH CARE FACILITIES (II)

Dogwood
District-wide WaSH Coverage Surveys in Health Care Facilities: A Roadmap to SDG6 in Four African Countries
Victoria Trinies, Centers for Disease Control and Prevention

The Clean Clinic Approach: An Implementation Case Study of 11 Health Care Facilities in the Western Highlands of Guatemala
Jason Lopez, Maternal and Child Survival Program

Understanding Hand Hygiene Adherence: Results from a Mixed-methods Study in Health Care Facilities in Sub-Saharan Africa
Margaret Person, Centers for Disease Control and Prevention
MATERNAL CHILD HEALTH

Bellflower
A Systematic Approach to Investigate the Complex Causal Variables to Child Stunting in Guatemala
Lee Voth-Gaeddert, Missouri University of Science and Technology
Child Mouthing of Contaminated Fomites and Animal Contact is Associated with Diarrhea and Stunting (REDUCE Program)
Christine Marie George, Johns Hopkins School of Public Health

SANITATION TOOLS & TECHNOLOGY

Windflower
Cassava, Cyanide and Drinking Water or the Consideration of Productive Uses in the Design of Water and Sanitation Infrastructures
Jean-Marc LeBlanc, Croix-Rouge française
Comparison of Stool Collection Methods for Microbiome Research
Kelly McCain, Emory University
Prioritizing Research and Development Pathways for Decentralized Treatment of Bodily Waste
Rebecca Andrus, University of Illinois Urbana-Champaign

WATER COLLECTION & STORAGE

Mountain Laurel
Efficacy of Jerrycan Disinfection Methods
Marta Domini, Tufts University
Household Water Quality in the US Virgin Islands: Understanding Risks in Cisterns
Gouthami Rao, Centers for Disease Control and Prevention
Microbial Contamination of Drinking Water from Vending Machines
Thomas Hile, Loma Linda University

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**POSTER RECEPTION**
5:00–6:30 p.m.

**Atrium**

### EVIDENCE

1. Failure Mode Effects and Criticality Analysis of Water Sources in Nigeria
   **Enovwo Odjegba**, Federal University of Agriculture, Nigeria

   **Aniruddha Deshpande**, Institute for Health Metrics and Evaluation

3. Using Microbial Source Tracking and Antibiotic Resistance for Environmental Justice
   **Brandon Hunter**, Duke University

4. Water-related Injuries in Low- and Middle-income Countries: Typologies and Correlates from 23 Sites
   **Vidya Venkataramanan**, Northwestern University

5. Validity and Reliability of Self-reported Measures Used to Monitor Access To Drinking Water: A Case Study in Southern Malawi
   **Alexandra Cassivi**, University of Victoria

6. Step-wise Approach to Increasing the Amount of Safely Managed Sanitation in a City
   **Naomi Korir**, Sanivation

7. Modifiable Drivers of Water Quality Variation: How Do We Improve Our Estimates?
   **Erin Conners**, Centers for Disease Control and Prevention

### FINANCE & POLICY

8. The Impact of a Private Water Enterprise on Household Water Services in Rural Ghana
   **Philip Deal**, University of Oklahoma

9. New Perspectives on Women in WaSH: Integrating Women’s Empowerment Programming into a Market-Based Sanitation Intervention
   **Allison Salinger**, WaterSHED

10. Social Responsibility In Water: Equity and Justice for All
    **Elesia Glover**, City of Atlanta, Watershed Management

11. A Randomized, Controlled Trial on Targeted Subsidies Post-CLTS in Ghana: Study Design and Baseline Findings
    **Caroline Delaire**, Aquaya Institute

### HEALTH & BEHAVIOR

12. Does Poor Mental Health Change the Effectiveness of Interventions?
    **Jurgita Slekiene**, Eawag

    **April Ballard**, Emory University

14. Water Security through a Comprehensive Educational Partnership in Metn, Lebanon
    **Nabil Chemaly**, Lebanon Water Project

15. Investigating Multiple Drinking Water Source Use in Low- and Middle-income Countries: A Systematic Review
    **Sean Daly**, North Carolina State University

    **Zachary Burt**, Athena Infonomics

17. Functionality and User Acceptance of a Family Vector Control Response Kit
    **Laure Anquez**, UNICEF
### HYGIENE

18. Factors Impacting Satisfaction with Cleanliness and Infection Control Practices within Rural Health Care Facilities  
   **Amy Guo**, The Water Institute at UNC

19. Formative Research and Evaluation Efforts to Improve Hand Hygiene in Rural Ugandan Health Care Facilities  
   **Matt Lozier**, Centers for Disease Control and Prevention

20. Improving Hygienic Management of Poultry in Rural Uganda  
   **Chris Prattas**, The Water Trust

### SANITATION

21. Modelling Pathogen Flows in Urban Environments: Case Study in Dhaka Bangladesh and Its Wider Implications  
   **Christine Moe**, University of Technology Sydney

   **Deepa Karthykeyan**, Athena Infonomics

23. Ensuring Quality of Latrine Construction for Low-income Consumers in Low Water Table Areas in Benin  
   **Bernard Elegbe**, ABMS/PSI

24. Sanitation Service Delivery in Waterfront Communities: The good, the Bad and the Ugly in Port Harcourt, Nigeria  
   **Chindo Nwanwo**, University of Leeds

25. Leach Pit Toilet and Susceptibility of Aquifer to Bacteriological Contamination in Parts of Gangetic Plane of Bihar, India  
   **Asad Umar**, Aga Khan Foundation

26. Lessons Learned from the National Sanitation Campaign in Njombe District Council, Tanzania  
   **Hussein Mohamed**, Muhimbili University

27. Assessing the Role of Community Toilets in Reducing Open Defecation Using Simple Diagnostic Tools  
   **Vinitha Murukesan**, Indian Institute for Human Settlements

28. Moving Toward Predictive, Geospatial Analytics for Urban Sanitation  
   **John Peter Archer**, Gather

29. The Role of Shared Sanitation and SDG 6: The Case of West Point, Liberia  
   **Iain Hunt**, Villanova University

30. Water Quality of the Fonteinspruit Stream, Bloemfontein, in the Free State  
   **Mongezi Adoons**, Central University of Technology

### WATER QUALITY

31. Assessment of Water Quality of the Densu River in Ghana  
   **Rita Gvimah**, Kwame Nkrumah University, Ghana

32. Traditional Water and Sanitation Strategies Impact Pathogen Exposure and Serve as Opportunities for WaSH Interventions  
   **Kaitlin Mattos**, University of Colorado Boulder

33. Impact of Source Type and Management Strategy on Functionality and Water Quality in Haiti  
   **Declan Devine**, Tufts University

34. Field-produced Coffee Cherry Biochar for Co-treatment of Chemical and Microbial Contaminants in Rural SW China  
   **Matthew Bentley**, University of Colorado Boulder

35. The Relationship Between Land Use and Compliance with the Safe Drinking Water Act in Central Appalachia  
   **Ethan Smith**, Virginia Tech

36. Impact of Rock Alum Pre-treatment on Light Biosand Filter Performance in Cambodia  
   **Kevin Curry**, Bridgewater State University
SIDE EVENTS
8:30–10:00 a.m.

**WaSH in Health Care Facilities: Global Indicators and Baseline Report 2019**
*Convened by World Health Organization/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene*

Redbud

In April 2019 the World Health Organization/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) published harmonized baseline estimates for water, sanitation, hand hygiene, health care waste management, and environmental cleaning (WaSH) services in health care facilities.

This session will present and define the global indicators and service ladders for WaSH services in health care facilities. The JMP team will demonstrate how national datasets were used to produce harmonized baseline estimates, as summarized in Excel Country Files. A panel will also discuss experiences of monitoring WaSH in health care facilities in a range of countries, including reflection on which elements of the global indicators present particular challenges, and what additional indicators have been collected and proven useful.

**Using Behavioural Science to Improve Latrine Use in India: What Works and Why?**
*Convened by International Initiative for Impact Evaluation (3ie), Eawag, Emory University, London School of Hygiene and Tropical Medicine, Oxford Policy Management*

Dogwood

The International Initiative for Impact Evaluation (3ie), with support from the Gates Foundation, started an evidence programme in 2016 to examine how behavioural science could be used to improve latrine use in rural India. 3ie supported the formative testing and impact evaluations of innovative, low-cost, behavioural interventions in the states of Bihar, Gujarat, Karnataka and Odisha.

This side event will bring together representatives from 3ie and each of the research teams to anchor a discussion grounded in evaluation evidence on behavioural science and sanitation uptake. In the first part of the session, representatives from 3ie and four research teams will provide a quick overview of the study findings and implications. In the second part of the session, we will use interactive group discussion formats for reflecting on the key takeaways for future sanitation programmes.

**How Can Research and Learning Institutions Support the Achievement of SDG 6?**
*Convened by Sanitation and Water for All Research and Learning Constituency*

Bellflower

This session will be led by the Research and Learning constituency of the Sanitation and Water for All partnership. SWA partners are committed to collaboration and coordination in order to achieve universal WaSH globally. During this session, the contribution of institutions such as universities, colleges, and research agencies to this objective will be discussed. There will be particular focus on the role of research and learning institutions in the global south. Participants will discuss how research and learning institutions can become key stakeholders in country processes such as WaSH sector planning, monitoring and accountability. Participants will also discuss how greater partnership with these institutions can be achieved.

**You Talk a Big (Systems Change) Talk… Now Measure It**
*Convened by Water For People, Environmental Incentives, Sustainable WASH Systems Learning Partnership*

Windflower

As the concept of “systems change” has gained traction in the sector, it is now an accepted approach to sustainable WaSH service delivery. A more robust body of evidence and best practices are being developed, much of which is led by collaborations like Agenda For Change and USAID-funded Sustainable WASH Systems Learning Partnership. Such a body of evidence is developed by sharing experiences, and like any good WaSH program, monitoring is of utmost importance. However, traditional quantitative approaches to WaSH monitoring aren’t sufficient. Instead, qualitative monitoring methods that get the how and why of results is systems change gold.

The experience of Water For People and Environmental Incentives has been that customized, mixed-method approaches that are refined with experience over time are best practice for measuring systems change work, reporting outcomes and managing programs to improve sustainability. By leveraging expertise of program staff in local WaSH ecosystems and allowing for experimentation, Water For People and EI have developed four tools to monitor WaSH systems change. Presenters will share each tool in a workshop-style session that will focus on practical development and use of such tools.
*Convened by Water Witness International*  
**Mountain Laurel**

At the heart of good water governance lies strong accountability: the obligation of one actor to provide information and to justify action to another actor who has the power to make demands and apply sanctions for poor performance or non-compliance. Accountability within the water sector is receiving new interest as a means of improving service delivery and governance towards delivery of SDG 6. Civil society organisations, international NGOs, as well as governments, donors, and development banks are initiating, delivering and investing in a diverse array of accountability initiatives and mechanisms.

Hosted by the Accountability for Water Consortium, this event shares the results of a systematic review of global evidence on the efficacy of accountability for improved water governance and service delivery. Building on this evidence base, the session will also see the launch of a new global action research programme on “Accountability for Water.” Delegates will be invited to share their experiences and priorities, and to shape and benefit from this research and the knowledge it will generate. The session will also share lessons from other sectors and provide a platform for government, civil-society, and research partners from case study countries (Tanzania, Zambia, Ethiopia and Kenya) to share experiences and priorities for strengthening accountability.

**Barrier Analysis Orientation: A Formative Research Tool for Identifying Significant Behavioural Determinants to Increasing Impact**  
*Convened by World Vision International, Curamericas, Mercy Corps*  
**Azalea** *(session continues after the break)*

Barrier Analysis is a rapid formative research tool used in projects that include behaviour change, including WaSH projects. The latest World Health Organization guidance on sanitation and health points out that behaviour change interventions are most successful when they target the determinants of behaviours. The purpose of Barrier Analysis is to identify these behavioural determinants (including barriers and enablers) so that more effective behaviour change messages, strategies and supporting activities can be developed. Barrier Analysis is a relatively rapid and easy-to-use approach that allows implementers to make decisions based on the findings in a timely manner without complex analysis. It relies on a comparison of those doing a particular behaviour (the Doers) and those who are not (the Non-doers), asking both groups questions to assess the relative importance of 12 different behavioural determinants on the behaviour in the location where the study is being conducted. It has similarities with the RANAS approach, and at least 30 international development organizations have used Barrier Analysis globally either alone or as part of the Designing for Behavior Change framework.

During this mini-training session, facilitated by Tom Davis (the creator of the Barrier Analysis methodology), participants will learn about the Barrier Analysis methodology and how different organisations have used it to design effective behavior change strategies. Participants will gain hands-on practice with the tool itself and will leave with a strong sense of the purpose and utility of the tool. The Barrier Analysis Facilitator’s Guide, A Practical Guide to Conducting a Barrier Analysis (in English, French, and Spanish), 30 different sample Barrier Analysis questionnaires (in English, French, and Spanish), and other tools will also be made available to practitioners.

**Using Prize Mechanism to Induce Public Private Partnership Financing of Sanitation: Lessons from Ghana**  
*Convened by IRC Ghana, Community Water and Sanitation Agency Ghana, Bill & Melinda Gates Foundation, IMC Worldwide*  
**Sunflower**

Lack of prioritisation and funding for sanitation has led to slow progress in sanitation services delivery. This constraint has consequences for achievement of SDG 6.2. This event will share the practical experience with application of prize mechanism as an innovative financing approach to incentivize public-private partnerships to transform and significantly improve sanitation service delivery in Ghana.

This event will present the processes, results, and lessons from the application of prize mechanism to attract private sector and non-state actors to partner with Metropolitan Municipal and District Assemblies (MMDAs) in Ghana to finance sanitation service delivery. It will highlight how this financing instrument stimulated and encouraged private sector and no-state actors’ interest to partner with MMDAs to address challenges of liquid waste management with capital investment, expertise and innovative solutions. The session will also foster cross learning by providing opportunity for participants to also share experiences with application of similar financing instruments in other settings to inform discussion on lessons, challenges and opportunities to advance the use of prize mechanism to blend other instruments for sanitation financing.
NETWORKING BREAK
10:00–10:30 a.m.
Atrium

SIDE EVENTS
10:30 a.m.–12:00 p.m.

Superbugs, Sustainable Infrastructure and Evidence that Matters for WaSH in Health Care Facilities
Redbud

This interactive session will bring together international partners, implementers and researchers working on WaSH in health care facilities to discuss best practices for triggering and sustaining efforts to improve WaSH in health care facilities. The session will focus on two of the eight practical steps detailed in the new World Health Organization/UNICEF publication “Water, sanitation and hygiene in health care facilities: practical steps to achieve universal access to quality care.” These are: improve infrastructure and maintenance and conduct operational research and shared learning.

Citywide Measurement of WaSH Services Levels for SDG 6: Progress So Far
Convened by Water & Sanitation for the Urban Poor, Joint Monitoring Programme for Water Supply, Sanitation and Hygiene
Dogwood

In the push for universal water and sanitation access, limited tracking of intra-city inequalities presents a major monitoring challenge. Most household surveys and censuses are not designed to provide disaggregated information covering those living in informal settlements. Rapid population growth in these areas presents major service delivery challenges, and granular data is required to help authorities plan inclusive service improvements. The SDG 6 core indicator requires data collection covering the whole faecal sludge management chain, which requires household surveys to be combined with city-level data on service provider practices and faecal sludge flows in order to assess the proportion of the population with “safely managed” services.

This participatory session will discuss these challenges and progress made in addressing this evidence gap. Through an online, interactive dashboard, Water & Sanitation for the Urban Poor (WSUP) will discuss our experience of piloting citywide assessments of WaSH service quality in low-income communities in seven cities. By walking participants through the online dashboard, we will illustrate key findings from this major study and WSUP’s attempt to make this data readily available and accessible for WaSH practitioners, donors, researchers, institutional partners, governments, and international agencies.

Revisiting Subsidies for Water Supply and Sanitation Services
Convened by World Bank
Bellflower

The SDGs represent a major shift in global ambition with respect to access to water supply and sanitation (WSS) services. To attain this ambition, governments and policy makers must better assess how scarce public resources can be used most effectively within the water and sanitation sector.

This session will present the latest findings and policy recommendations from the World Bank’s upcoming flagship report on subsidies in the WSS sector. It will begin by investigating the current WSS subsidy challenge through innovative, data-driven estimation and analyses. Subsequently, the session will shift its focus towards the future. Given that the scarcity of public resources demands policy makers make tough allocative decisions across subsectors (e.g., networked vs. nonnetworked, access vs. consumption, etc.), policymakers must move beyond existing biases and acknowledge that all options entail tradeoffs. The session will present approaches and tools, including an innovative affordability metric, to guide policy makers in designing effective and efficient context-specific subsidies.
Blunder, Bloopers and Foul-ups: A WaSH Game Show. What Next for the Nakuru Accord?

*Convened by WASH Failures

**Windflower**

Shit happens, but it doesn’t always have to! Through an interactive game show starring WaSH “personalities,” we showcase some “if only I had known…” moments to demonstrate that despite best intentions, things do go wrong in development and engineering projects. By sharing and understanding things that go wrong, sometimes at the expense of communities and often at the expense of donors, the WaSH Community of Practice can learn from one another’s mistakes and improve the way we operate.

The aim of this side event will be to raise awareness of failures in WaSH and the importance of sharing and proactively addressing them to ensure better outcomes in projects, and to promote “The Nakuru Accord: Failing better in the WaSH sector.” Additionally, it will encourage participants to get involved in an emerging research project to understand how we can best learn from WaSH failures to improve our practice. The event will use a game-show format where experienced WaSH professionals will be asked to share past failures and the audience will have to identify which stories are real. WaSH personalities will highlight that no matter how successful you are, you still make mistakes which you have learned from, and which it would be useful for others to know about.

Keeping up with the Kumars: Leveraging Dynamic Signaling for Sanitation-related Behavior Change in India

*Convened by University of Pennsylvania Social Norms Group

**Mountain Laurel**

Sanitation program implementers should acknowledge the role of socially conditional preferences in the cessation of open defecation to inform the design of their intervention content and implementation approaches. Programs should consider leveraging social influence in the context of behavior change interventions while also acknowledging and addressing other key behavioral antecedents and determinants of improved sanitation behaviors.

The purpose of this side session is to present and discuss lessons learnt from a practical application of Bicchieri’s Social Norms Theory and collective behavior diagnosis approach that centers around the design and evaluation of a norms-centric intervention. The side session will begin with a brief overview of Social Norms Theory and continue with a series of learning presentations that use LENNS to highlight how theory can be incorporated into various aspects of study or program design, from formative work to intervention design and evaluation. Learning presentations will be followed by an open forum discussion regarding lessons learnt and evidence-based recommendations for the practical application of theory, the diagnosis of collective WaSH behaviors, and intervention design more generally.

Barrier Analysis Orientation: A Formative Research Tool for Identifying Significant Behavioural Determinants to Increasing Impact

*Convened by World Vision International, Curamericas, Mercy Corps

**Azalea** (session continues from 8:30-10:00 a.m., see previous description)
LUNCH
12:00–1:00 p.m.
Trillium Dining Room, plus special sessions in Sunflower, Magnolia

LUNCH OPTIONS
First, go through the buffet line to pick up your lunch, then choose one of these locations to eat (details below):

• Networking Lunch, Trillium Dining Room
• The New USAID, New Congress, and... the Same Administration, Sunflower
• Spotlight on Careers in WaSH, Magnolia

NETWORKING LUNCH
Trillium Dining Room
12:00–1:00 p.m.

Connect with colleagues old and new over lunch in the main dining hall.

THE NEW USAID, NEW CONGRESS, AND... THE SAME ADMINISTRATION
Sunflower
12:10–1:00 p.m.

Congress has finally approved the biggest reorganization of USAID in 30 years—just as it also approved a nearly 9% jump in WaSH funding, more than other development sectors and the highest for WaSH yet. Congress keeps saying “no” to the proposed cuts by Trump Administration—is that going to last? What should our focus be now? Hear how the big agency reorganization affects water and related sectors in the field, and the prospects for the U.S. government’s role in water, including and beyond USAID. Even for organizations not funded by USAID, these policies affect other governments and private sector companies.

Vida Duti, Country Director of IRC Ghana
At IRC, Vida Duti’s work focuses on WaSH sector change management and partnerships for sustainable service delivery. Vida is a governance, organisational and systems development expert with over 20 years working experience with national and international entities. Vida Duti is the winner of the 2019 OPEC Fund for International Development Annual Award for Development in recognition of her work and engagement in ensuring sustainable water, sanitation and hygiene services for the population of Ghana.
PLENARY SESSION
1:00–2:30 p.m.
Grumman Auditorium

Breaking Up is Hard to Do—Planning an Exit Strategy

Many WaSH development partners have adopted a “systems approach” that seeks to strengthen the bureaucratic, social, technical, and financial systems in which service delivery takes place. But systems change is difficult and slow, and there is often no shared vision, understanding, or measurement framework for what is to be achieved. This plenary panel will examine the institutional frameworks, financial health, and service provider performance that signal that development partners can exit, leaving governments and service providers to manage the system without external support. Panelists will also address how to plan an exit strategy from the beginning of an intervention and the role of various stakeholders in determining such an exit strategy.

MODERATOR
Clarissa Brocklehurst, Adjunct Professor, Environmental Sciences and Engineering, The Water Institute at UNC

Clarissa Brocklehurst is a water supply and sanitation specialist with experience in facilitating policy debate. As Chief of WaSH at UNICEF, she provided leadership to the organisation’s large-scale water, sanitation and hygiene programme, and also played a role in development of strategy and advocacy for the global water supply and sanitation sector. She was instrumental in the establishment of the Sanitation and Water for All partnership, a global alliance that seeks to strengthen government systems and encourage evidence-based decision-making. She currently chairs the Strategic Advisory Group that guides the WHO/UNICEF Joint Monitoring Program (JMP) and the UN Water Global Assessment and Analysis of Sanitation and Water (GLAAS). She edits the WaSH Policy Research Digest published by the Water Institute at UNC.

PANELISTS

Eleanor Allen, CEO, Water for People

Eleanor Allen is a compassionate truth-teller and advocate of empowered equality for people across the globe. She is a world-leading water expert dedicated to helping billions of people access safe and sustainable water and sanitation services needed to save lives, stay healthy, find jobs, and thrive. Eleanor is fiercely passionate about improving the state of the world with respect to water and sanitation. She has dedicated her career to this goal, first as a Peace Corps volunteer in the Dominican Republic, then as a consulting engineer (at CH2M/Jacobs and Arcadis), and now as the CEO of Water For People. As a professional civil engineer, Eleanor has lived and worked all over the world. As a business executive with extensive experience in water, she has led large global and regional operations in consulting, project management, program management, business development, and engineering. Eleanor believes societal change can be accelerated through social entrepreneurship and the efforts of organizations like Water For People.

Osei Assibey Antwi, Metropolitan Chief Executive (Mayor), Kumasi Metropolitan Assembly

Osei Assibey Antwi was nominated in 2017 by Ghanaian President Nana Addo Dankwa Akufo-Addo to be the Chief Executive of Kumasi Metropolitan Assembly. The Kumasi Metropolis is the second largest city in Ghana and the administrative capital of the Ashanti Region. It is a fast growing city with an estimated population of more than two million people and an annual growth rate of about 5.4%. Mr. Assibey Antwi holds an MBA in marketing and has 20 years experience in senior management positions within both the public and private sector. His past positions include serving as Deputy Regional Minister in Ashanti Region, and as Assistant Inspector of Taxes at the Ghana Revenue Authority.

Vida Duti, Country Director, IRC Ghana

Vida Duti has 20 years working experience with national and international entities in the areas of community development and poverty reduction; gender and development; capacity development of local government actors; democratic governance and public sector reforms. Vida was the Country Team Leader for Triple-S (Sustainable Services at Scale) Ghana and she is currently involved in WaSH policy and sector change management processes, which is resulting in transformational changes and partnerships for sustainable water service delivery. She has in-depth experience in the design and management of different financing mechanisms including district performance-based grants and social investment funds.
Stuart Kempster, Policy Analyst for Monitoring and Accountability, WaterAid

Stuart Kempster is a political economist with over a decade of experience in international development. He leads WaterAid’s global policy work on sector monitoring, focusing in particular on evidence-informed decision making and the integration of political economy and systems approaches. Prior to joining WaterAid, Stuart’s experience included roles with global think tanks and local community-based organisations, working on a range of policy issues related to poverty and inequality.

Peter Opwanya, Reg. Engineer, ERB, MUIPE, Technical Support Unit, Ugandan Ministry of Water and Environment

Peter Opwanya is a Water and Sanitation Specialist and also doubles as the Team Leader for the Technical Support Unit 6 under the Rural Water Supply and Sanitation Department in the Ministry of Water and Environment in Uganda, providing technical support to 16 districts in mid-western Uganda on Water, Sanitation and Hygiene/Integrated Water Resources Management (IWRM) related issues. Peter has more than ten years of professional experience in Civil/Water Resources Engineering/Management, construction supervision and design spanning across water supply and sanitation systems. He is a member of the Uganda Institution of Professional Engineers and a Registered Engineer with the Uganda Engineers Registration Board. He has been in the WaSH/IWRM sector for over 10 years and holds a Bachelor of Engineering (B.Eng.) Degree in Civil and Building Engineering from Kyambogo University as well as a Master of Science in Water Resources Engineering from the Katholieke Universiteit Leuven and Vrije Universiteit Brussels, in Belgium. Prior to joining the Ministry of Water and Environment, he worked as a Research Associate at the Katholieke Universiteit Leuven in the framework of the STEP-WISE/SIPE Projects funded by the European Commission (Framework Programme 7), and as a Water Engineer at Soroti District Local Government.

VERBAL PRESENTATIONS
2:30 p.m.–3:30 p.m.

MONITORING & EVALUATING TOOLS

Redbud
Development and Reliability of a Novel Personal Hygiene Metric: Implications for Holistic WaSH Program Evaluation
Maryann deLea, University of Pennsylvania/Emory University

Findings from the Implementation of the First Cross-culturally Validated Household Water Insecurity Experiences (HWISE) Scale in Zambia and Democratic Republic of Congo
Sera Young, Northwestern University

Effectiveness of SMS Messaging for Diarrhoea Measurement: A Factorial Cross-over Randomised Controlled Trial
Ryan Rego, University of Warwick

HOUSEHOLD WATER QUALITY

Dogwood
Integration of Household Water Filters into the Community-based Environmental Health Promotion Programme in Rwanda
Abigail Bradshaw, University of Colorado Boulder

Machine Learning and Spatial Data Analysis Applications in Modeling Risks of PFAS Substances in Private Well Water
Javad Roostaei, Gillings School of Global Public Health, University of North Carolina

Rural Water Service Provision: 5 Years of Experience in 40 Communities of Mexico
Ane Galdos Balzategui, Cantaro Azul
## LATRINES

### Bellflower

**Effectiveness of Sundara Grama: A Behavior Change Intervention to Increase Latrine Use in Rural India**

*Bethany Caruso, Emory University*

**Latrine Reconstruction Decisions and Predictors in Flood-affected Households in Ethiopia**

*Katherine Chambers, University of Colorado Boulder*

## WATER SOURCE SELECTION

### Windflower

**Drinking Water Quality and Source Selection in Central Appalachia**

*Hannah Patton, Virginia Tech*

**Drivers and Barriers Affecting Water Source Choice in Kibera, Kenya**

*Victoria Trinies, Centers for Disease Control and Prevention*

**The Difference a Day Can Make to Safe Water Access in Bangwe Slum in Malawi**

*Heather Price, University of Stirling*

## BABYWaSH

### Mountain Laurel

**Formative Research for Development of Evidence-based BabyWaSH Interventions to Reduce Exposure to Fecal Pathogens (REDUCE Program)**

*Jennifer Kuhl, Johns Hopkins School of Public Health*

**Formative Research for the Design of a BabyWaSH Mobile Health Program (CHoBI7 mHealth Program)**

*Shwapon Biswas, Johns Hopkins School of Public Health*

## EQUITY IN WaSH

### Azalea

**Incorporating Equity into the Sanitation Service Chain**

*Zachary Burt, Athena Infonomics*

**Water, Sanitation, and Hygiene Access for People with Disabilities: An Analysis from 14 Countries**

*Wren Tracy, The Water Institute at UNC*

**Will the United States Meet Sustainable Development Goal 6, Water and Sanitation for All?**

*Colleen Naughton, University of California Merced*
NETWORKING BREAK
3:30–4:00 p.m.
Atrium

VERBAL PRESENTATIONS
4:00–5:00 p.m.

COLLECTIVE ACTION

Redbud
An Enhanced Rotational Cleaning System Among Shared Toilet Users in Lusaka, Zambia
JenaLa Chipungu, Centre for Infectious Disease Research in Zambia

Savings Groups: Unlocking Financing for Rural Water Operations and Maintenance
Chris Prattas, The Water Trust

Social Capital and Community Health Clubs in Haiti
Jason Rosenfeld, University of Texas Health Science Center, San Antonio

HUMANITARIAN WaSH

Dogwood
Effectiveness of the Three Water Trucking Interventions in Humanitarian Emergencies
Mustafa Sikder, Tufts University

Field-trial of an Automated Chlorinater at Shared Water Points in a Rohingya Camp, Cox’s-Bazar, Bangladesh
Mahbubur Rahman, icddr,b

WaSH Coordination in Humanitarian Response: Evidence Summary
Travis Yates, Tufts University

Supporting Adoption of Solar Pumping Solutions Among Humanitarian Actors: 10 Country Learning on Common Misconceptions
Alberto Ibanez Llario, United Nations Agency for Migration (IOM)

WOMEN & WaSH

Bellflower
Strengthening Evidence of Gender Outcomes in WaSH: A Review of Methodologies for Gender Evaluation
Jess MacArthur Wellstein, Institute of Sustainable Futures (ISF)

Women as WaSH Change Agents
Rachel Rose, iDE

Women’s Empowerment through WaSH Enterprises in Vietnam, Indonesia and Cambodia
Jess MacArthur Wellstein, Institute of Sustainable Futures (ISF), on behalf of Melita Grant, University of Technology Sydney
Fecal Contamination

Windflower
Risk Factors of Human Fecal Contamination in Urban Mozambican Households in the Mapsan
David Holcomb, University of North Carolina Chapel Hill

Unveiling Pathogen Hazards Associated with Sanitation Technologies in Tamil Nadu
Musa Manga, The Water Institute at UNC

Using Fecal Sludge for Surveillance and Health Impact Assessment in Maputo, Mozambique
Drew Capone, Georgia Institute of Technology

Drinking Water Chlorination

Mountain Laurel
Disinfection By-product Formation in Drinking Water Systems Using a Unique Chlorine-based Disinfection Agent, Trichloroisocyanuric Acid
Megan Lindmark, University of Iowa

Recommendations for Bucket Chlorination Implementations in Emergency Contexts and Cholera Outbreaks
Gabrielle String, Tufts University

WaSH Interventions’ Effect on Acute Malnutrition in Children Under 5: A Systematic Review
Heather Stobaugh, Action Contre La Faim (ACF)

Three Drinking Water Chlorination Intervention Evaluations in Cox’s Bazar Refugee Camps
Mustafa Sikder, Tufts University

Sanitation Transmission Pathways

Azalea
Faces, Fingers, Fomites & Flies: What Do We Know About Human Behaviour and Trachoma Transmission?
Katie Greenland, London School of Hygiene & Tropical Medicine

Got Worms? Thank Your Neighbor! Herd Protection Against Soil-Transmitted Helminths
Per Ljung, East Meets West/Thrive Networks

READY: Global Readiness for Response to Major Disease Outbreaks: Case Studies on WaSH Links to Cholera and Ebola Outbreaks
Marielle Snel, Save the Children

Poster Reception

5:00–6:30 p.m.
Atrium

Evidence

1. Power with Data: Improved WaSH Evidence-based Decision-making in Africa
   Anahit Gevorgyan, DAI

2. Measuring the Impact of Capacity Development on WaSH: Baseline findings from Lokabaya and Abeshege, Ethiopia
   Kelly James, CAWST
3. Understanding the Current State of WaSH Infrastructure Maintenance in Schools: Successes, Challenges, and Opportunities  
Christine Pu, Stanford University

4. From Aspirations to Reality: Crunching the Numbers on Universal WaSH Services  
Angela Huston, IRC

5. The Value of a Data Standard for the Urban Sanitation Sector  
John Peter Archer, Gather

6. Robust Baseline Assessment: An Answer to Effective Decentralised Solid Waste Management – Insights from Indian State of Bihar  
Asad Umar, Aga Khan Foundation

7. Tracking Scale-up of Continuous Water Services in Hubli-Dharwad, India  
Narayan Billava, Centre for Multi-Disciplinary Development Research

8. Road Map to Prioritise WaSH in Schools for Sustainability Development  
Patricia Acهماpong, Loughborough University, WEDC

9. Using mWater for Faster Response to Fix Water Points Post Cyclone Idai in Malawi  
Kelly Alexander, CARE

**FINANCE & POLICY**

10. Making Water Infrastructure Last Longer at a Lower Cost in the Arid Lands of Kenya  
Tom Wildman, Oxfam GB

11. Solving Legal Challenges for Sanitation in Abidjan, Côte d’Ivoire  
Lassina Togola, PSI

12. A Model to Cost Environmental Health Services in Health Care Facilities  
Darcy Anderson, The Water Institute at UNC

13. A Leg-up on the Sanitation Ladder: The Role of Community Promoters  
Per Ljung, East Meets West Foundation

14. Assessing Maintenance Interventions to Improve the Sustainability of Rural Water Services Using System Dynamics Modelling  
Pranav Chintalapati, University of Colorado Boulder

15. A Simple Life Cycle Budget Calculator for WaSH in Kenyan Schools  
Jordan Brands, Emory University

Bernard Elegebe, ABMS/PSI

17. Regulation of Small-scale Providers is Both Possible and Promising: Evidence from Mozambique  
Heather Skilling, DAI

**HEALTH & BEHAVIOR**

Nelson Ekane, Stockholm Environment Institute

19. WaSH Projects and Fight Against Malnutrition in the Bounkani (Côte d’Ivoire) Rural Areas  
Alassane Ouattara University

20. Expanding Toilet Use Among Families in Chittoor District (Andhra Pradesh) Through Behaviour Change Communication  
Sanjay Singh, PSI India

Benjamin Abuehl, Eawag

22. Conceptualizing ChickFlows in Maputo, Mozambique: High-risk Behaviors and Pathways for Childhood Exposure to Chicken Feces  
Frederica Lamar, Emory University
23. Exploring the Relationship Between Fecal Exposure Pathways and Enteric Infections in Children in Vellore, India  
   Sydney Hubbard, Emory University

24. A J-OP Case Study: Dakar, Senegal  
   Tyler Ovington, Sanitation Technology Platform at RTI International

25. Results of a Fecal Sludge Management Total Market Assessment in Cambodia  
   Jennifer Marcy and John Sauer, PSK/PSI Cambodia

26. Feedstock Adequacy For a J-OP in One Indian City: Findings from a Multifunctional Study in Tiruppur, India  
   Andrea Stowell, Sanitation Technology Platform at RTI International

27. The Sludge Treatment Site in Sittwe and the Future of FSM in Humanitarian Response  
   Alberto Acquistapace, Solidarities International

28. Experimental Determination of the Moisture Sorption Isotherm (MSI) of Fresh Faeces  
   Claire Remington, University of Victoria

29. Follow the Money: Increasing Safely Managed Sanitation with Positive Economics of Feces Reuse  
   Naomi Korir, Sanivation

30. Decision-making and Practices of Fecal Sludge Management Service Providers in Rural Bangladesh  
   James Harper, University of Colorado Boulder

31. Market Study About Commercializing Faecal Sludge–based Briquettes in Uganda  
   Scott Roy, Whitten & Roy Partnership

32. The World’s Fecal Biomass: Discharge of Susceptible and Antibiotic Resistant E. coli by Sanitation Systems  
   David Berendes, Centers for Disease Control and Prevention

33. Assessing Women’s Empowerment in WaSH: Key Findings from a Systematic Review  
   Bethany Caruso, Emory University

34. Environmental Justice and Disaster Recovery: The Role of Citizen Science and Fecal Indicators  
   Gracie Hornsby, North Carolina State University

35. Lead (Pb) Mitigation of Handpumps in Madagascar: Impact of Social Marketing and Improved Technology on Water Quality and Children’s Health  
   Adaline Buerck, University of South Florida

   Emanuele Sozzi, The Water Institute at UNC

37. The CLARifier Kit for Emergencies (CLARKE): A Novel Water Treatment System  
   Caetano Dorea, University of Victoria

38. Water, Sanitation and Hygiene (WaSH) Facilities in Primary Health Care Centers in Ogun State, Southwest Nigeria  
   Enovwo Odjegba, Federal University of Agriculture, Nigeria

39. Assessment of Stormwater Drain Pollution in Non-sewered and Partly Sewered Urban Locations in Tamil Nadu  
   Rajesh Ramamoorthy, Indian Institute for Human Settlements

40. Fluoride Removal in Drinking Water with Augmented Bentonite and Community Perceptions in Arusha, Tanzania  
   Kara Okular, Duquesne University

41. From Pathogens to Pharmaceutical Waste: A Field-friendly Tool for Low-cost, Rapid Water Quality Analysis  
   Julius Lucks, Northwestern University
SIDE EVENTS
8:30–10:00 a.m.

What the Nudge? Integrating Nudges into Handwashing Behavior Change Program
Convened by Global Handwashing Partnership, Catalyst Behavioral Sciences and Duke University, USAID, London School of Hygiene and Tropical Medicine, FHI 360, Splash
Redbud

This session will explore the theory and practice of “nudging”, covering the scientific evidence base (including beyond WaSH), and practical examples of integration with handwashing behavior change. Nudges are cues that influence people to behave in a certain way, without forcing them explicitly to change. However, ‘big questions’ remain about the science behind nudges, their potential to create lasting change in hygiene habits, and the practicalities of including them in programs.

This session will be an extended, nuanced discussion on what nudges are, why they matter, and how they can be used. Common questions about nudges will be answered, including:
• How do nudges relate to habit formation?
• Are nudges different from reminders?
• Does the impact of a nudge last after the nudge itself is gone?
• Can nudges be implemented at scale?
• What is the appropriate balance between nudges and information-based approaches?

Understanding Demand for WaSH Services: How Much are Consumers Willing to Pay?
Convened by Harvard Kennedy School of Government, The Aquaya Institute, Water and Sanitation for the Urban Poor
Dogwood

Reaching the SDGs for water and sanitation will require substantial additional investments. Leveraging consumer demand is key to meeting the SDGs in a “sustainable” way—first, because it unlocks a significant source of funding, but secondly, because if consumers have sufficient demand for WaSH products and services, they will pay to maintain and even improve their existing situations.

In this workshop we will discuss some of the latest empirical findings for consumer WTP, including tenant WTP for chlorinated water and sanitation quality; urban water utility customers’ WTP for cross-subsidies to improve sanitation in poorer neighborhoods; landlord WTP for pit emptying and sewer connections; and rural handpump reliability provided by contracted maintenance services. We will discuss the different methods used to assess WTP in each setting, including vouchers, experimental auctions, hedonic pricing, contingent valuation, and discrete choice experiments. We will also discuss the implications of the magnitude of the values measured with these methods for mobilizing funds and improving water and sanitation coverage and quality.

Applying Gender Analysis to Achieve Citywide Inclusive Sanitation: Findings from the BMGF CWIS Initiative
Convened by Iris Group International
Bellflower

The Sustainable Development Goals have clear targets for WaSH and for marginalized groups’ access to WaSH resources, especially for women and girls. Making progress towards these targets requires specific tools that reveal the needs of excluded groups and pinpoint ways in which programs and policies can be improved in pursuit of inclusive WaSH outcomes.

Under the Bill & Melinda Gates Foundation funded City-Wide Inclusive Sanitation (CWIS) Initiative, Iris Group, in coordination with CWIS partners, is implementing gender analysis and integration activities to examine the influence of gender on urban sanitation in eight cities in five countries (Bangladesh, India, Senegal, Uganda, and Zambia). Using a standardized gender analysis and integration methodology, the work aims to understand the gendered dimensions of urban sanitation and identify recommendations for mainstreaming gender in city sanitation plans.

This session will begin with a panel discussion with panelists representing several of the eight CWIS cities and will sharing highlights from the gender analysis and integration findings as well as updates on how their respective cities are taking actions to address the recommendations. Following the panel discussion, participants will be invited to a crowd-sourcing exercise using the Graffiti Wall Research Method to identify and reach consensus on the critical components of gender integrated inclusive sanitation.
Professionalized Customer Support to Increase Quality, Accountability, Collaborative Practice, and Mobilize Popular Support for WaSH
*Convened by* IRC Ghana, Netcentric Campaigns, Asutifi North District Assembly, Conrad N. Hilton Foundation

**Windflower**

When there is a long-broken component or a consistent failure anywhere across a system providing safe sustainable water, sanitation and hygiene, the break is not only an indication of a part missing, a fee uncollected or a piece of hardware failed, but a visible symptom of a failure rooted much deeper and harder to fix. Our field work and research indicate that the biggest challenges confronting transformation of WaSH services stems from attitudes, behaviors and operations that suppress, ignore, miss or forget the issues and suggestions of those most dependent on fragile and underfunded systems. The deepest scar in WaSH failures are when people served, or even the staff assigned, no longer even bother to notice, complain, or shoulder basic rights and responsibilities.

In this session, participants will be guided into very engaging peer to peer exercise to focus perspectives on “great customer service” then work together to brainstorm about the ways to apply those lenses to work on WaSH. The project designers, implementors, and the local government officials managing the customer service WASH DESK will be on-hand to share their experience and obtain inputs to improve and continue to evolve their work. They also hope to inspire others to adapt this innovative network building approach in large scale multi-partner WaSH projects.

Using Sanitary Inspections to Assess and Address Risk from Sanitation Systems
*Convened by* World Health Organization

**Mountain Laurel**

Sanitary inspections consist of a short-standardized observation checklist to identify risk factors at or near a water supply system that may lead to contamination of drinking-water. Sanitary inspections have been commonly used as a simple risk assessment tool to support water safety plans for small community supplies and have been used in surveillance programmes to define regional or national priorities. However, there are no equivalent standard forms for inspection of sanitation technologies and systems.

The World Health Organization recently developed sanitary inspection forms to support risk assessment and management of simple sanitation systems. The development and use of standard sanitation inspection forms can promote improvement of the quality, quantity, accessibility of sanitation facilities and services along the sanitation chain from the household to end use/disposal. The tool could be adapted and used by stakeholders to identify the scale of risk in a given setting and the appropriate actions that are required to safeguard public health from sanitation-related risks.

Sustaining Market-based Sanitation: Designing Viable Sanitation Enterprises
*Convened by* USAID, UNICEF

**Azalea**

Local businesses play an essential role in the delivery of on-site sanitation to the underserved, insofar as it is impossible to move communities up the sanitation ladder without offering them the opportunity to act upon the motivation and financial ability to purchase and install a toilet. At the same time, the value proposition of selling toilet to the poor – particularly the rural poor – is often insufficient to attract private sector actors.

A number of donor-funded market-based sanitation programs have contributed to significant sales by nurturing the local private sector with varying levels of technical and financial support. These programs have generated a rich trove of intelligence as to both the market-level and firm-level barriers to sustainability and scale of sanitation enterprises in different settings. This event will consist of a presentation on the results of the USAID/WASHPaLS enterprise viability analysis and the WASHPaLS enterprise viability Toolkit followed by a group-based learning activity and a facilitated Q&A.

State of the Art Condominial Sanitation Systems within the Framework of the Optimal Sanitation Initiative
*Convened by* IADB

**Sunflower**

Condominial Sewerage, a participatory, simplified piped sewerage technology invented in Brazil in the 1980s, has the capacity to serve crowded urban and peri urban slums with a sanitation solution. In addition to being, in many cases, the only solution which can adapt to complex crowded neighborhoods, it is much cheaper to install than conventional sewerage systems. It has been installed in close to one thousand municipalities in Brazil and in more than twenty countries internationally. It is a key tool in approaching SDG 6.2 of universal sanitation for all.
The panel will feature several Brazilian practitioners, each with close to 40 years’ experience working in large scale projects in Brazil and internationally. They will discuss recent innovations; important differences between Condominial and conventional sewerage; keys to success in scaling the technology up, including using a block of houses as a decision making unit; and the importance of parallel solutions such as improving the management of sludge from individual solutions. The presentation will include an overview of the technology, a roundtable discussion including the perspectives of three public utilities: one which uses Condominial technology citywide, one which uses it only in slum areas and one which has no solution available for unplanned areas. There will also be a presentation on the newly released SaniBID software, a free downloadable QGIS plugin which allows users to plan systems quickly and easily.

NETWORKING BREAK
10:00–10:30 a.m.
Atrium

SIDE EVENTS
10:30 a.m.–12:00 p.m.

The Maputo Sanitation (MapSan) Trial: Measuring Health, Environmental, and Social Impacts of an Urban Sanitation Intervention in Mozambique

Convened by Georgia Institute of Technology, London School of Hygiene and Tropical Medicine, University of North Carolina at Chapel Hill, Water and Sanitation for the Urban Poor, Bill & Melinda Gates Foundation, USAID

Redbud
This side event is a proposed in-depth discussion of the largest controlled health impact trial of an urban sanitation intervention to date: the Maputo Sanitation (MapSan) Trial. This is a controlled before-and-after impact evaluation of an onsite, shared private sanitation intervention on the health of children less than five years old living in unplanned, low-income neighborhoods of urban Maputo, Mozambique. The sanitation intervention, implemented by Water and Sanitation for the Urban Poor, included pour-flush latrines to septic tanks with soak-away pits. We collected data from intervention and control sites in three phases between February 2015 and September 2018: baseline (pre-intervention) and 12- and 24-months after the intervention had been implemented.

The goal of this panel discussion is to (1) provide a concise description of study findings for health outcomes, environmental measures, and social research; (2) place these findings in the context of urban sanitation and sanitation impact research more broadly.

From Data to Decisions: Promoting Evidence-based Decision Making through External Investments in Country-led Monitoring

Convened by WaterAid

Dogwood
There is a long history of attempts by external development agencies to strengthen monitoring within the WaSH sector. However, this has not always been matched by progress in the use of data for decision-making. This challenge of promoting the use of data for decision-making is not unique to the WaSH sector. In this respect, much can be learned from disciplines such as behavioural science and political economy, which seek to understand the cognitive elements of decision-making and the institutional processes and incentives that shape how data is used by decision makers.

This session will place discussions about the monitoring of WaSH service levels within this wider discourse on evidence-informed decision making, and examine how development partners can strengthen country-led monitoring processes in ways which promote the use of data. Case study research from WaterAid will be presented, examining the extent to which recent investments in WaSH monitoring reflect what is known about decision-making from a political economy and behavioural science perspective. This will be followed by perspectives from development partners and government representatives as to how existing practices can be strengthened to ensure that stronger country monitoring systems lead to better decisions, not just better data.
Sanitation Workers: The Missing Link in the Sanitation Chain  
Convened by World Bank, WaterAid, ILO, World Health Organization  
**Bellflower**

Without sanitation workers, the sanitation service chain will not function. Yet, sanitation workers are generally taken for granted in sanitation improvements and their – often terrible working conditions – remain invisible. Recurrent news items about “sewer deaths”, “pit collapse” and disease burdens (not only for manual emptiers!) are considered incidents rather than part of a structural problem requiring a systematic solution. The SDG framework, with SDG 6.2 highlighting sanitation services and being rooted in the human right to sanitation (right to sanitation cannot come at the expense of the rights of the workers) and SDG 8 focusing on decent work, offers an opportunity to revert this situation.

In this workshop, we want to bring together data on the situation across several countries in Asia, Africa and Latin America, and reflect how OHS in the sanitation service chain can be addressed in a more systematic and effective way. We will consider the importance of reliable data, regulation as well as the worker’s capacity and perceptions. We hope that participants will see the weight of the issue, setting a common agenda for the future.

Missing Puzzle Pieces? The Role of Social Constructs in WaSH Program Design, Targeting and Evaluation  
Convened by Emory University, Eawag, Center for Medical Humanities & Ethics at the University of Texas Health Science Center at San Antonio, University of North Carolina, University of Zürich, University of Pennsylvania  
**Windflower**

While progress has been made, the WaSH sector still seeks to elucidate the role of interpersonal factors in the success or failure of program interventions at individual, household, and community levels. Theory and evidence suggest that social constructs may be instrumental to the operation and maintenance of WaSH infrastructure and the adoption of improved WaSH practices, which may influence downstream health and development outcomes. However, the sector continues to overlook key social constructs known to influence behavior change and collective action. Overlooking or underestimating the role of social constructs in the uptake and effectiveness of WaSH interventions may result in the attenuation of intended WaSH program outcomes, including behavior change and maintenance, and gains in health and development.

The overarching goal of this side session is to draw attention to the role of social constructs in WaSH programming. More specifically, the purpose of this interactive event is to provide space for session conveners and participants to present, share, and discuss results and evidence-based recommendations emerging from examinations of social constructs that can be used to strengthen WaSH programming and evaluation.

Selecting a Handwashing Station: Understanding User, Market, and Environmental Constraints to Inform Selection for Your Use Case  
Convened by MSR Global Health, Tufts University, Global Handwashing Partnership  
**Mountain Laurel**

Handwashing with soap at critical times is fundamental to good health; and the Sustainable Development Goals target is for everyone to have access to a handwashing station by 2030. Currently, access is below 10% in some countries. As practitioners work towards this target, many face challenges in selecting or developing the right handwashing station for their setting. Sustainable, convenient, and desirable handwashing stations respond to the physical demands of a given context, and to the needs and desires of their users. These considerations vary by behavioral and social setting, environment, and other factors.

This session will use design principles to help participants understand and apply the technical requirements and user needs for handwashing stations in diverse contexts.

Debunking Myths About Market-based Approaches in “Difficult” Contexts  
Convened by Oxfam GB, Water for Good  
**Azalea**

If we’re serious as a sector about tackling SDG 6.1 and specifically the “last mile,” we must tackle the world’s most difficult contexts—and this includes, chronically vulnerable, fragile, conflict-affected, and remote rural areas. However, engaging private sector actors and financing sustainable solutions in these contexts is challenging, as there’s no “win-win” situation where we can both make profits and keep prices affordable for the poorest—the numbers just don’t work out.
In this session, we’ll examine in an evidence-based manner how to drive efficiency and affordability for the “last mile”, i.e. proving that market-based approaches can, in fact, be appropriate in these types of places – but require different types of partnerships and financing models. We will provide insights into how we can approximate data to make sound decisions when exact data is not available; describe key metrics and cost data to determine financial feasibility; and unpack the problem by examining issues such a testing the feasibility of ideas and building new models.

LUNCH
12:00—1:00 p.m.
Trillium Dining Room, plus special sessions in Sunflower, Magnolia

LUNCH OPTIONS
First, go through the buffet line to pick up your lunch, then choose one of these locations to eat (details below):

- Networking Lunch, Trillium Dining Room
- Technology and Innovation Showcase, Sunflower
- Spotlight on Careers in WaSH, Magnolia

NETWORKING LUNCH
Trillium Dining Room
12:00—1:00 p.m.
Connect with colleagues old and new over lunch in the main dining hall.

TECHNOLOGY AND INNOVATION SHOWCASE
Sunflower
12:10—1:00 p.m.
The Technology and Innovation Showcase is an exciting platform to engage with the innovators who are developing solutions to water, sanitation and hygiene problems. In a rapid-fire style presentation, companies will introduce their WaSH technologies and discuss how they have been or will be put to work in households and communities. Participants will have an opportunity to connect with innovators and learn about available technologies.

SPOTLIGHT ON CAREERS IN WaSH
Magnolia
12:10—1:00 p.m.

Laura R. Brunson, Program Director, MWA
Laura joined MWA in 2017 to serve as the Program Director. She holds a Ph.D. and M.S. from the College of Engineering at the University of Oklahoma. Dr. Brunson’s research focused on fluoride and arsenic removal in emerging regions and was partially funded through graduate fellowships obtained at different times from the NSF and the EPA. She has a business degree, taught Social Entrepreneurship, examined business models for water implementation, and has worked in both the private and non-profit sectors. Prior to working for MWA, Dr. Brunson was a Director in the College of International Studies at the University of Oklahoma and served as a consultant for Emory University on water implementation in Rwanda.

Mohamed Selman Khalil, Programmes Director and Secretary to the Board of Directors, Engineers Without Borders Sierra Leone
With two decades of rich and diverse experience, Mohamed, has contributed in diverse capacities in the public/private/non–governmental institutions and the WaSH Sector in Sierra Leone since 2001. Mohamed supported the formation of EWB International, and is now supporting the establishment of the EWB Africa whose main focus is WaSH and WaSH infrastructure provision. Mohamed holds a bachelor’s degree in civil engineering from University of Liberia and a diploma in architectural drafting from Don Bosco Polytechnic.
Urban Sanitation and Integrated Urban Services Provision

Urban sanitation problems are getting worse overall, as most population growth is urban and progress to meet the sanitation needs of growing cities has been uneven. Densely populated environments allow for economies of scale in management, but experience specific challenges around space, conveyance, treatment, and disposal that require systems-based solutions. This plenary panel will address how to best develop and deliver integrated wastewater collection and treatment, drainage, solid waste management, and fecal sludge management for all urban residents. Panelists will also explore approaches for informal communities where high density, high proportion of renters, and informal or uncertain land tenure are constraints.

PANELISTS

**Sharmistha Debnath**, Executive Engineer, Survey Investigation & Research Division, Department of Public Health Engineering, Ministry of Local Government, Rural Development & Cooperatives—Bangladesh

Sharmistha heads the Survey Investigation & Research Division, which collects data on municipalities and prepares databases regarding water supply sanitation and septage management. Her division also provides technical support to different urban and rural projects linked with water sanitation and septage management. Sharmistha also is a member of the FSM Support Cell established in the Department of Public Health Engineering in collaboration with the Bill & Melinda Gates Foundation.

**Martin Gambrill**, Lead Water and Sanitation Specialist, World Bank

Martin is a Lead Water and Sanitation Specialist who has worked at the World Bank for over two decades on the preparation and implementation of water, sanitation, urban development and related investment programs in Africa, Latin America, Asia and Eastern Europe. He currently leads the Bank’s “Citywide Inclusive Sanitation” global initiative. Martin graduated from the University of Leeds in the UK with a B.Sc. in Civil Engineering and went on to obtain his PhD at Leeds on the treatment of wastewater for safe effluent reuse in irrigation. Before joining the Bank, he worked for non-governmental organizations, engineering consultants and in academic research.

**Eva Muhia**, Founder of Global Sanitation Environmental Projects

Eva is an authority in matters water and sanitation, an expert who has served in different capacities within water/sanitation value chains (from governance, leadership and advocacy, to social entrepreneurship and innovation) in a career spanning twenty years. Eva is the founder of Global Sanitation Environmental Projects—an environmental non-profit involved in research, advocacy and intervention programs such as Menstrual Health Waste Management and WaSH—and also serves as Deputy President of the Pan African Sanitation Actors.

**Andy Whiteman**, Director, WasteAware and RWA Group

Andy has 29 years’ experience on policy advocacy, programming and implementing waste management systems. Working extensively across the MENA region, Sub Saharan Africa, Asia, and the Caribbean, his focus is on pioneering new concepts, approaches and methodologies. Andy is preparing the methodology for SDG 11.6.1 for municipal solid waste, and through that process building linkages and synergies with other urban environment-related SDGs.
## VERBAL PRESENTATIONS

2:30 p.m.–3:30 p.m.

### BEHAVIOR CHANGE

**Redbud**
- Community Perceptions and Implementation Fidelity of a Multi-level Behavior Change Sanitation Intervention in Odisha, India
  *Gloria Sclar*, Emory University
- Effect of an mHealth Intervention with No Interpersonal or Material Components on Handwashing with Soap
  *Anila Gopal*, Unilever Lifebuoy
- Facilitators and Barriers to Sustained WaSH Behaviors for Household Members of Diarrhea Patients (CHoBI7 Program)
  *Elizabeth Thomas*, Johns Hopkins School of Public Health

### WaSH-RELATED HEALTH IMPACTS

**Dogwood**
- Estimating the Burden of Waterborne Disease in the United States
  *Sarah Collier*, Centers for Disease Control and Prevention
- Individual and Community Level Factors in Under-five Children Diarrhea Among Agro-ecological Zones in Southwestern Ethiopia
  *Bezuayehu Alemayehu*, Jimma University, Ethiopia
- The Effects of Water and Sanitation Conditions on Household Illness in Peri-urban Lusaka, Zambia
  *Sydney Hubbard*, Centers for Disease Control and Prevention

### FECAL CONTAMINATION & EXPOSURE

**Bellflower**
- A Multi-pathogen Behavioral Exposure Model for Young Children Playing in Public Spaces in Developing Communities
  *Stephanie Houser*, University of Iowa
- Comparison of SaniPath Exposure Assessments in Low-income Urban Areas in Eight Countries
  *Wolfgang Mairinger*, Emory University
- Fecal Contamination of the Environment and Child Health: A Meta-analysis Using Individual Participant Data
  *Frederick Goddard*, Emory University

### CULTURAL INFLUENCE

**Windflower**
- Water Borrowing is Widely Practiced, and Associated with Market, Infrastructure, and Public Health Failures Globally
  *Asher Rosinger*, Penn State University
- Rethinking Community: Prediction of Household Toilet Ownership is Sensitive to Geographical Scale Selection and Neighbors’ Characteristics
  *Jinyi Kuang*, University of Pennsylvania
### FINANCING WASH SERVICES

**Mountain Laurel**
- Moving Performance Improvement Plans from Myth to Reality: Emerging Evidence from Kenya  
  **JaPheth MBuVI, DAI**
- Sustaining Urban WASH Services through Finance and Governance Reforms in India: Ex-post Evaluation Lessons  
  **LesLIE HoDEL, Social Impact**
- What Drives Financial Viability of Rural Water Service Providers in Nepal?  
  **ToM WildMAn, Oxfam**

### NETWORKING BREAK

3:30–4:00 p.m.  
**Atrium**

### VERBAL PRESENTATIONS

4:00–5:00 p.m.

#### WEATHER & CLIMATE

**Redbud**
- Precipitation and Salmonellosis Incidence in Georgia, United States of America  
  **DeBBie LeE, Emory University**
- Quantitative Microbial Risk Assessment of Contaminated Private Wells Impacted by Hurricane Harvey Flooding  
  **Anna GitteR, Texas A&M University**
- WaSH in Pacific Island Countries: Baseline and Census Data from Fiji, Kiribati and the Solomon Islands. Key Results and Lessons Learned  
  **caRMen anthonJ, The Water Institute at UNC**

#### RURAL WATER SUPPLY

**Dogwood**
- Time, Economic and Health Benefits of the Transition to Rural Piped Water Systems in Southern Zambia  
  **JaMES WiNTeR, Stanford University**
- In-line Chlorination for Safe Drinking Water in Community-managed Systems in Rural Nepal  
  **YosHIKa crIDER, University of California Berkeley**
- Understanding Functionality of Hand Pumped Borehole Water Supply in Sub-Saharan Africa  
  **DoNAlD JoHN MacAllIStEr, British Geological Survey**
- Water Quality Testing Laboratories in Rural Nepal: Installation and Operation  
  **RuBIKAn ShreSTHa, Eawag**
**Bellflower**

*Impact of an Urban Sanitation Intervention on Fecal Sludge Management in Maputo, Mozambique*

**Drew Capone**, Georgia Institute of Technology

*Multidimensional Tradeoffs Across Sanitation System Alternatives in an Informal Settlement in Kampala, Uganda*

**John Trimmer**, University of Illinois Urbana-Champaign

*OCTOPUS (Operational Collaborative Tool for Ongoing Practices in Urgent Sanitation)—Reasons and Results*

**Marine Ricau**, Solidarités International

*Swachh Survekshan: Tool for Scaling-up Decentralized Wastewater Treatment (Faecal Sludge Management) Service Delivery in India*

**Kalimuthu Arumugam Pillai**, WASH Institute

**Windflower**

*Capacity-building for Improved WaSH Governance through Tracking and Analysis of Decentralised Budgets and Financial Systems*

**Ingeborg Krikkert**, IRC

*Political and Ethical Determinants of Water Quality Data Use in Rural Kenya*

**Saskia Nowicki**, University of Oxford

*Tackling the “Political Will” Problem: How Local Leadership Development Has Accelerated Sanitation Uptake in Cambodia*

**Allison Salinger**, WaterSHED

**Mountain Laurel**

*Can Social Motivators Improve Children’s Handwashing Behavior? RCT Evidence from Elementary Schools in the Philippines*

**Jeffery McManus**, IDinsight

*Do Toilets Keep Kids in School? Statistically Linking School Sanitation and Enrollment in Low- and Middle-income Countries*

**Leigh Hamlet**, University of Washington

**Azalea**

*Child Feces Management and Fecal Contamination of Hands and Stored Drinking Water in Rural Bangladesh*

**Mahfuza Islam**, icddr,b

*Child Feces Management and Fecal Contamination: Evidence from a Cross-sectional Study in Rural Odisha, India*

**Valerie Bauza**, Emory University

*Mothers’ Perceptions and Behaviors to Safe Child Feces Disposal Practices in Odisha, India*

**Rebekah Williams**, Emory University
# Detailed Schedule | Wednesday Oct. 9 (cont.)

## Poster Reception

5:00–6:30 p.m.

Atrium

### Evidence

1. Adapting Translational Research Approaches for Water, Sanitation, and Hygiene  
   Karen Setty, The Water Institute at UNC

   Umesh Chaudhary, World Food Programme, Nepal

3. Field Determination of Sand Size Distribution for Biosand Filter Construction  
   Kristen Jellison, Lehigh University

   Tracy Morse, University of Strathclyde

5. A Description of the Emergency WaSH Google Group  
   Dan Campbell, USAID

6. Preventing Failure in Rural WaSH Systems: Mapping and Modeling Rural Water Maintenance Approaches  
   Caleb Cord, University of Colorado Boulder

### Finance & Policy

   Jennifer Marcy, PSI

8. Increasing Women’s Participation in Water-related Decision-making by Transforming Social Norms  
   Christina Sudi, WARIDI

9. “Women Can Only Plant Onions”—Expanding the Role, Skills and Voice of Women Farmers  
   Kelly Alexander, CARE

10. Strengthening Rural Customer Care: Everflow Africa’s Annual Service Quality Meetings  
    Alison Filler, International Lifeline Fund

### Health & Behavior

11. Exploring Behavioral Factors, Caregiver Role, and Hardware for Safe Child Feces Management in Orissa, India  
    Gloria Sclar, Emory University and University of Zürich

    Rebecca Werner, The Manoff Group

13. Implementing a BabyWaSH Approach: Lessons Learned from Displaced Pregnant and Lactating Women in Nigeria  
    Bram Riems, UMR EMMAH

14. Water, Sanitation and Hygiene Are Highly Associated with Children’s Health in Remote Areas of Nepal  
    Regula Meierhofer, Eawag

### Sanitation

15. Study on Menstrual Hygiene Management in the DRC  
    Lise Lacan, UNICEF

16. Menstrual Hygiene Management in the Workplace and Women’s Economic Empowerment  
    Aditi Krishna, Iris Group

17. Putting a Gender Lens in Action: Case Studies from Sanitation Technology Demonstrations  
    Myles Elledge, Biomass Controls
18. Gender Inequity and Attitudinal Differences Across Genders Among Decision-Makers in Kenya’s Sanitation Sector  
   Zachary Burt, Athena Infonomics

19. Sustainable Urban Sanitation Solutions through Innovative Partnerships and Sanitation Complexes  
   John Apambilla Arudago, Habitat For Humanity International

20. Sustaining Open Defecation Free Status in Benin through the TIIMON Approach  
   Maryanne Leblanc, Medical Care Development International

21. Sanitation Realities and Anomalies: A Statewide Analysis of FSM in Urban Tamil Nadu  
   Rajesh Ramamoorthy, Indian Institute for Human Settlements

### WATER QUALITY

22. The Use of Membrane Filtration-based Fecal Indicator Bacteria Data to Study Drinking Water Quality  
   Mustafa Siddar, Tufts University

23. Improvements to Community Water Point Infrastructure Do Not Always Lead to Household-level Water Quality Improvement  
   Nicholas Lawrence, charity: water

24. Development of a Microbial Risk Assessment Sensor to Remotely Monitor Drinking Water Quality  
   Emily Bedell, University of Colorado Boulder

25. Improving Methods for Evaluating Waterborne Risk Under Field Settings  
   Camille Zimmer, University of Victoria

26. Emerging Technology and Its Critical Role in Rapid Water Quality Testing  
   Rick Johnston, UNICEF

27. Environmental Indicators for Norovirus and Hepatitis A in the Agricultural Environment: A Systematic Review  
   Courtney Victor, Emory University

28. Microbial Contamination of Drinking Water in Sub-Saharan Africa: Indicator Methods Versus Bacterial Community Composition  
   Jade Ward, University of Surrey & British Geological Survey

29. UV LED Disinfection and Fouling Mitigation During Drip Irrigation with Reclaimed Wastewater  
   Tara Randall, University of Colorado Boulder

30. A Coupled DNA Labeling and Sequencing Approach to Enumerate VNBC Vibrio spp. in Irrigation Water Sources  
   Leena Malayil, University of Maryland

   Rianna Murray, University of Maryland

32. Bacterial Characteristics of Community-associated Carbapenem-resistant Enterobacteriaceae  
   Emanuele Sozzi, The Water Institute at UNC

33. Efficacious Locally Available Cleaning Agents and Methods to Reduce Biofilms on Taps of Water Storage Containers  
   Patrick Mirindi, Tufts University

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**CONFERENCE DINNER**

6:30–8:30 p.m.  
*Trillium Dining Room*
SIDE EVENTS
8:30–10:00 a.m.

Resilient WaSH: A Strategy for Climate Change Adaptation
*Convened by* WaterAid America, IRC WASH, Water for People, Conservation International

**Redbud**

Improving the health and well-being of people and freshwater sources will be key to ensuring the resiliency of communities and ecosystems during times of change. Can WaSH as a strategy for climate change adaptation be a piece of solving this great challenge?

Delivering universal access to sustainable WaSH is a critical part of building resilience to the negative impacts of climate change, and should be considered a climate change adaptation mechanism. The 844 million poor and marginalized people who rely on unimproved drinking water sources will be increasingly vulnerable to climate change because such sources are highly exposed to climatic threats. Poor hygiene behaviors and lack of access to improved sanitation also increase vulnerability to climate change.

This event will discuss the success and challenges of WaSH as a strategy for climate change adaptation, the impact of climate change on WaSH and specifically on women and girls, and the policies that are needed to institutionalize resilient WaSH systems and shape climate policies to be inclusive of WaSH as an adaptation measure. We will demonstrate the importance of resilient WaSH services as an adaptation strategy for people and nature and how climate finance targets can go further to include the development needs of the poor.

Hygienic Environments for Infants & Young Children for Improved Growth: New Evidence and Interventions
*Convened by* USAID, Johns Hopkins Bloomberg School of Public Health, Clean, Fed & Nurtured Coalition, World Vision, icddr,b (Bangladesh), Cranfield University (UK), People in Need (Czech Republic), Action Against Hunger, FHI360

**Dogwood**

The goal of the session is to share evidence that begins to fill key gaps in understanding of infant and young child (IYC) exposures and risks affecting health and growth; and provide a forum for discussion on next steps for evidence-based programming at a time when findings from several RCTs have left many in doubt of how to proceed. Recognizing the evidence gaps in exposure pathways as well as interventions to break these under-studied pathways, this side session will highlight the latest evidence linking child stunting to deficiencies in WaSH, and then highlight pioneering research to protect IYC from direct and indirect exposure to human and animal feces.

Going beyond a series of rapid-fire presentations, the session will be tightly facilitated to allow for extensive questions and focused debate to unpack implications of the current evidence base, identify research gaps and programming implications.

What Will it Take to Close the Gender Gap in the WaSH Sector?

**Bellflower**

Women are under-represented in the WaSH sector, particularly at leadership levels. At large WaSH sector organisations, such as UNICEF and World Vision, women comprise 20–30% of total WaSH staff, with even fewer at leadership levels. This has been linked to a variety of issues, including unconscious bias; cultural and societal gender norms; and lower numbers of women working in traditional WaSH roles (e.g., engineering). The situation is not limited to WaSH organizations in low and middle income countries, but is a global disparity: women remain under-represented in utilities, government agencies, consulting firms, non-governmental organizations and other types of organizations around the world.

The convening organisations will share their work and learnings thus far on addressing the gender imbalance in WaSH. The conveners will invite WaSH sector leaders will share recent qualitative and quantitative study results, and brief case studies from organizations that have taken steps towards fostering institutional change. The presentations and discussion will focus on understanding organizational policies that enable or inhibit gender parity and equality. Data and case studies will be complemented by reflections from sector leaders on their own professional journeys through the WaSH sector. The session will conclude with a structured but candid discussion on participants’ experiences around emerging themes.
Left Behind: How Shut Off Laws Create Water Accessibility Traps and How to Fix It

Convened by The Center for Water Security and Cooperation

**Windflower**

This session will discuss the findings of The Center for Water Security and Cooperation’s report on water affordability in Maryland: “The Accessibility Trap: Maryland’s Invisible Water Crisis,” which looked at granular, municipal-level law across Maryland to determine how WaSH affordability is manipulated and affected by these local laws. This event will discuss how law creates recurrent and sometimes inescapable traps for the most vulnerable citizens, while also providing real and concrete solutions for addressing these problems. Through an interactive presentation and discussion, this session will also address the effectiveness of different affordability solutions to help define the affordability and financing decision tree for participants.

Large Volume Household Water Storage, Tanks, and Cisterns: Synthesizing Current Knowledge, Identifying Knowledge Gaps, and Targeting Risk Mitigation

**Mountain Laurel**

Many communities around the world utilize some form of large volume household water storage. These systems vary considerably, with respect to the location of the cistern (atop the house, beside the house above ground, or belowground), whether they are decentralized or plumbed into a community distribution system, and whether a rainwater catchment system is utilized. Also, circumstances requiring operation recommendations include two categories: non-emergency and emergency.

This workshop aims to bring key stakeholders in academia, government, and other institutions together to align ongoing work in this area and generate consensus on next steps for data collection, recommendation dissemination and community engagement, and potential user-centered interventions across the varied geographic and cultural systems where households use large volume water storage.

We Need to Talk About Food: New Evidence on Food Hygiene Risks and Interventions

**Azalea**

Ensuring infants are provided safe, clean food may be critical for preventing infant infection by the enteric pathogens that cause diarrhoea and related secondary outcomes, such as enteric dysfunction, malnutrition, and death. Food hygiene interventions can act at multiple points in the farm-to-fork food system, from upstream farm production and packaging sources of pathogen contamination to market hygiene conditions to downstream household-level improvements in infant food preparation, feeding, and storage. Targeting improved hygiene in the production and distribution of commercially-sold foods has the potential for wide-scale impact in a population.

However, these strategies often require sustained safety monitoring and regulatory accountability to ensure compliance. Interventions aiming to improve household-level infant food preparation, feeding, and storage suggest potential effectiveness at reducing microbiological contamination of food but require sustained changes in behaviour which are challenging to achieve. This session will present and synthesize emerging evidence from several new studies on infant food contamination in LMICs.

Reaching the Poor and Leaving No One Behind in Sanitation

**Sunflower**

Indonesia Urban Water, Sanitation, and Hygiene Plus (IUWASH PLUS) is a 5-year USAID investment supporting national and city level government to increase access to WaSH services. Aligned with the Government of Indonesia’s “100-0-100” campaign to reach universal access by 2019, USAID/IUWASH PLUS has targets to support city government and service providers to reach populations in the bottom 40% by wealth (B40). In this session, we will share how USAID/IUWASH PLUS has partnered with local government on innovative targeting and verification systems for the B40.

This side event will bring together evidence and concrete cases of programs that reach poor households and communities with sanitation. Cases will be presented from Indonesia and Ghana and findings from recent research on subsidies and targeting the poor from the World Bank and the USAID WASHPALS project will be shared. This side session will also provide an opportunity to see the results from a recent World Bank Flagship research study on subsidies in the sanitation sector.
NETWORKING BREAK
10:00–10:30 a.m.
Atrium

SIDE EVENTS
10:30 a.m.–12:00 p.m.

An Agenda Setting Workshop for “Limited” (Shared) Sanitation: User Experiences, Measurement, and Improvement Approaches
Convened by Harvard Kennedy School of Government, Water and Sanitation for the Urban Poor, Sanitation and Hygiene Applied Research for Equity
Redbud

This session builds on the call of the June 2017 article: “Limited services? The role of shared sanitation in the 2030 Agenda for Sustainable Development,” which made two arguments: 1) that harm could be caused to poor citizens living in urban slums if shared sanitation were excluded from SDG-compliant ‘basic’ services, and 2) that investments in high-quality shared toilets should be prioritized when it is the only viable option. Much research has been conducted on the health impacts, user experiences, measurement, and effective interventions to improve quality of shared sanitation. Given the rapid growth of the peri-urban population, expected to more than double to about 2 billion residents between now and 2035, the time is right to reflect on the evidence produced in recent years and come to consensus on a prioritized research agenda going forward.

This session will lead to the creation of a research agenda for establishing the role of shared sanitation in bringing safely managed sanitation to all. The sessions will employ a “quick fire” format whereby several early career researchers will be allowed 1 slide and 5 minutes to summarize their recent research on shared sanitation and what it means for the future research agenda followed by group discussion on key themes.

Managing Risks & Uncertainty in Water Services for the Underserved
Convened by Millennium Water Alliance & IBM Research
Dogwood

The current model for water services delivery in underserved communities in Africa is ineffective, leading to water insecurity. Pro-poor aid organisations focused on increasing access have financed construction of expensive decentralised water schemes which after commissioning are handed to communities that have limited operational capacity to operate and maintain them.

This session shares experiences of water risks management based interventions that are being implemented through public-private partnerships to mitigate uncertainties that disrupt water services such as normal wear, weather hazards, security incidents, weak governance and financial mismanagement in underserved communities. Moreover, we highlight how advances in smart technology such as token-based prepaid metering systems and remote monitoring are providing unprecedented transparency and accountability as these communities transition from aid-dependency to self-sufficiency.

Open Forum on Capacity Building and Training Approaches for Water Safety Plans
Convened by IHE Delft, University of North Carolina, World Health Organization, Centers for Disease Control
Bellflower

The World Health Organization has recommended water safety plans (WSPs), a holistic risk assessment and risk management approach, for drinking-water suppliers across low-, middle- and high-income countries, since publishing its 2004 Guidelines for Drinking-water Quality. While rapid WSP adoption has occurred, capacity is still catching up to needs. Many countries and regions lack case examples, legal requirements and training resources for WSPs, corresponding to widespread capacity shortfall in the water supply sector.

This session is a WSP training taxonomy and will discuss it in relation to the stages of learning (introduction, practice, and reinforcement); describe the importance of customizing training to the target group, local language and circumstances; highlight the relevance of auditing for evaluating change over time; and call for robust methods to monitor WSP capacity development.
Gender Integration into WaSH Programming—Not Just Numbers of Women
Convened by CARE, Emory University, IRIS

Mountain Laurel

Sustainable Development Goal 6.2 calls for ‘paying specific attention to the needs of women and girls’ in sanitation programming. Yet, what ‘paying attention’ means operationally has not been formally articulated. Thus, the onus remains on programs to carry out this type of audit on their own programming and to report in kind. To truly meet this part of the goal, there is a need, therefore, to ensure that those designing, delivering, and monitoring programs are a) aware of key gender analysis concepts b) have concrete examples of how these can be applied to WaSH.

This session will focus on topics such as WaSH programming through the lens of gender—what is gender inclusion? What is not gender inclusion?

Effective National Sanitation Policies: Lessons from Africa
Convened by The Center for Water Security and Cooperation

Azalea

Effective legal frameworks, including national policies and plans, are fundamental for improving access to WaSH, which is part of Sustainable Development Goal (SDG) 6. Since the adoption of the 2030 Agenda, there has been increasing demand to assess and monitor how countries are taking on-board the aspirational targets for WaSH under SDG 6 in their national WaSH policies and plans. Additionally, national governments are re-examining their laws and policies and are often revising and adopting more effective WaSH laws and policies that align with the SDGs.

This learning workshop will discuss how laws and policies have been used to address WaSH issues, provide a roadmap for policy change and progressive development, and give participants exposure to the application of law and policy in the WaSH sector through an active participation case study.
LUNCH
12:00–1:00 p.m.
Trillium Dining Room, plus special session in Magnolia

LUNCH OPTIONS
First, go through the buffet line to pick up your lunch, then choose one of these locations to eat (details below):

- Networking Lunch, Trillium Dining Room
- Spotlight on Careers in WaSH, Magnolia

NETWORKING LUNCH
Trillium Dining Room
12:00–1:00 p.m.
Connect with colleagues old and new over lunch in the main dining hall.

SPOTLIGHT ON CAREERS IN WaSH
Magnolia
12:10–1:00 p.m.
Heather Skilling, Principal Global Practice Specialist, Water and Sanitation, DAI
Heather Skilling is an economist with more than 25 years of experience in strengthening water and sanitation service delivery in developing countries. She has worked at three levels: 1. At the global level, as a Steering Committee Member of the Sanitation and Water for All partnership, UN Advisor, and consultant on the NEPAD Africa Infrastructure Country Diagnostic and the World Bank WaSH Poverty Diagnostics; 2. At the sector level, leading reform activities including policy, regulation, sector financing and good governance; and 3. At the provider level, including efficiency improvements, public-private partnerships, twinning and formalization of small-scale providers.

Christian Borja-Vega, Economist, Global Water Practice, World Bank
Christian Borja-Vega is an Economist in the World Bank’s Global Water Practice with more than 10 years of experience in development organizations. His experience in the World Bank focuses on water operations, econometrics and economic analysis. Prior to working in the World Bank, he held positions as research analyst at the Social Development Secretary in Mexico and the Mexican Health Foundation. He earned a B.A. of Economics at ITESM in Mexico, a Master in Public Policy at the University of Chicago, and he is a PhD Candidate in Civil Engineering at the University of Leeds in the United Kingdom.
PLENARY SESSION
1:00–2:30 p.m.
Grumman Auditorium

Policy Synthesis—Translating the Science of the Week into Action
A moderated discussion on the key findings coming out of this year’s Water and Health Conference and their implications for policy-makers. What is it we want the world to do differently?

Aaron Salzberg, Director, The Water Institute at UNC
As Director of The Water Institute at UNC, Aaron uses his experience as an international leader on global water issues to mobilize knowledge, expertise and resources to create a more water-secure world and build the next generation of water leaders. He formerly served as the U.S. Department of State’s first Special Coordinator for Water and Chief of the Water Division within the Bureau of Oceans and International Environmental and Scientific Affairs, where he led the development of U.S. foreign policy on drinking water and sanitation, water resources management and transboundary water issues to save lives, advance sustainable economic growth, and promote peace and security.

VERBAL PRESENTATIONS
2:30 p.m.–3:30 p.m.

WaSH MARKETS

Redbud
Rachel Peletz, Aquaya Institute
Three-Quarters of People in Port-au-Prince, Haiti, Get Their Drinking Water from Private Providers
Ian Ross, London School of Hygiene & Tropical Medicine
Using Evidence of Consumer Preferences on Basic Sanitation to Expand Business Development Strategies in Ethiopia
Monte Achenbach, Population Services International

CLIMATE

Dogwood
Association Between Ambient Temperature and Childhood Diarrhea at Varying Levels of Piped Water and Sewerage Access, Pre- and Post-rotavirus Vaccination: Peru 2005 – 2015
Miranda Delahoy, Emory University
Heavy Rainfall and Diarrheal Disease Epidemiology within Urban–Rural Contexts
Aniruddha Deshpande, Emory University
Understanding the Changing Patterns of Droughts during Cropping Seasons of Pakistan from 1901 to 2010
Kamal Ahmed, Lasbela University of Agriculture, Water & Marine Sciences
Fecal Sludge Management

**Windflower**

Evidence-based Planning for Effective FSM in Two Town Panchayats in Tamil Nadu, India  
*Santhosh Ragavan Kolar Venkateshan*, Indian Institute for Human Settlements

Technoeconomic Analysis (TEA) of Model Fecal-Sludge Management and Sewer-Based Systems in India  
*Andrea Stowell*, Sanitation Technology Platform at RTI International

Coordinated and Effective Capacity Development Services for Emptiers Using the Emptying Service Competency Framework  
*Kelly James*, CAWST

Environmental Cleanliness

**Mountain Laurel**

Poultry Ownership is Associated with Infant *Campylobacter* Infection and Infant Malnutrition: Formative Evidence from Ethiopia  
*Sophie Budge*, Cranfield University

*E. coli* in Soil, Food, Hand, Water, and Surfaces Samples in the Democratic Republic of Congo  
*Patrick Mirindi*, Johns Hopkins School of Public Health

Ruminant Fecal Contamination Introduced to Drinking Water after Collection from Shared Sources in Rural Kenya  
*Latifa Hamzah*, Stanford University

Food Hygiene

**Azalea**

A Cluster Randomized Controlled Trial of an Infant Food Hygiene Intervention in Peri-urban Kisumu, Kenya  
*Jane Mumma*, Great Lakes University of Kisumu

A Combined WaSH and Complementary Food Hygiene Intervention to Reduce Diarrhoeal Disease in Rural Malawi  
*Tracy Morse*, University of Strathclyde

Intervention Study to Improve Food Hygiene Behaviors in Rural Households of Malawi  
*Kondwani Chidziwisano*, University of Malawi
NETWORKING BREAK
3:30–4:00 p.m.
Atrium

VERBAL PRESENTATIONS
4:00–5:00 p.m.

AGRICULTURE & IRRIGATION

Redbud
Association Between Gastrointestinal Disease in Children and Wastewater Agricultural Irrigation in Valle del Mezquital, Mexico
EUNICE FELIX-ARELLANO, National Institute of Public Health Mexico

Source Tracking Microbial Communities from Rooftop Harvested Rainwater to Irrigated Soil and Produce
SUHANA CHATTOPADHYAY, University of Maryland

Spatial Proximity to Wastewater Used for Irrigation and Childhood Diarrhea in the Mezquital Valley, Mexico
JESSE CONTRERAS, University of Michigan Department of Epidemiology

WASTEWATER & FECAL SLUDGE TREATMENT

Dogwood
Geotextiles: Low Cost Dewatering Technique in the Initial Step of Fecal Sludge Treatment
NAOMI KORIR, Sanivation

Managing Reclaimed Water Applications Using QMRA Approach
RAJASHREE HAJARE, CSIR-National Environmental Engineering Research Institute

Testing of an Integrated Waste Treatment System for a Women’s Toilet in India
CLAIRE WELLING, Sanitation Technology Platform at RTI International

A Root - Lactic Acid Bacteria-based Method for the Removal of Enteric Pathogens from Wastewater
WALTER CHINGWARU, Bindura University of Science Education

EQUITY

Bellflower
Disparities in Municipal Water Service Access Increase Risk of Elevated Blood Lead in Children
JACQUELINE MACDONALD GIBSON, Indiana University

Equity in Water Safety Planning in Nepal
GIRI KHATRI, IHE Delft
**ANTIMICROBIAL RESISTANCE & ANIMALS**

**Windflower**
Assessing Impacts of Commercial Hog Operations on Surface Water Quality  
Elizabeth Christenson, University of North Carolina Chapel Hill

Hand Contamination with Pathogenic, Zoonotic, and Antimicrobial Resistant Bacteria Among Caregivers Residing with Domestic Animals  
Marlene Wolfe, Tufts University

Poultry Raising in Bangladesh: High-risk Hygiene and Waste Disposal Practices Along Pathways for Transmission of AMR Bacteria  
Mahbub Ul Alam, International Centre for Diarrhoeal Disease Research, Bangladesh

**OPEN DEFECATION & CLTS**

**Mountain Laurel**
Open Defecation in Households with Toilets During the Swachh Bharat Mission in Rajasthan, India  
Natalie Exum, Johns Hopkins School of Public Health

Where Does CLTS Work Best? Evidence from Four National Datasets  
Kara Stuart, Aquaya Institute

**FINANCE & SANITATION**

**Azalea**
Cost-effectiveness Analysis of a Sanitation Intervention with a Quality of Life Measure as the Outcome  
Ian Ross, London School of Hygiene & Tropical Medicine

Human Waste of Time—Valuing Open Defecation Time Savings  
Ian Ross, London School of Hygiene & Tropical Medicine

The Global Water Pathogens Project: Forming a Global Network to Address Sanitation and Water-borne Disease  
Colleen Naughton, University of California Merced

**POSTER RECEPTION**
5:00–6:30 p.m.  
Atrium

**EVIDENCE**

Ryan Rego, University of Warwick

2. Measuring Menstrual Experiences: Development and Validation of the Menstrual Practices Questionnaire and Menstrual Perceptions Scale  
Julie Hennegan, Johns Hopkins Bloomberg School of Public Health

3. Outcome and Impact Indicators for Assessment of Water Safety Plans Implementation in Bushenyi Municipality, Uganda  
Christopher Kanyesigye, National Water and Sewerage Corporation Uganda
4. Interventions to Improve Water Supply and Quality, Sanitation and Handwashing Facilities in Health Care Facilities, and their Effect on Health Care-associated Infections in Low- and Middle-income Countries
Lauren D’Mello-Guyett, London School of Hygiene & Tropical Medicine

5. Developing and Applying a Conceptual Evaluation Framework for “WaSH FIT” in Health Care Facilities
Nicole Weber, Save the Children

6. Hydroclimatic Monitoring in Chronic Humanitarian Crisis Area—Southwestern Madagascar
Bram Riems, UMR EMMAH

FINANCE & POLICY

7. Partnering with Companies for Rural WaSH Innovation
Nick McClure, Resonance

8. Associations with Tap Stand Functionality and Monitoring Challenges: Evidence from Nepal, Rwanda, and Niger
Anna Murray, Charity: Water

Alison Filler, International Lifeline Fund

10. An Innovative and Sustainable Systems-based Approach for Remote Monitoring of Boreholes
Elsa Berhane, World Vision

11. Cistern Water Quality and Increased Community Health Impacts
Christina Chanes, University of the Virgin Islands

HEALTH & BEHAVIOR

12. Strengthening WaSH Markets by Understanding and Overcoming Behavioral Biases
James Tidwell, Harvard Kennedy School of Government

13. Understanding Menstrual Hygiene Management Among Adolescents in Indian Urban Slums
Tanya Dhingra, Temple University

14. Measuring the “Software” Side of WaSH—Maji Safi Group’s Health Screening Program
Bruce Pelz, Maji Safi Group

HYGIENE

15. A Systematic Review and Meta-analysis of the Association Between Water, Sanitation, Hygiene, and Food and Typhoid in Case-control Studies
Marlene Wolfe, Tufts University

16. Identifying Barriers to Adoption of Household Disinfection Kits for Environmental Infection Control of Cholera Transmission
Camille Heylen, Tufts University

17. Barriers and Facilitators to Handwashing Among Students Participating in a School-based Intervention in Northwest Tanzania
Elia Lilima Okello, Mwanza Intervention Trials Unit

18. Impact of Community-led Total Sanitation (CLTS) on Hygiene and Sanitation Practices, and Diarrheal Diseases
Josea Ratsiranarison, Medical Care Development International

SANITATION

19. How Does Sanitation Contribute to a Good Life? Qualitative Research in Maputo, Mozambique
Ian Ross, London School of Hygiene & Tropical Medicine

20. PoopGames: LoosePoops
Jessica Kaminsky, University of Washington

Drew Capone, Georgia Institute of Technology

22. Understanding Shared Latrine Use and Dynamics In Rural Cambodia
Chrey PoM, Causal Design; Rafael Catalla, Plan International; Sina Nong, WaterAid
23. No One Left Behind: City-wide Inclusive Sanitation Planning in Practice  
   Naomi Korir, Sanivation

24. Household Demand and Willingness to Pay for Formalized Pit Latrine Emptying Services in Kigali, Rwanda  
   Zachary Burt, Athena Infonomics

25. The Challenges of Running Shared Toilets in a City with Lacking Systematic Faecal Sludge Management  
   Kamal Farah, CARE

   Lydia Mirembe-Ssenyonjo, IRC

27. Lessons in Commercializing Sanitation Technology  
   Tate Rogers, Triangle Environmental

   Moise Ngwa, Johns Hopkins Bloomberg School of Public Health

29. Faecal Waste Management in African Cities: Experience from Cities in Kenya and Uganda  
   Sheillah Simiyu, African Population and Health Research Centre

### WATER QUALITY

30. Evaluation of the SafiStation Chlorine Generator in Health Care Facilities in Ghana and Uganda  
   Adam Drolet, PATH

31. Occurrence and Associations of Manganese and Iron in Drinking Water Systems in Three Low- and Middle-income Countries  
   Emily Browning, The Water Institute at UNC

32. Computational Modeling to Optimize Chlorinator Design for a Drinking Water Treatment System in Rural Haiti  
   Ashley Martin, Clemson University

33. Thou Shalt Chlorinate? Christchurch, NZ, Heretically Proposes to Manage Its Own Drinking Water Safety Risk  
   Alistair Humphrey, Canterbury District Health Board

34. Chlorine Tablets for Emergency Household Water Treatment: Qualitative Assessment and Development of Tablet Selection Guidelines  
   Marlene Wolfe, Tufts University

35. Coagulant/Disinfecant Point of Collection Water Treatment in Humanitarian Emergencies  
   Leigh Borrett, University of Victoria

36. Model for Initial Chlorine Dose Design in WaSH Interventions  
   Hongjian Wu, University of Victoria

37. DNA-specific Probe-based Molecular Biosensors for Schistosomes in Fresh Water  
   Alexander Webb, Imperial College London

38. Point of Use Water Quality and Citizen Science in San Rafael Las Flores, Guatemala  
   Cristina Marcillo, Virginia Tech

39. Validity of Pathogen Culture and PCR-based Methods for Monitoring in High Transmission Settings  
   Kevin Tsai, University of Iowa

40. WaSH Interventions That Do Not Remove Chemical Immunotoxins Fail to Achieve Health Benefits  
   Josh Kearns, North Carolina State University
Emergency! Filter to the Rescue—But Which One?
Convened by World Health Organization, Elrha, University of Applied Sciences and Arts Northwestern Switzerland

Redbud
Safe drinking-water is an immediate priority in most emergencies, and household water treatment (HWT) and safe storage is often an essential emergency response intervention. However, the HWT technology market is diverse, and not all technologies effectively remove pathogens from drinking-water, or are accepted by users. Independent evaluations of HWT technology performance and acceptability can help inform procuring humanitarian agencies, governments and users at large in HWT product selection.

This interactive session will bring together implementers, humanitarian agencies, and HWT manufacturers to discuss laboratory and field evaluations of HWT. We will focus on key themes that emerged from the laboratory testing of 20 products under the Scheme and the field evaluations of five different filters under the Elrha HIF Emergency Filter Challenge, including manufacturing quality, limitations of disinfection; and user preferences. The session will also stimulate discussion on problems/gaps in field performance of HWT, and where research and innovation should focus to strengthen such performance.

SELF-SUPPLY: Towards Affordable Water for All—Benefits, Concerns, and Case Studies
Convened by Mercer University, Millennium Water Alliance, IRC

Dogwood
As improved water supply coverage grows, those left behind are often the most expensive to serve - households in remote areas and/or with low density populations. Globally, those left un-served or poorly served often resort to their own solutions such as self-supply. Estimates suggest 22% of rural America and higher proportions in rural South Asia obtain most of their water through self-supply. A few countries are beginning to develop such support services, having found that without including self-supply, universal coverage as noted in SDG 6.1 cannot be achieved. There are many interesting lessons to be learned about self-supply activities being conducted across many countries in sub-Saharan Africa, but also many differing viewpoints about the benefits, challenges and negative aspects.

This session will focus on three key aspects: information about self-supply will be shared by defining it, offering examples, and examining how it works; information about self-supply across sub-Saharan Africa and what some of the interesting implementations have been and delving into the arguments for and against self-supply.

Making Agriculture Water-smart: Systems Change Approaches for Water and Food Security
Convened by CARE

Bellflower
Agricultural water management has long been an important, if under-recognized, factor in health. It is also a central factor in water security, and a key, but often overlooked, element of WaSH systems change. As global population rises and global demand for food intensifies, agricultural water management (already accounting for 70% of global freshwater use) will increasingly become one of the largest influences on global health and water security. In order to feed a growing global population that is projected to surpass 9 billion by the year 2030, global food production will have to increase by roughly 70% of current production. As climate variability continues to increase, farmers will be able to rely less on consistent rainfall and will need to access and manage water in more effective ways to sustain food production. As governments invest in water resources and plan water for multiple uses in contexts of increasing scarcity — Water Smart Agriculture has become increasingly relevant in discussions on systems change.

This side session will convene organizations and research institutions working in WaSH and Water for Agriculture to review impacts of water smart agriculture implementation in Africa and Central America, examine alignment and linkages to WaSH systems change approaches, and refine a case for investment from governments and donors.
Beyond RCTs—Evidence of All Kinds, For All Kinds of Decisions  
Convened by iDE  
**Windflower**

Organizations frequently face decisions about how to implement and improve their programs, and want to use evidence to make those decisions. But having good and appropriate data to guide programmatic decision making when needed is challenging. The same type of evidence isn’t appropriate for every programmatic decision, and a 5-year, $2 million RCT is rarely the right tool when a decision needs to be made next month.

The side event will explore learning loops of all shapes and sizes - sharing real-world examples, methods and insights, while providing participants an opportunity to design their own set of learning loops based on a set of example programs. Drawing on our collective, broad experiences in the sanitation sector globally, IDinsight and iDE will share real-world examples of nimble (quasi) experimental methods used to obtain rigorous causal evidence without waiting three to five years for results or spending in excess of $1 million.

Training on One of the Five Commitments for Gender and WaSH in Emergencies  
Convened by CARE  
**Mountain Laurel**

This session will be a mini training on 1 of the 5 commitments (see below) of the Global WaSH cluster’s Gender and WaSH Minimum Commitments in an Emergency.

The Gender and WaSH Minimum Commitments are the following:

1. Consult separately girls, boys, women and men including older people and those with disabilities (hereeto called “diverse groups”) to ensure WaSH programs and infrastructure are designed so as to provide equitable access and reduce incidences of violence.
2. Ensure that diverse groups have access to appropriate and safe WaSH facilities.
3. Ensure diverse groups have access to feedback and complaint mechanisms so that corrective actions can address their specific protection and assistance needs.
4. Monitor and evaluate safe and equitable access and use of WaSH services in WaSH projects.
5. Give priority to girls (particularly adolescents) and women’s participation in the consultation process.

Ceramic Pot Filters: Current Research, Future Directions and Defining Next Steps  
Convened by Ceramics Manufacturing Working Group, Tufts University  
**Azalea**

The purpose of the Ceramic Pot Filter side session is to bring together those involved in filter manufacturing, marketing, dissemination and research in order to share successes and challenges over the past year and discuss future directions, challenges and solutions.

**NETWORKING BREAK**  
10:00–10:30 a.m.  
Atrium
SIDE EVENTS
10:30 a.m.–12:00 p.m.

Annual Meeting of the International HWTS Network
Convened by Household Water Treatment and Safe Storage
Redbud

Household water treatment and safe storage (HWTS) is an important public health intervention to improve the quality of drinking-water and prevent water-borne and vector-related diseases at the point of use. The HWTS Network includes international, governmental and non-governmental organizations, private sector entities, and academia promoting HWTS as a key component of community-targeted environmental health programmes. We cover four main areas of activities in our network; policy and advocacy, research and learning, implementation and scale-up, and monitoring and evaluation. The 2019 Annual Network Meeting provides an opportunity to share the latest in research, implementation and policy on HWTS and water safety.

This year’s meeting will focus on experiences with integration of HWTS into public health programmes. It will also give the opportunity for sub-groups to meet and plan for future activities, and inform participants on changes to Network coordination and updates on key projects (such as the Scheme and the HIF funded research of filters in emergencies).

SELF-SUPPLY: The Potential Role of SMART Centers as a Hub for Building Value Chains to Reach Those Being Left Behind with WaSH
Convened by WaterAid
Dogwood

SMART Centers help to build WaSH supply value chains for those being left behind. At this moment, there are centers in six countries on two continents and the number is increasing. SMART Centers demonstrate a range of affordable WaSH solutions, like manual well drilling, rainwater harvesting, artificial groundwater recharge, low cost hand and solar pumps, sanitation solutions and household water treatment systems (filters).

The side-event will focus on sharing and exchanging experiences from two continents (Africa and Latin America) and discussing the key elements of a business model to the success of SMART Centers in propagating the acceleration of Self-supply in distinct local contexts.

OCTOPUS and Other Initiatives Towards More Comprehensive Faecal Sludge Management Standards in Humanitarian Response?
Convened by Solidarites International
Bellflower

At the beginning of emergency, selecting an appropriate treatment and disposal site for faecal sludge is critical. Although some guidance on safe faecal sludge management (FSM) exists, they are often not fully applied in practice. HIF financed SI in partnership with Borda to find solutions to this issue and again SI, in partnership with Global WaSH Cluster (GWC) and Oxfam to scale up the project and make it sustainable.

This side event will provide an in-depth review of the project and platform developed to support sanitation practitioners:
• to collaborate and share practices (through case studies and indicators) in specific emergency contexts,
• to share local WaSH Cluster and governmental guidelines and standards,
• to rapidly compare different practices of the same contexts,
• to take timely and rapid decisions,
• and to improve their practices.

Creating Inclusive Sanitation Markets for the Urban Poor: Lessons from West Africa
Convened by Population Services International, Water and Sanitation for the Urban Poor, USAID
Windflower

Market-based approaches are widely promoted in the delivery of sanitation products and services. In West Africa, much work has been done in recent years to understand market dynamics, products, services and costs relating to sanitation, and the private sector’s interest in the sector has grown. However, the private sector is yet to create mass demand for appropriate products and services for low-income urban consumers.

This side event will synthesize the learning from a 5-year program—Sanitation Service Delivery (SSD)—which aimed to create a more effective, efficient, and inclusive sanitation market for the urban poor in Benin, Cote d’Ivoire, and Ghana. The Program responded to
key market failures by developing and testing scalable, market-based models to facilitate growth of local sanitation markets. Grounded in experience from the three countries, the side event will engender discussion about responding effectively to sanitation market failures and opportunities. The event will explore three core challenges related to sanitation market development, presenting the learning from West Africa—before broadening the discussion to leverage the experience and perspectives of the audience.

Citizen Science and Water Quality 101

*Convened by Virginia Tech, London School of Hygiene and Tropical Medicine and Eawag*

Mountain Laurel

The increased adoption of citizen science, a practice where members of the public directly participate in scientific research and knowledge creation, in mainstream research endeavors as evidenced by thousands of projects on SciStarter.com is, with some caveats, broadly seen as a positive movement. In this citizen science and water quality workshop, we will focus on sharing our technical tools, procedures and expertise, specifically, low-cost and time-efficient sampling of environmental contaminants of concern, direct collaboration and outreach practices, disaster response, ethical considerations, and science communication.

**LUNCH**

12:00–1:00 p.m.

*Trillium Dining Room, plus special session in Magnolia*

**LUNCH OPTIONS**

*First, go through the buffet line to pick up your lunch,* then choose one of these locations to eat (details below):

- Networking Lunch, *Trillium Dining Room*
- USAID Water & Development Research Agenda Consultation, *Magnolia*

**NETWORKING LUNCH**

*Trillium Dining Room*

12:00–1:00 p.m.

Connect with colleagues old and new over lunch in the main dining hall.

**USAID WATER & DEVELOPMENT RESEARCH AGENDA CONSULTATION**

*Magnolia*

12:10–1:00 p.m.

USAID plans to launch a five-year Water and Development Research Agenda to fill key evidence gaps that are critical to address in order to better implement WaSH and water resources programming in the Agency’s high priority and aligned partner water and sanitation countries. Please join us for an open, facilitated session in which USAID will seek feedback from researchers and implementing organizations on implementation research priorities. For more information, please visit: [https://www.globalwaters.org/USAID-Water-Development-Research-Agenda-Consultation](https://www.globalwaters.org/USAID-Water-Development-Research-Agenda-Consultation)
OUR SPONSORS

PLATINUM

The Osprey Foundation strives to empower individuals and communities through education, health, economic opportunity and human rights in a sustainable way. Osprey’s water, sanitation and hygiene (WaSH) program has three main elements: 1) Supporting systems change that provides sustainable access to WaSH services at scale; 2) Seeding innovative models for delivering WaSH services to the poor; and 3) Advocating for change within the sector through collaboration and a focus on leveraged impact. Osprey supports select WaSH initiatives, NGOs and social ventures with grants, impact investments and expert advice on strategy, funding and operations. It focuses its WaSH program in sub-Saharan Africa, Latin America and the Middle East.

GOLD

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Latter-day Saint Charities is the humanitarian arm of The Church of Jesus Christ of Latter-day Saints. Since 1985, Latter-day Saint Charities has worked with government ministries, nongovernmental organizations, and community-based organizations to help millions of people worldwide. Built on the principles of personal responsibility, community support, self-reliance, and sustainability, our efforts give individuals and communities the resources they need to improve their lives in lasting and meaningful ways. We do this through six core initiatives: Clean Water, Food Security, Immunizations, Maternal and Newborn Care, Vision Care, and Wheelchairs. Additionally, Latter-day Saint Charities works to respond to emergencies around the world and help refugees.

The Clean Water initiative aims to improve the health, sanitation, and self-reliance of communities by establishing sustainable water and sanitation services. Latter-day Saint Charities acts as both a donor and an implementing organization, and in 2018 we supported WaSH programming in 28 countries. Aligning with the UN’s Sustainable Development Goals, we want to support organizations that are ensuring the availability and sustainability of water and sanitation services. We partner with NGOs, local communities and governments to champion a systems-change approach to bringing clean water to communities for generations.

The P&G Children’s Safe Drinking Water program consists of not-for-profit social marketing and emergency relief efforts to provide P&G packets in the developing world with private, public, and NGO partners. Our goal is to reduce sickness and death in children that results from drinking contaminated water.

World Vision is an international partnership of Christians whose mission is to follow our Lord and Savior Jesus Christ in working with the poor and oppressed to promote human transformation, seek justice and bear witness to the good news of the Kingdom of God.

World Vision has water, sanitation and hygiene (WaSH) programs in almost 60 countries around the world. WaSH is integral to World Vision’s transformational development work because we believe every child has the right to use safe water and live in a clean environment. When children and families use clean water, living environments clean from waste, and wash their hands with soap, they are more likely to be well educated and grow up with good health and food security.

SILVER

Chemonics International’s mission is to promote meaningful change around the world to help people live healthier, more productive, and more independent lives.

Deloitte Consulting is one of the world’s leading consulting firms for business strategy, operations, technology, and human resources planning. Deloitte Consulting provides services that are designed to bring together the unique experience, scale, and capabilities of their professionals to help clients in their efforts to address their most complex business problems. The Emerging Market sector of Deloitte Consulting works with clients to implement economic reforms, support financial and private sector growth, and develop local capacity.

DT Global collaborates with stakeholders to improve resiliency, accelerate access to safe water and sustainable sanitation, improve environmental management, promote clean energy, and mainstream green economy solutions to help communities overcome increasing pressure from climate change, urban and industrial growth, and deforestation. Through locally-led initiatives grounded in real-time data and quantitative analysis, we develop improved policies and practices, strengthen local capacity, and create partnerships with the private sector and other stakeholders to bring innovation to scale and improve access to basic infrastructure—including power, water, sanitation, roads, and information and communication technology. Together, we catalyze economic growth and transform lives.
**Easy Water for Everyone**'s mission is to provide pure drinking water in rural villages without power, with contaminated water sources (river, boreholes, wells, lakes). A device utilizes repurposed, reprocessed (sterilized) polysulphone hemodialyzers (8), with an absolute pore size of 0.003 microns, rendering it impassable to all parasites, bacteria and viruses, to deliver the pure water at a rate of 250 liters per hour, through gravity flow. This is an ample supply for villages up to 800 for drinking and hand washing. Currently ~15,000 villagers utilize this device with research results showing a marked reduction in diarrhea pre/post device installation.

The **International, Water, Sanitation, and Hygiene Foundation** (IWSH) harnesses the skills and expertise of industry professionals, organizations, and manufacturers to support critical water and sanitation initiatives worldwide. We do this by tapping into over 100 years of industry experience to develop local infrastructure, improve governance, and build skilled labor leading to better public health and economic outcomes. We devote our resources to work with public, private, and philanthropic partners in carrying out these objectives. Our work goes beyond providing clean water and sanitation—it is building the technical framework, workforce, and supply chains necessary to sustainably grow these services and empower local communities.

**Zero Mass Water**'s mission is to make drinking water an unlimited resource. **SOURCE** is a Hydropanel that creates drinking water by combining sunlight and air – made possible by the application of advanced materials science, thermodynamics, and controls technology. With SOURCE Hydropans, Zero Mass Water puts the power of safe, high-quality water production into the hands of every person in nearly every climate and corner of the world. Zero Mass Water is headquartered in Scottsdale, AZ, USA with installation partners.

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**Aqua Research** is a humanitarian for profit company that provides innovative and affordable water treatment technologies for those in low income settings.

**Aquagenx** provides simple, portable water quality test kits for field-level testing in low resource settings. Aquagenx CBT Kits are easy to use for microbiological testing, enable ambient temperature incubation and generate P/A and MPN test results. No labs, electricity, temperature control, expensive equipment, cold chain or complex methods are required.

Our commitment to WaSH in HCF throughout Kenya combines **Aquatabs** for drinking water, Klorkleen, multi-purpose disinfection and cleaning for surfaces and Ultrasепtin, cold sterilization granules for medical instruments and endoscopes. Aquatabs Water Systems will bring safe water to 30,000 schools/15 million children in Africa by the end of 2019.

**Catholic Relief Services** is a humanitarian and development aid organization which helps the poor and vulnerable overseas by responding to major emergencies, fighting disease, ensuring basic access to health care and education, all within peaceful, just communities.

The **Global Handwashing Partnership** (www.globalhandwashing.org) is a public–private partnership working to advance handwashing with soap as a fundamental component for health and development. The Partnership strengthens handwashing implementation and builds political commitment through initiatives such as its campaign for hand hygiene in health facilities and founding and supporting Global Handwashing Day.

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**NSF International** is an independent, global organization that facilitates standards development, and tests and certifies products for the water, food, health science, sustainability and consumer product sectors.

**RTI International** is an independent, nonprofit research institute dedicated to improving the human condition. We combine scientific rigor and technical expertise in social and laboratory sciences, engineering, and international development to deliver solutions to the critical needs of clients worldwide. Visit www.rti.org.

**Silivher Technologies** is a Charlottesville, Virginia, based company that provides an effective point-of-use water disinfection solution at a low cost-point to individual users and organizations that work in communities with decentralized water infrastructure. Our solution is the MadiDrop technology, “Madi” being the Tshivenda South African word for “water.”

The **Sanitation Learning Hub** supports organisations working in WaSH by creating spaces to reflect, share and learn from each other and co-generate answers to emerging questions for stronger policy and improved practice. Our activities include action-orientated publications, timely digital communications, workshops and development of new rapid action learning approaches.

**Tomlinson** is a manufacturer of faucets and fittings used on containers to dispense water, beverages and other liquids.
Latter-day Saint Charities

helps others feel the love of Jesus Christ by relieving suffering, instilling hope, and building stability to strengthen families and promote individual dignity.

_We partner with NGOs, local communities, and governments to champion a systems-change approach to bringing clean water and sanitation services to communities for generations._

LEARN MORE AT latterdaysaintcharities.org.

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World Vision is a Christian humanitarian organization dedicated to working with children, families, and their communities worldwide to reach their full potential by tackling the causes of poverty and injustice.

Our water, sanitation and hygiene programs are integral to our work—_we believe every child has the right to safe water and a clean environment._ When children and families use clean water, have living environments clean from waste, and wash their hands with soap, they are more likely to be well educated and grow up with good health and food security.

Make sure to visit the World Vision table in the Atrium during the conference

Learn more: www.wvi.org/cleanwater
Agenda for Change is a collaboration of like-minded organizations that have adopted a set of common principles and approaches. We advocate for and support national and local governments in strengthening the WASH systems required to deliver universal and sustained access to WASH services.

www.washagendaforchange.net
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### GOLD

- Latter-day Saint Charities
- P&G Children’s Safe Drinking Water
- World Vision

### SILVER

- Chemonics
- Deloitte
- DT Global
- easy water for Everyone
- IWSH.org
- ZERO MASS water

### BRONZE

- Aqua Research
- Aquagenx
- Aquatabs water purification tablets
- CRS
- Global Handwashing Partnership
- NSF
- RTI International
- Silivhere Technologies
- The Sanitation Learning Hub
- Tomlinson

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