WEF FORUM 2019: JAMES BARNARD RESEARCH CONFERENCE ON EMERGING THEMES IN BIOLOGICAL PHOSPHORUS REMOVAL AND RECOVERY

January 14–6, 2019
Austin, Texas

CONFERENCE PROGRAM

Water Environment Federation the water quality people®
The Water Research Foundation
LIFT®
The University of Texas at Austin Civil, Architectural and Environmental Engineering Cockrell School of Engineering

This Forum is held by the Water Environment Federation in cooperation with The Water Research Foundation and the Leaders Innovation Forum for Technology program, and the University of Texas at Austin.

Water Environment Federation

TRAINING AND EDUCATIONAL EVENTS '19

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May 7–10, 2019
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ResidualsBiosolids-WEFIWA.org

MAY

STORMWATER AND GREEN INFRASTRUCTURE SYMPOSIUM
May 8–10, 2019
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JUNE

COLLECTION SYSTEMS
June 4–7, 2019
Indianapolis, IN
wef.org/CollectionSystems

JULY

NUTRIENT REMOVAL AND RECOVERY SYMPOSIUM
July 23–25, 2019
Minneapolis, MN
wef.org/Nutrients

AUGUST

WEF/AWWA
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JULY

WEF/EESS
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July 29 – August 1, 2019 | Singapore | wef.org/AWWTR

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Water Environment Federation®
the water quality people®

WEF Forum 2019

James Barnard Research Conference on Emerging Themes in Biological Phosphorus Removal and Recovery

January 14-16, 2019
Embassy Suites Austin Central
University of Texas at Austin
Austin, Texas, USA

This Forum is held by the Water Environment Federation in cooperation with The Water Research Foundation and the Leaders Innovation Forum for Technology program, and the University of Texas at Austin.

TABLE OF CONTENTS

FORUM STEERING COMMITTEE

James Barnard
2019 Forum Honorary Chair
Black & Veatch

Chris deBarbadillo
2019 Forum Co-Chair
DC Water

Peter Schauer
2019 Forum Co-Chair
Clean Water Services

Charles Bott
Hampton Roads Sanitation District

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Manhattan College

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Aqualia

Andy Shaw
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David Stensel
University of Washington

Gerry Stevens
AECOM

Beverley Stinson
AECOM

GENERAL INFORMATION FOR PARTICIPANTS

Most events and technical programming will be held at the Embassy Suites Austin Central [5901 N Interstate Hwy 35, Austin, TX 78723].

The technical program will be hosted in the Agave Meeting Room.

REGISTRATION

The Registration Desk is located in the Agave Meeting Room Foyer and will be open from 12:00pm – 1:30pm on Monday. Once the Welcome Session begins, registration will move inside the Agave Meeting Room.

ONSITE CONTACT INFORMATION

As a Forum participant, if you have any issue onsite please contact the following WEF Staff for assistance.

Laura Childs, WEF Senior Manager, Education and Training
Email: lchilds@wef.org
Mobile Phone: 412.352.7487

Norman Cochran, WEF Manager, Meetings
Email: ncochran@wef.org
Mobile Phone: 703.439.4639

SUSTAINABILITY

In an effort to emphasize WEF's priority goal of sustainability, event signs have been printed on recyclable or reusable materials.

MEAL AND RECEPTION FUNCTIONS

Please advise staff if you have any special dietary requirements.

Monday Evening Welcome Reception

Please join the Steering Committee, technical program presenters, and other participants for a welcome reception in the Agave Foyer area. Join us for this casual event and network with other Forum participants over light hors d'oeuvres and beer and wine.

Monday, January 14
Agave Foyer Area
5:00pm – 6:00pm
Reception continues in the Hotel Lobby until 7:00pm for Embassy Suites guests.

Sponsored by YSI, a Xylem Brand

Breakfasts and Luncheons

For Embassy Suites Austin Central guests, breakfast will be informally held Tuesday and Wednesday mornings from 7:15am-8:15am in the Embassy Suites lobby. Coffee will be provided in the session room at 10am and 3pm.

Luncheons will be served on Tuesday and Wednesday in the technical session room.

Tuesday Evening Dinner Reception

Tuesday evening's reception and honorary dinner will be held on campus at UT Austin. Please meet your colleagues at the Embassy Suites main lobby entrance by 5:50pm to board the buses to campus. Following the dinner, buses will promptly return Forum participants back to the hotel.

Tuesday, January 15
6:00pm – 9:00pm
***Board buses at 5:50pm from Embassy Suites main lobby*

WEF POLICIES AND POSITIONS

WEF's Vision
A community of empowered professionals creating a healthy global water environment.

Core Values
Leadership, Passion, Scholarship, and Collaboration, and Service

WEF Policies
WEF respects and takes the broadest view of human diversity and inclusion and is committed to providing a professional, safe, and welcoming environment at its events for all water professionals and their guests. WEF expects all sponsors, speakers, attendees, media, exhibitors and other participants to uphold our commitment to diversity and inclusion by helping us provide a positive Symposium environment for everyone.

For more information, please see WEF's Diversity and Inclusivity Policy, as well as WEF's Non-Discrimination and Harassment Policy at www.wef.org/about/about-wef.

Reporting Concerns
If you have any concerns during this Forum, please contact WEF staff onsite or you may email the WEF Executive Director Dr. Eileen O'Neill at eoneill@wef.org.

WEF SOCIAL MEDIA POLICY

WEF strongly encourages the use of social media to share your experiences at our event. This includes sharing interesting quotes or information, taking pictures with colleagues, and using the event hashtag. However, to protect intellectual property, videotaping, filming, or live-streaming of any workshop or technical session presentation, or exhibit booth is prohibited. Any participant violating this policy must relinquish the media and may be removed from the Symposium. Also, promotional or commercial use of photographs taken at WEFTEC and other WEF Conferences is strictly prohibited. If you are interested in content, materials, or products, please consider talking to the speaker or exhibitor, who may provide the information or grant permission.

FORUM SAFETY AND SECURITY

WEF works hard to provide a comfortable and safe environment during our meetings and events, including contracting with private security firms and off-duty police officers when required. Your help also is needed to provide a safe and secure environment.

WEF recommends that you follow these safety guidelines:

1. **Share your plans**. Advise a family member or friend of your travel plans, including the dates you will be gone, how you will travel to the meeting or event, and where you are staying;

2. **Protect your identity**. Wear your name badge only inside the meeting or event venue; remove and secure your name badge when going to and from the venue; when disposing of your name badge, scratch out or destroy your name and/or the QR code to protect your personal information;

3. **Plan for an emergency**. Be aware of your surroundings. Know where the nearest exists are located. Use the buddy system. Exchange contact information with another event attendee. In case of a venue evacuation, agree where you will meet up. Call for help if your buddy doesn't meet up at the agreed location within a reasonable amount of time.

4. **See something, say something.** If you see something that raises a safety or security concern, please follow the instructions printed on the back of your name badge to alert security personnel.

Embassy Suites by Hilton Austin Central Emergency Information:

Embassy Suites by Hilton Austin Central
5901 N Interstate Hwy 35
Austin, TX 78723
Phone: (512) 454-8004

To report a medical emergency, fire, safety or security concern, pick up any house phone and dial "0" to reach the hotel operator.

CONTINUING EDUCATION

How Do I Receive Credit For this Forum?
To receive credit for all technical sessions and pre-Symposium workshop, please fill out a Continuing Education Request Form and be sure to have WEF staff initial for verification.

Attendees will have to submit their CE Request Form to WEF staff at the end of the Symposium. Please request a continuing education form when you check-in and ask WEF staff if you have further questions.

Technical Sessions:
WEF offers Professional Development Hours (PDHs) for participation in technical sessions. **A PDH is defined as one hour** spent engaged in an activity that contributes to the advancement or enhancement of professional skills or scientific knowledge of a professional engineer or operator.

When Will I Receive Credits For this Symposium?
Certificates and transcripts for this event will be mailed within 8 weeks of the Forum. Please keep in mind that although WEF does provide these files, most states will require the individual licensee to report continuing education credits.

Note: *Educational Credits will not be recorded and documentation will not be distributed unless the attendee is a confirmed registrant of this event and the proper steps are is completed as indicated in the directions provided.*

Are WEF Continuing Education Credits Approved in My State?
WEF applies for approval in many states and will be happy to work with individuals and Member Associations for additional state or agency approvals upon request. In addition, WEF has been approved as a Training Provider through the following:
The Florida Board of Professional Engineers, the New York State Department of Education, and the Ohio EPA. Many other states accept WEF PDH credits and WEF CEU credits as long as subjects and content meets with state requirements. For example: California (CWEA), Nevada, and New Jersey.

What Else Do I Need to Know?
WEF follows the International Association of Continuing Education and Training (IACET) guidelines along with state-specific regulations to achieve strict policies and procedures regarding its Continuing Education Program. WEF calculates education credits following a standardized method that is the most widely accepted by certification and licensing agencies. However, many states differ in the type and/or number of credits they will approve for educational events. Because of this, participants are responsible for exploring their state requirements and for ensuring that WEF Symposium credits are accepted.

Continues on following page

CONTINUING EDUCATION

Continued from previous page

Service and Support…
In keeping with IACET guidelines, WEF maintains a database of all continuing education files for a minimum of 7 years. You may contact WEF's Customer Service Team between the hours of 8:30am and 5:00pm EST, Monday through Friday to request these files. Please call 1-800-666-0206 or submit an email request to csc@wef.org.

State Credit Calculations:
*Some state licensing boards will accept CEUs for session under 3 hours in length. Some use different acronyms for training credits. In most instances the credits issued by WEF can be converted to meet state specific requirements that vary from the system used by WEF. This is usually managed at the state level using the following conversion method:

1.0 CEU = 10 Hours of session time
1.0 PDH = 1 Hour of session time
1.0 Contact Hour = 1 Hour of session time
For example: **1.2 CEU** Credits = **12.0 PDH** Credits or **17.0 PDH** Credits could equate to **1.7 CEU Credits** depending on individual state regulations.

**CEU & PDH credits are available for Workshops to Professional Engineers licensed in the state of New York (NYSED).*

For more information regarding WEF's Continuing Education Program, please visit http://www.wef.org/Forum.

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TECHNICAL PROGRAM

Opening Session

Monday, January 14, 2019
1:30pm-2:30pm

Facilitators: **Chris deBarbadillo, *DC Water, 2019 Forum Co-Chair***
Peter Schauer, *Clean Water Services, 2019 Forum Co-Chair*

1:30pm **Introduction to the 2019 Forum**
Chris deBarbadillo, *DC Water, 2019 Forum Co-Chair*
Peter Schauer, *Clean Water Services, 2019 Forum Co-Chair*
Tom Kunetz, *Metropolitan Water Reclamation District of Greater Chicago, WEF President*

1:40pm **What is the Importance of Phosphorus?**
James Barnard, *Black & Veatch*

2:00pm **Introducing Forum Topics, Discussion Questions, and Future Research**
2019 Forum Co-Chairs and Steering Committee

Sponsored by Black & Veatch

This session leads immediately into Session 1, continued on next page.

TECHNICAL PROGRAM

Session 1: Watershed Based Strategies for Managing Phosphorus

Monday, January 14, 2019
2:30pm-5:00pm

Facilitator: **Glen Daigger, *University of Michigan***

2:30pm **Introduction to Session and Purpose**
Glen Daigger, *University of Michigan*

2:45pm **HRSD's Vision for Advanced Water Treatment and Managed Aquifer Recharge in Eastern Virginia, USA: Sustainable Water Initiative for Tomorrow (SWIFT)**
Charles Bott, *Hampton Roads Sanitation District*

3:00pm **NEW Water's Adaptive Management Approach**
Nathan Qualls, *NEW Water*

3:15pm **Dixie Drain: Evolution of Watershed Based Phosphorus Removal**
Haley Falconer, *City of Boise, Idaho*

3:30pm **Reducing Phosphorus Loads by Over 10 Million Pounds: How the Chesapeake Bay Program Partnership Did It**
Rich Batiuk, *U.S. EPA Chesapeake Bay Program Office (Retired)*

3:45pm **Progress with Source Separation and Conversion to Fertilizer**
Nancy Love, *University of Michigan*

4:00pm **Wrap up and Framing of the Discussion**
Glen Daigger, *University of Michigan*

4:10pm **Facilitated Panel Discussion**
All presenters, led by Session Facilitator

Following this session, Forum attendees are invited to participate in the Monday Evening Welcome Reception, 5:00pm-6:00pm in the Agave Foyer. For those staying as guests at the Embassy Suites, the reception continues until 7:00pm in the hotel lobby.

TECHNICAL PROGRAM

Session 2: Emerging Trends and Unexpected Outcomes

Tuesday, January 15, 2019
8:30am-9:45am

Facilitator: **Beverley Stinson, *AECOM***

8:30am **Chronicle Review of Progress of EBPR, Challenges, and Future Trends and Needs**
James Barnard, *Black & Veatch*

8:55am **Exploring and Piloting the Implementation of Sidestream EBPR with Mainstream Shortcut Nitrogen Removal Processes**
Charles Bott, *Hampton Roads Sanitation District*

9:00am **Engineering the Microbiome of EBPR Granular Sludge for Nutrient Removal and Biorefinery**
David Weissbrodt, *Delft University of Technology*

9:10am **Experiences from Incorporation of Phosphorus Recovery Technologies in EBPR Processes**
Peter Schauer, *Clean Water Services*

9:20am **Facilitated Panel Discussion**
All presenters, led by Session Facilitator

This session leads immediately into Session 3, continued on next page.

TECHNICAL PROGRAM

Session 3: Understanding Microbial Ecology of EBPR

Tuesday, January 15, 2019
9:45am-11:00am

Facilitators: **Per Nielsen, *Aalborg University***
April Gu, *Cornell University*

9:45am **Overview of Current Microbial Ecology in EBPR, New Advances, and Existing Knowledge Gaps**
Per Nielsen, *Aalborg University*

10:10am **The Promise and Peril of DPAOs for Resource-Efficient EBPR**
George Wells, *Northwestern University*

10:20am **Combining Phenotyping, Phylogeny, and Modeling to Reveal the Factors which Impact EBPR Performance and Stability**
April Gu, *Cornell University*

10:35am **Challenges in EBPR in Warm Climates**
Yingyu Law, *Nanyang Technological University*

10:45am **Facilitated Panel Discussion**
All presenters, led by Session Facilitators

This session leads immediately into Session 4, continued on next page.

TECHNICAL PROGRAM

Session 4: Modeling Challenges and New Thoughts

Tuesday, January 15, 2019
11:00am-12:30pm

Facilitators: **April Gu, *Cornell University***
Andy Shaw, *Black & Veatch*

11:00am **Introduction**
Adrienne Menniti, *Clean Water Services*
April Gu, *Cornell University*

Topic: Current EBPR Models and Knowledge Gap

11:05am **Current Models, Advantages, and Limitations**
Imre Takacs, *Dynamita*

11:15am **Towards a Comprehensive Metabolic-ASM Model for Full-Scale Biological Nutrient Removal Systems**
Jorge Santos, *Universidade Nova de Lisboa*
Leiv Rieger, *inCTRL Solutions, Inc.*

11:25am **Agent-Based Modeling in EBPR, Process Heterogeneity, and Population Heterogeneity**
Andy Schuler, *University of New Mexico*
April Gu, *Cornell University*

11:35am **How to Incorporate Mechanistic Parameters/Models into Practice Model Effectively?**
Patrick Dunlap, *Black & Veatch*
Andy Shaw, *Black & Veatch*

11:45am **Facilitated Panel Discussion**
- Which Approach is Best and Why?
- Knowledge Gap in Current Models: What Is the Critical Information Missing?

All presenters, led by Session Facilitators

This session is immediately followed by lunch (12:30pm-1:30pm) in the room.

TECHNICAL PROGRAM

Session 5: Interaction with Nitrogen Removal

Tuesday, January 15, 2019
1:30pm-3:00pm

Facilitator: **Pusker Regmi, *Brown and Caldwell***

1:30pm **Facilitator Introduction**
Pusker Regmi, *Brown and Caldwell*

Topic: Utility – Process Flow Diagram, Objectives, and Challenges

1:35pm **Compact Nitrogen and Phosphorus Removal Through Application of Sidestream Configurations**
Jim McQuarrie, *Denver Metro Water Reclamation District*

1:40pm **Impact of Shortcut Nitrogen Removal on Biological Phosphorus**
Peter Schauer, *Clean Water Services*

Topic: Prospective Solutions

1:45pm **Integrating BioP with Shortcut Nitrogen Removal at Pilot Scale**
Stephanie Klaus, *Virginia Tech and Hampton Roads Sanitation District*

2:00pm **Understanding Low DO-Based Shortcut Nitrogen with Biological Phosphorus Removal**
Jose Jimenez, *Brown and Caldwell*

2:10pm **Aerobic Granular Sludge**
Mari Winkler, *University of Washington*

2:20pm **Facilitated Panel Discussion**
All presenters, led by Session Facilitator

This session leads immediately into Session 6, continued on next page.

TECHNICAL PROGRAM

Session 6: Design and Operating Practices

Tuesday, January 15, 2019
3:00pm-4:30pm

Facilitator: **JB Neethling, *HDR***

3:00pm **Facilitator Introduction**
JB Neethling, *HDR*

3:05pm **Operational Strategies to Optimize Fermentation and Carbon Use**
Gerry Stevens, *AECOM*

3:15pm **What Happens in the Bioreactor Should Not Stay in the Bioreactor: Shedding Light Upon Bio-P Removal with Integrated CFD-Biokinetics**
Usman Rehman, *AM-TEAM*

3:25pm **Denitrifying Glycogen Accumulating Organisms: (Out?) Selection, Impact on EBPR Stability, and Supplemental Carbon Control**
Alexandria Gagnon, *Virginia Tech and Hampton Roads Sanitation District*

3:35pm **BioP and ChemP Interplay**
Bryce Figdore, *HDR*

3:45pm **Facilitated Panel Discussion**
All presenters, led by Session Facilitator

4:30pm **Session Concludes**

Following this session, participants are encouraged to enjoy a short afternoon break from 4:30pm-5:50pm. Please plan to meet in the hotel lobby by 5:50pm to travel to UT Austin's campus for the reception and honorary dinner.

TECHNICAL PROGRAM

Session 7: Whole Plant Impacts

Wednesday, January 16, 2019
8:30am-10:00am

Facilitators: **Jim McQuarrie, *Denver Metro Water Reclamation District***
Blair Wisdom, *Denver Metro Water Reclamation District*

8:30am **Facilitator Introduction**
Blair Wisdom, *Denver Metro Water Reclamation District*

8:40am **The Total Value of Phosphorus Recovery**
Brooke Mayer, *Marquette University*

8:55am **Whole Plant Considerations for Performing Phosphorus Recovery at WRRFs**
Wendell Khunjar, *Hazen and Sawyer*

9:10am **Impacts of BioP on the Dewaterability of Anaerobically Digested Biosolids**
Jeff Nicholson, *Virginia Tech and Hampton Roads Sanitation District*

9:25am **Facilitated Panel Discussion**
All presenters, led by Session Facilitators

This session leads immediately into Session 8, continued on next page.

TECHNICAL PROGRAM

Session 8: Preparing for Future Nutrient Management Strategies

Wednesday, January 16, 2019
10:00am-12:00pm

Facilitator: **Jeanette Brown, *Manhattan College***

10:00am **Introduction**
Jeanette Brown, *Manhattan College*

10:05am **Back-Casting Exercise – 30-50 Years in the Future**

Phosphorus from Field to Fork and Beyond
David Vaccari, *Stevens Institute of Technology*
This discussion will focus on phosphorus from the perspective of global supply and demand, summarizing the global flows of phosphorus from mine to field to fork to disposal and showing how wastewater and its recycling fits into the overall scheme. The potential effectiveness of several conservation measures will be compared, including reuse and recycling of phosphorus from wastewater.

Resource Recovery in Integrated Wastewater Management – The Future is Here Now
David Stensel, *University of Washington*
Donald Mavinic, *University of British Columbia*
Recognized available resources in wastewater are carbon for methane, nitrogen and phosphorus for fertilizers, thermal energy for heat extraction, and water for reuse and groundwater recharge. The biological pathway of using carbon in biological processes for phosphorus recovery and heterotrophic nitrogen removal is in conflict with maximizing energy recovery via methane production. Recent advances at UBC in microwave/advanced oxidation for sludge pretreatment and phosphorus recovery and use of granular sludge at UW in continuous flow systems for biological nutrient removal are discussed. Synergy of these technology developments are increased efficiency of using carbon for both energy production and nutrient recovery and removal.

"Waste Not, Want Not" – Utilities in the Future
Amit Pramanik, *The Water Research Foundation*
For more than a century, water professionals have contributed significantly to protecting the public and environment, as well as increasing human

Session 8 continues on next page

Session 8 continues from previous page

longevity. They have made even greater strides in the past few decades and are beginning to focus their attention on global issues, including the United Nation's "sustainable development goals" (SDGs), especially clean water and sanitation for all people. Water & sanitation also intersect with several other SDGs – the next few decades will see more innovations in our water utilities that begin to make larger & more positive impacts on other goals, including food, energy, sustainable cities and communities, etc. – by using our resources even more wisely.

10:40am **Group Exercise**
Small Groups with Facilitated Discussion Questions

11:15am **Facilitated Discussion**
All presenters, led by Session Facilitator

This session leads immediately into the working lunch and Closing Session, *continued on next page.*

TECHNICAL PROGRAM

Closing Session / Roadmap

Wednesday, January 16, 2019
12:00pm-2:45pm

Facilitator: **Charles Bott, *Hampton Roads Sanitation District***

This session will kick off at noon with a working lunch in the session room and from there will lead into the program listed below.

12:00pm **Working Lunch**
Report Outs and Discussion on Important Topics and Research Questions from Sessions 1-8 Facilitators

1:30pm **Discuss and Document the Most Important Research Questions and Path Forward**
Facilitated Panel with All Session Facilitators; Sessions 1-8

2:00pm **Summarizing the Forum, Future Directions, and Research Needs**
David Jenkins, *University of California at Berkeley*

2:30pm **Final Comments**
James Barnard, *Black & Veatch*

Working Session

2:45pm-5:00pm

The Steering Committee will lead discussions immediately following the Closing Session. All Forum registrants are invited to participate in take-aways and next steps.

PRESENTER AND FACILITATOR BIOGRAPHIES

A short biography for each Presenter and Facilitator is provided below in alphabetical order by last name.

James Barnard, *Black & Veatch, 2019 Forum Honorary Chair*

James L. Barnard, Ph.D. IWA Fellow, WEF Fellow, BCEE., Dist. MASCE developed the Bardenpho, MLE and Phoredox (aka AO, A2O) processes for biological nitrogen and phosphorus removal and designed more than 140 BNR plants including the first plants in North America at Palmetto FL and Kelowna BC. He served on WERF supervisory committees and Advisory Committees for New York, DC Water, Los Angeles, Winnipeg and others. He was awarded the Clarke Prize in 2007, received Honorary Doctorates from the Universities of Johannesburg, Iowa State and Stellenbosch, the Lee Kuan Yew Singapore Water Prize in July 2011 and Dist. MASCE. Became a WEF Fellow in 2011. He is presently employed by Black & Veatch as a Global Practice and Technology Leader. His research into BPR has unveiled some new perspectives. He is fascinated by the history of sanitation and especially biological nutrient removal.

Rich Batiuk, *U.S. EPA Chesapeake Bay Program Office (Retired)*

Rich Batiuk was the Associate Director for Science, Analysis, and Implementation at the United States Environmental Protection Agency's Chesapeake Bay Program Office located in Annapolis, Maryland. In his 33 years with EPA and the Chesapeake Bay Program partnership, he led the integration of science into multi-partner policy-making and collaborative decision-making. Rich has now teamed up with Holly Greening, former Director of the Tampa Bay Estuary Program, as CoastWise Partners to apply their combined 70+ years of experience to provide help with development and implementation of collaborative watershed management strategies. They are working with a wide array of agencies and organizations across the country, all for only good food! He received his B.S. in Environmental Science from the University of New Hampshire in 1984 and his M.S. in Environmental Toxicology from American University in Washington D.C. in 1985.

Jeanette Brown, *Manhattan College*

Jeanette Brown Is a Research Assistant Professor at Manhattan College, Department of Civil and Environmental Engineering and former Executive Director of the Stamford Water Pollution Control Authority. She is a registered professional engineer, a Board Certified Environmental Engineer, and a Diplomate in the American Academy of Water Resource Engineers. She is a Past-president of WEF and currently serves on the Board of the Water Research Foundation. She has published and presented numerous papers on nutrient removal, biosolids management, and history of environmental engineering.

PRESENTER AND FACILITATOR BIOGRAPHIES

Charles Bott, *Hampton Roads Sanitation District*

Charles Bott is the Director of Water Technology and Research (and Chief Technical Officer) at the Hampton Roads Sanitation District (HRSD) in southeast Virginia, where he currently is managing technology innovation and research and development efforts for HRSD's sixteen wastewater treatment plants (2.5 M p.e. combined capacity) and collection system.

Glen Daigger, *University of Michigan*

Dr. Daigger is currently Professor of Engineering Practice at the University of Michigan and President and Founder of One Water Solutions, LLC, a water engineering and innovation firm. He previously served as Senior Vice President and Chief Technology Officer for CH2M HILL where he was employed for 35 years, as well as Professor and Chair of Environmental Systems Engineering at Clemson University. Actively engaged in the water profession through major projects, and as author or co-author of more than 100 technical papers, four books, and several technical manuals, he contributes to significantly advance practice within the water profession. He has advised many of the major cites of the world, including New York, Los Angles, San Francisco, Detroit, Singapore, Hong Kong, Istanbul, and Beijing. Deeply involved in professional activities, he is currently a member of the Board of Directors of the Water Research Reuse Foundation (TWRF), and a Past President of the International Water Association (IWA). The recipient of numerous awards, including the Kappe, Freese, and Feng lectures and the Harrison Prescott Eddy, Morgan, and the Gascoigne Awards, and the Pohland Medal, he is a Distinguished Member of the American Society of Civil Engineers (ASCE), a Distinguished Fellow of IWA, and a Fellow of the Water Environment Federation (WEF). A member of a number of professional societies, Dr. Daigger is also a member of the U.S. National Academy of Engineers.

Christine deBarbadillo, *DC Water, 2019 Forum Co-Chair*

Chris deBarbadillo currently serves as the director for DC Water's Department of Clean Water Quality and Technology which focuses on wastewater treatment process research, laboratory analyses in support of Blue Plains AWTP operation, and DC Water's pretreatment program. Over the past twenty-five years, she has been actively involved with nutrient removal in a number of roles, including research, pilot testing, process evaluations and design of a number of full-scale systems.

PRESENTER AND FACILITATOR BIOGRAPHIES

Patrick Dunlap, *Black & Veatch*

Patrick Dunlap is a process engineer with Black & Veatch specializing in process modeling and BNR process design. He has a BS in Civil Engineering from North Dakota State and an MS in Environmental Engineering from the University of Texas. Patrick has been involved in the process design, modeling, and study of many facilities utilizing innovative EBPR and fermentation processes during his 8 years in the industry.

Haley Falconer, *City of Boise, Idaho*

Haley Falconer is the Environmental Division Manager for the City of Boise. In this role, Haley oversees the water quality, water renewal planning, materials management, air quality, energy, and sustainability. Her role includes tracking and implementing environmental, economic, and community projects and programs throughout the City. Prior to this role, Haley served as the Sustainability Coordinator for the City. Before joining the City, Haley worked as a wastewater project manager for HDR Engineering in Boise. She received her undergraduate degree in civil engineering from North Dakota State University and her M.S. in environmental engineering from Washington State University.

Bryce Figdore, *HDR*

Bryce Figdore is a wastewater process engineer with HDR based in Bellevue, WA. He has a Bachelor's degree from The Pennsylvania State University, a Master's degree from Villanova University, and a PhD from the University of Washington where his work focused on granular activated sludge. Bryce is enthusiastic about applying his expertise in biological nutrient removal to deliver innovative and robust solutions to protect water quality and astutely manage water resources. Occasionally he can be found exploring the great Pacific Northwest while fly fishing or hiking with his family.

Alexandria Gagnon, *Virginia Tech and Hampton Roads Sanitation District*

Alexandria "Ali" Gagnon is a Treatment Process Engineer with Hampton Roads Sanitation District. She holds a Bachelor's of Science degree in Civil & Environmental Engineering from Virginia Military Institute and Masters of Science in Environmental Engineering from Virginia Tech. She is currently pursuing her PhD in Civil Engineering from Virginia Tech.

PRESENTER AND FACILITATOR BIOGRAPHIES

April Gu, *Cornell University*

Dr. Gu is currently full professor and Atkinson Center for a Sustainable Future Faculty Fellow in the School of Civil and Environmental Engineering at Cornell University in Ithaca, NY, US. Dr. Gu received her B.S. in Environmental Engineering and Science from Tsinghua University in Beijing, China and a Ph.D. in Civil and Environmental Engineering, jointly in Microbiology, from the University of Washington, US. Dr. Gu is an elected Fellow of Water Environment Federation for her professional achievement, stature and contributions to the water profession. She is among the recognized world leaders in enhanced biological phosphorus removal (EBPR) technology with her distinguished contributions to the advancement in both fundamental science and translation to practice technology innovations.

David Jenkins, *University of California at Berkeley*

David Jenkins is Professor Emeritus of Civil and Environmental Engineering at the University of California at Berkeley where he taught from 1960 to 1999. His major areas of interest are in biological wastewater treatment processes and water and wastewater microbiology and chemistry. Since becoming emeritus, he has continued the participate in research as well as engage in consulting and advisory work worldwide. He is a member of the National Academy of Engineering and the holder of the IWA Global Water Award. He is an honorary life member of WEF and IWA.

Jose Jimenez, *Brown and Caldwell*

Jose Jimenez is a Vice President and Senior Process and Technical Specialist at Brown and Caldwell who has been involved with the functional design of numerous wastewater treatment plants across the U.S. Jose currently serves as Brown and Caldwell's Director of Process Engineering and Applied Research. Jose received his PhD at the University of New Orleans and is a licensed professional engineer in multiple states and board certified environmental engineer by the American Academy of Environmental Engineers.

Stephanie Klaus, *Virginia Tech and Hampton Roads Sanitation District*

Stephanie Klaus is a PhD student at Virginia Tech in Environmental Engineering working with Dr. Charles Bott at Hampton Roads Sanitation District. She has researched a variety of topics pertaining to sidestream and mainstream shortcut nitrogen removal. She is currently working on integrating Bio-P with mainstream shortcut nitrogen removal at a pilot scale plant. Stephanie is a PE in the state of Virginia.

PRESENTER AND FACILITATOR BIOGRAPHIES

Wendell Khunjar, *Hazen and Sawyer*

Wendell O. Khunjar obtained his B.S. in civil engineering from Howard University in 2004, M.S. and PhD. in Civil and Environmental Engineering from Virginia Tech in 2006 and 2009 respectively. He completed post-doctoral research at both the University of Michigan and Columbia University. He is a licensed profession engineer in the Commonwealth of Virginia and New York State. Wendell is currently a senior associate and director for wastewater innovations at Hazen and Sawyer.

Tom Kunetz, *Metropolitan Water Reclamation District of Greater Chicago, WEF President*

Thomas E. Kunetz is the 2018-2019 President of the Water Environment Federation (WEF), an international organization of water quality professionals headquartered in Alexandria, Va. Tom is the assistant director of monitoring and research for the Metropolitan Water Reclamation District of Greater Chicago, leading the district's efforts on key strategic engineering initiatives. He has over 30 years of experience in the field of environmental engineering in both the public and private sectors, focusing on design of wastewater treatment facilities, improving the water environment, and protection of public health. A WEF member since 1992, Tom is the past chair of the Municipal Wastewater Treatment Symposium, and served on the Program Committee, and the Municipal Water Resource Recovery Design Committee. He was a member of the Chicago WEFMAX organizing committee and served on the Stockholm Junior Water Prize organizing committee with the Illinois Water Environment Association. Tom is a registered professional engineer in the state of Illinois. He is a graduate of the WEF-sponsored Water and Wastewater Leadership Center at the University of North Carolina, the 2012 recipient of the Charles Walter Nichols Award for Environmental Excellence from the American Public Works Association, and a WEF Fellow. He has served as technical advisor to the student chapter of Engineers for a Sustainable World at Northwestern University, traveling to Panama with the students. Tom earned his B.S. in environmental engineering from the Pennsylvania State University and an M.S. in water resources engineering from Villanova University.

Yingyu Law, *Nanyang Technological University*

Yingyu obtained her Phd in 2012 in Chemical Engineering from the Advanced Water Management Centre, the University of Queensland, Australia where she investigated greenhouse gas emissions from waste water treatment systems. She then moved to Singapore and joined the Singapore Centre on Environmental Life Sciences Engineering (SCELSE) at the Nanyang Technological University where she started working on understanding EBPR in the tropics. Currently a Senior Research Fellow, she is also a Co-Principle Investigator investigating mainstream nitritation-anammox.

PRESENTER AND FACILITATOR BIOGRAPHIES

Nancy Love, *University of Michigan*

Dr. Nancy G. Love is the Borchardt and Glysson Collegiate Professor of Civil and Environmental Engineering at the University Michigan, and an adjunct Professor at the Institute of Biotechnology at Addis Ababa University. She has advised over 70 graduate students and post-doctoral research associates. Her research focuses at the interface of water, infrastructure and public health. She has co-authored: over 100 peer reviewed papers, chapters and reports; over 250 conference presentations; and the 2011 textbook Biological Wastewater Treatment, 3rd Edition by Grady, Daigger, Love and Filipe. Dr. Love has held leadership positions in multiple organizations, including with the Water Environment Federation (WEF), the International Water Association (IWA), and the Association of Environmental Engineering and Science Professors (AEESP). She is a Fellow of all three of these organization s as well. She is also a licensed professional engineer (P.E.) in the state of Michigan and a Board Certified Environmental Engineer (BCEE).

Brooke Mayer, *Marquette University*

Dr. Brooke Mayer is an Associate Professor in the Department of Civil, Construction and Environmental Engineering at Marquette University. Dr. Mayer's research focuses on the design and assessment of more sustainable water and wastewater treatment technologies that are able to simultaneously mitigate the risks posed by microbial and chemical contaminants. Her work deals with efforts to remove and recover phosphorus from wastes for reuse as a valuable fertilizer product. She also specializes in providing safe drinking water through the removal and inactivation of pathogens as well as harmful chemicals such as metals and disinfection byproduct precursors. Dr. Mayer earned her B.S. (2004), M.S. (2006), and Ph.D. (2008) from Arizona State University.

Jim McQuarrie, *Denver Metro Water Reclamation District*

Jim McQuarrie is the Director of Strategy and Innovation at Metro Wastewater Reclamation District in Denver Colorado. In this role he has spent the last few years working to grow organizational capacity in the areas of strategy and communication, capital planning prioritization, and technology and innovation. He has been with the District for eight years including prior roles as Operations Officer and Chief Innovation Officer. Before joining the District he worked as a consultant doing wastewater process design and clearly remembers the very first time he got to work with Dr. Barnard and will be forever grateful for his mentorship.

PRESENTER AND FACILITATOR BIOGRAPHIES

Adrienne Menniti, *Clean Water Services*

Adrienne Menniti, PhD, PE is a Principal Process Engineer at Clean Water Services. Adrienne received her bachelor's degree in Civil and Environmental Engineering from the University of Cincinnati and her master's and doctoral degrees from the University of Illinois at Urbana-Champaign. Dr. Menniti has ten years of experience in planning, design, optimization and troubleshooting of wastewater treatment processes.

JB Neethling, *HDR*

Dr. Neethling is a Senior Vice President with HDR Engineering, Inc. As the Technical Director for Wastewater Treatment, he is responsible for evaluating technical solutions to environmental problems, drawing from his academic and research experience to find practical solutions for current challenges. JB has 40 years' experience in reviewing, evaluating, and designing wastewater treatment processes. His primary focus is biological wastewater treatment processes, specifically nutrient removal design and operations. JB is the lead principal investigator for WERF's Nutrients challenge, a collaboration of utilities, universities, consultants, manufacturers, and others researching nitrogen and phosphorus removal processes, and initiating research to fill the knowledge gaps. He led the "Shortcut Nitrogen Removal – Nitrite Shunt and Deammonification" Special Publication. JB has been active in nutrient removal since the 1970's and designed many nitrogen and phosphorus removal plants, including the Clean Water Service's BNR plant to meet 0.07 mg/L total phosphorus in the 1990's, several facilities in the Pacific Northwest to meet less than 50 ug/L TP, and several nitrogen removal processes including one to meet 2 mg/L TIN. He holds a bachelor's degree from the University of Stellenbosch (South Africa) and MS and PhD degrees from University of California, Berkeley.

Jeff Nicholson, *Virginia Tech and Hampton Roads Sanitation District*

Jeff began his research career looking at the effect of monochloramines on lead release in drinking water with Marc Edwards at Virginia Tech. However, after a job in Paraguay with the Peace Corps working with a rural community improving public health issues, he returned to the dark side of water treatment. With HRSD he's been able to learn many aspects of wastewater treatment. He worked on a project fermenting primary biosolids with grease trap waste, exposing him to a wonderful bouquet of odors making him an unofficial sludge sommelier (Pronounced: suh-mel-yay). He continues his work focusing on the dewatering of biosolids with Matt Higgins at Bucknell identifying the mechanisms that affect dewatering with respect to Bio-P and thermal hydrolysis pretreatment.

PRESENTER AND FACILITATOR BIOGRAPHIES

Per Nielsen, *Aalborg University*

Per Halkjær Nielsen is full professor at the Department of Chemistry and Bioscience at Aalborg University, Denmark where he is heading the multidisciplinary Center for Microbial Communities (www.cmc.bio.aau). His research group has been active in environmental biotechnology for over 25 years, focusing on microbial ecology of biological wastewater treatment and bioenergy production and recovery of nutrients. He has been among the pioneers in the development and implementation of the new DNA sequencing technologies in the water engineering field, and has developed MiDAS, an open online microbiology resource for everyone working in wastewater treatment systems. One focus point has been microbial ecology of the EBPR process. He is IWA Fellow and has chaired the International Water Association (IWA) specialist group "Microbial Ecology and Water Engineering" for 8 years (2005-2013) and is chair of the IWA-ISME (International Society for Microbial Ecology) BioCluster, coordinating activities in the two associations.

Amit Pramanik, *The Water Research Foundation*

Dr. Pramanik has >30 years of experience in environmental engineering both in the USA and overseas. He joined the not-for-profit Water Environment Research Foundation (WERF) in 1997. He held several positions at WERF and became Director of Research, with oversight and responsibility for their portfolio of research and coordination with collaborative partner organizations. Amit managed a diverse portfolio of projects, some with national or global implications, and works with world renowned technical experts on these topics. WERF merged with WRRF in 2016 and then with WaterRF in 2018 and is now The Water Research Foundation (WRF). He is currently WRF's Chief Innovation and Development Officer.

Nathan Qualls, *NEW Water*

Nathan Qualls, P.E., is the Director of Technical Services for NEW Water, the brand of the Green Bay Metropolitan Sewerage District. Nathan has been in the wastewater field for 18 years. In his current role Nathan leads the Engineering and Field Services Departments and is responsible for the Capital Improvement Plan. He has a B.S. in Chemical Engineering from the University of Wisconsin.

PRESENTER AND FACILITATOR BIOGRAPHIES

Pusker Regmi, *Brown and Caldwell*

Dr. Pusker Regmi is a Process Engineer with Brown and Caldwell in Washington DC area, with a wide-ranging experience in research and development of innovative wastewater treatment technologies. Dr. Regmi is the author of over 30 publications in peer-reviewed international technical journals and proceedings of national and international conferences. Dr. Regmi is a valuable partner of Water Environment and Reuse Foundation (WE&RF) working on many collaborative research projects of national significance. He is one of the primary authors of Water Environment Federation (WEF) special publication - Shortcut Nitrogen Removal - Nitrite-shunt and Deammonification. Dr. Regmi authored Biofilm Reactor Technology and Design Chapter in WEF Manual of Practice - Design of Water Resource Recovery Facilities (MOP 8, 6th edition). He also serves as a reviewer for many international peer-reviewed journals including Water Research. Dr. Regmi's technical expertise includes process design for nutrient removal, instrumentation, control and automation of wastewater treatment. Dr. Regmi has led research of a novel mainstream shortcut nitrogen removal. He has U.S. patents for developing novel mainstream shortcut nitrogen removal and deammonification technologies.

Usman Rehman, *AM-TEAM*

Dr. Usman Rehman has a PhD degree in Applied Biological Sciences from Ghent university, Belgium. In 2017, he along with his colleagues has co-founded AM-TEAM (An advanced modelling services provider company) and is currently working as CTO in AM-TEAM. His research interests include integrated CFD-biokinetic modelling of wastewater treatment processes and technologies. He has actively advocated the use of CFD modelling for not only troubleshooting but also for designing new processes and technologies.

Leiv Rieger, *inCTRL Solutions, Inc.*

Leiv Rieger, PhD, P.Eng., CEO of inCTRL Solutions, specializes in instrumentation, monitoring, modelling, and control of wastewater treatment. He received his Ph.D. from EAWAG/ETH Zurich in Switzerland. Leiv is the chair of the IWA Task Group on "Good Modelling Practice", co-developed the format and chaired the first two IWA/WEF Wastewater Treatment Modeling Seminars (WWTmod) and co-chaired the Instrumentation, Control & Automation (ICA2017) conference in Quebec City. He is the past chair of the Modeling Expert Group of the Americas (MEGA) and is member of the WEFTEC municipal symposia. He serves as Editor and member of the Core Editorial Board for *Water Science & Technology* and is a reviewer for various scientific journals in the field of water research. Leiv is the 2015 recipient of WEF's Eddy Wastewater Principles/Processes Medal and is a Fellow of the International Water Association (IWA).

PRESENTER AND FACILITATOR BIOGRAPHIES

Jorge Santos, *Universidade Nova de Lisboa*

Jorge Santos specializes in monitoring and modelling of biological processes from water resource recovery facilities. His main areas of interest are: metabolic modelling and process optimisation, biological nutrient removal and recovery, anaerobic digestion, biopolymer production and entrepreneurship. Jorge Santos is currently a PhD candidate from the MIT-Portugal Program in Bio-Engineering Systems. His PhD project, entitled as "New strategies to promote wastewater treatment plant sustainability through microbial community-based process modelling tools", has been conducted in the Biochemical Engineering Group (BIOENG) at FCT NOVA. Jorge Santos has been an active affiliated Young Water Professional (YWP) member in the International Water Association (IWA) Specialist Group on Modelling and Integrated Assessment since 2016. He was a scientific committee member of two International conferences, speaker in an International webinar and workshop. In 2018, he was the co-chair of the YWPs at the 6th IWA/WEF Water Resource Recovery Modelling Seminar (WRRmod2018) in Québec, Canada**.** Jorge Santos has been involved in five European projects and one national project, he is the author of two papers in world class peer reviewed journals and twelve papers in conference proceedings.

Peter Schauer, *Clean Water Services, 2019 Forum Co-Chair*

Peter Schauer is the Principal Process Engineer heading the Technology Development & Research group for Clean Water Services. CWS operates four wastewater treatment facilities discharging to the Tualatin River in Washington County, Oregon. Previous to CWS Peter was a process engineer within the Water Technologies Group of Black & Veatch and also worked as a civilian for the Navy conducting R&D on membrane bioreactors for shipboard waste. Peter is a graduate of Johns Hopkins with a masters in environmental engineering from the same school.

Andy Schuler, *University of New Mexico*

Andrew Schuler is a Professor in the Department of Civil, Construction, and Environmental Engineering at the University of New Mexico. His primary research interests include nutrient removal, microbial competition, biofilms, and sedimentation. He has 25 years of experience with Enhanced Biological Phosphorus Removal, beginning with his doctoral thesis at UC Berkeley, and continuing today with research on microbial competition and agent-based modeling.

PRESENTER AND FACILITATOR BIOGRAPHIES

Andy Shaw, *Black & Veatch*

Dr. Andrew Shaw is a Global Practice and Technology Leader in Sustainability and Wastewater for Black and Veatch. He has over 25 years of experience in wastewater treatment design, having worked in the UK, Australia and North America. His specialties include nutrient removal, computer modeling, instrumentation, process optimization and life cycle assessments. He is an active member and chair of several WEF and IWA task groups and committees. In his precious spare time, he is a sporadic blogger at the poopengineer.blogspot.com.

David Stensel, *University of Washington*

David Stensel is Professor Emeritus of Civil and Environmental Engineering at the University of Washington, Seattle, WA. He received a B.S. degree in civil engineering from Union College, Schenectady, NY, and M.E. and Ph.D. degrees in environmental engineering from Cornell University. He has authored or coauthored over 150 technical publications and textbooks including the AECOM Metcalf & Eddy *Wastewater Engineering: Treatment and Resource Recovery* textbook. He is a registered professional engineer, a Diplomate in the American Academy of Environmental Engineers, a member of Washington Academy of Science and a Water Environment Federation Fellow.

Gerry Stevens, *AECOM*

Mr. Stevens has been working with the BNR process since 1979, starting with North America's 1st full scale plant in Kelowna B.C. Gerry has provided design, optimization, commissioning and start-up services for more than 30 BNR facilities around the world and many involved close collaboration with James Barnard. Gerry has also contributed to the design, con figuration and operation of the Bio-P Anaerobic Zone and Carbon Fermentation options. Gerry recently participated in the WERF RAS Fermentation Study providing one year of detailed operating data on the Westside Regional WWTP process.

Beverley Stinson, *AECOM*

Beverley Stinson is a Senior Vice President with AECOM and heads up the Wastewater business globally for AECOM. Throughout her career she has had a significant focus on BNR and technical innovation. Bev has had the privilege to work with some of the most innovative thought leaders in the industry including DC Water, HRSD, Singapore PUB and many more. Most recently she has been working on the evaluation of sidesteam Bio-P (specifically the Westbank EBPR process) and its potential to support continuous flow granulation and capacity infra-stretching at BNR facilities.

PRESENTER AND FACILITATOR BIOGRAPHIES

Imre Takacs, *Dynamita*

Dr. Imre Takacs is a widely recognized expert on process modeling with close to 40 years of experience. He received his PhD in environmental sciences in Ghent, Belgium. He is active member of IWA and WEF, worked on the Good Modeling Practice STR, several books and many peer reviewed papers. He is founder and first director of the MEGA workgroup in MRRDC, WEF. Imre participated in and directed the development of process software that are widely used in the industry: GPS-X, BioWin and Sumo. He has also developed new concepts in process models that extend their applicability for real-world, whole plant applications: settling, chemical and biological phosphorus removal, side-stream treatment, carbon capture for energy recovery, biofilms, equilibrium chemistry, natural and engineered precipitation such as for nutrient recovery. Imre trained hundreds of companies around the world in the use of process modeling. He is currently CEO of Dynamita, a new kind of simulation company, makers of Sumo.

David Vaccari, *Stevens Institute of Technology*

Dr. Vaccari is a professor at Stevens Institute of Technology in Hoboken, NJ. He has degrees in environmental science and chemical engineering from Rutgers University. He is a licensed Professional Engineer in New Jersey, a Board-Certified Environmental Engineer, and is listed in the Who's Who in Environmental Engineering and Science. His specialties include stochastic modeling of wastewater treatment and other processes, and biogeochemical cycling of phosphorus. He is the author of a Scientific American article on phosphorus resources, and the textbook Environmental Biology for Engineers and Scientists.

David Weissbrodt, *Delft University of Technology*

David Weissbrodt is an Assistant Professor at Delft University of Technology, Netherlands, where he leads the Weissbrodt Group for Environmental Life Science Engineering within the Environmental Biotechnology Section of the Department of Biotechnology, and where he teaches in both the Life Science & Technology and Civil Engineering & Geosciences programs. He received the 2nd Best Teacher Award of the Year 2018 of the Master Track in Environmental Engineering. His research program in process ecogenomics involves a strong combination of (bio)process engineering and environmental systems biology at the nexus of ecodesign (intensified processes using biofilms and granular sludge for nutrient removal and capture), biorefinery (exopolymers, carboxylate platform, phototrophic systems) and wastewater-based epidemiology (micropollutants, xenogenic elements, antibiotic resistances). He owns 15 years of experience on BNR granular sludge technologies. He is member of the management committee of the IWA specialist group Microbial Ecology and Water Engineering and organized and chaired the IWA Biofilms: Granular Sludge Conference 2018.

PRESENTER AND FACILITATOR BIOGRAPHIES

George Wells, *Northwestern University*

George Wells is an Assistant Professor in the Department of Civil and Environmental Engineering at Northwestern University, where he directs the Environmental Biotechnology and Microbial Ecology Laboratory. His primary research interests are microbial nitrogen and phosphorus cycling and shortcut biological nutrient removal processes, resource and energy recovery from wastewater, microbial ecology of engineered and impacted natural systems, sustainable biological wastewater treatment, and microbial greenhouse gas production. George received his B.S. in Chemical Engineering and B.A. in Environmental Engineering from Rice University in 2004. After a short period working at BP Chemicals in Naperville, Illinois, George joined the Department of Civil and Environmental Engineering at Stanford University, where he completed his MS (2006) and PhD (2011) under Dr. Craig Criddle and Dr. Chris Francis. Prior to joining Northwestern University in the fall of 2013, George spent nearly 2.5 years as a postdoctoral scholar under Dr. Eberhard Morgenroth at Eawag- the Swiss Federal Institute of Aquatic Science and Technology (near Zürich, Switzerland).

Mari Winkler, *University of Washington*

Dr. Winkler (Mari) is a Professor at Civil & Environmental Engineering Department at the University of Washington. During her scientific career she studied at the University Duisburg Essen (DE) (Chemistry Department), at University of British Columbia (CA) (Microbiology and Immunology Department), at Columbia University (Earth and Environmental Engineering Department), and at the University of New South Wales (AU) in the Marine-Microbiology Department. She received her PhD from the Environmental Biotechnology Department at Delft University of Technology (NL) and wrote two dissertations; one in the field of environmental engineering and one in microbial ecology. She worked in the Biosystems Engineering Department at the Ghent University (BE) on mathematical modelling of biological processes with Europe's most prestigious Post-Doctoral fellowship (Marie Curie). Dr Winkler received several prizes for her work (AEESP outstanding PhD dissertation award, Huber Technology prize, Jaap van de Graaf award, BIWA industry award, ISME-IWA Biocluster award, Paul A. Busch award from WE&RF, and Rhurverband water award). Her curriculum includes industrial experience in the field of process engineering (NL) and sales management (DE, AT). She is the newsletter editor of the IWA group for sludge management. Her academic interests include microbial ecology of mixed culture communities, mathematical modeling of microbial interactions, and innovative wastewater and sludge treatment processes including Anammox, aerobic granular sludge, resource recovery, and biosolids technology.

PRESENTER AND FACILITATOR BIOGRAPHIES

Blair Wisdom, *Denver Metro Water Reclamation District*

Blair is a wastewater design and process engineer with 9 years of experience as a consultant engineer and 2 years at the Metro District in Denver, Colorado, where she is currently serving as the Technology and Innovation Officer. Blair received her Bachelor of Science degree in Civil and Environmental Engineering at the University of Texas – Austin and a Master of Science degree in Environmental Engineering at the University of Massachusetts – Amherst. Since joining the District, she has been involved in multiple studies and pilot experiments involving phosphorus recovery and the mitigation of negative consequences from bio-P. Studies include piloting of AirPrex, WAS release pretreatment prior to digestion, thermal hydrolysis and associated pre-dewatering, and struvite and vivianite reduction and management.

UPCOMING WEF EDUCATION AND TRAINING EVENTS

AWWA/WEF Utility Management Conference 2019
March 5-8, 2019
Nashville, Tennessee
www.wef.org/UtilityManagement

WEF/IWA Residuals and Biosolids Conference 2019
May 7-10, 2019
Fort Lauderdale, Florida
www.ResidualsBiosolids-WEFIWA.org

Stormwater and Green Infrastructure Symposium 2019
May 8-10, 2019
Fort Lauderdale, Florida
www.wef.org/StormwaterGI

Collection Systems 2019
June 4-7, 2019
Indianapolis, Indiana
www.wef.org/CollectionSystems

Nutrient Removal and Recovery Symposium 2019
July 23-25, 2019
Minneapolis, Minnesota
www.wef.org/Nutrients

WEF/AWWA Transformative Issues Symposium on Workforce 2019
August 7-9, 2019
Washington, DC
www.wef.org/TISWorkforce

WEFTEC 2019
September 21-25, 2019
Chicago, Illinois
www.weftec.org

FORUM LAYOUT AT-A-GLANCE

WEF Forum 2019:
James Barnard Research Conference on Emerging Themes in Biological Phosphorus Removal and Recovery

Overall Event Layout

January 14, 2019 Arrival and Day 1	January 15, 2019 Day 2	January 16, 2019 Day 3 and Departure
	7:15am-8:15am BREAKFAST (for Embassy Suites guests)	7:15am-8:15am BREAKFAST (for Embassy Suites guests)
	8:30am-9:45am 2: Emerging Trends and Unexpected Outcomes	8:30am-10:00am 7: Whole Plant Impacts
	9:45am-11:00am 3: Understanding Microbial Ecology of EBPR	10:00am-12:00pm 8: Preparing for Future Nutrient Mgmt Strategies
	11:00am-12:30pm 4: Modeling Challenges and New Thoughts	12:00pm-2:45pm WORKING LUNCH and Closing Session/Roadmap
12:00pm-1:30pm *Registration Open & Check-in*	12:30pm-1:30pm LUNCH	Working Session approx. 2:45pm-5:00pm Steering committee to lead; all participants invited Head start on take-aways and next steps
1:30pm-2:30pm Opening Session	1:30pm-3:00pm 5: Interaction with Nitrogen Removal	
2:30pm-5:00pm 1: Watershed Based Strategies for Managing Phosphorus	3:00pm-4:30pm 6: Design and Operating Practices	
5:00pm-6:00pm Evening Welcome Reception *[Reception continues until 7:00pm for Embassy Suites guests]*	*4:30pm-6:00pm* *AFTERNOON BREAK -- FREE*	
	Board bus at hotel for commute to UT Austin	
	6:30pm-8:30pm Dinner and Reception at UT Austin	
	Board bus at UT Austin for travel back to hotel	

730 800 830 900 930 1000 1030 1100 1130 1200 1230 100 130 200 230 300 330 400 430 500 530 600 630 700 730 800 830 900 930

NOTES

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The Water Environment Federation
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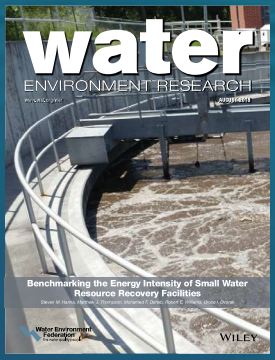
Water Environment Research starting in January 2019!



Published since 1928, *Water Environment Research* (WER) is an international multidisciplinary water resource management journal for the dissemination of fundamental and applied research in all scientific and technical areas related to water quality and resource recovery. *WER's* goal is to foster communication and interdisciplinary research between water sciences and related fields such as environmental toxicology, agriculture, public and occupational health, microbiology, and ecology. In addition to original research articles, short communications, case studies, reviews, and perspectives are encouraged.

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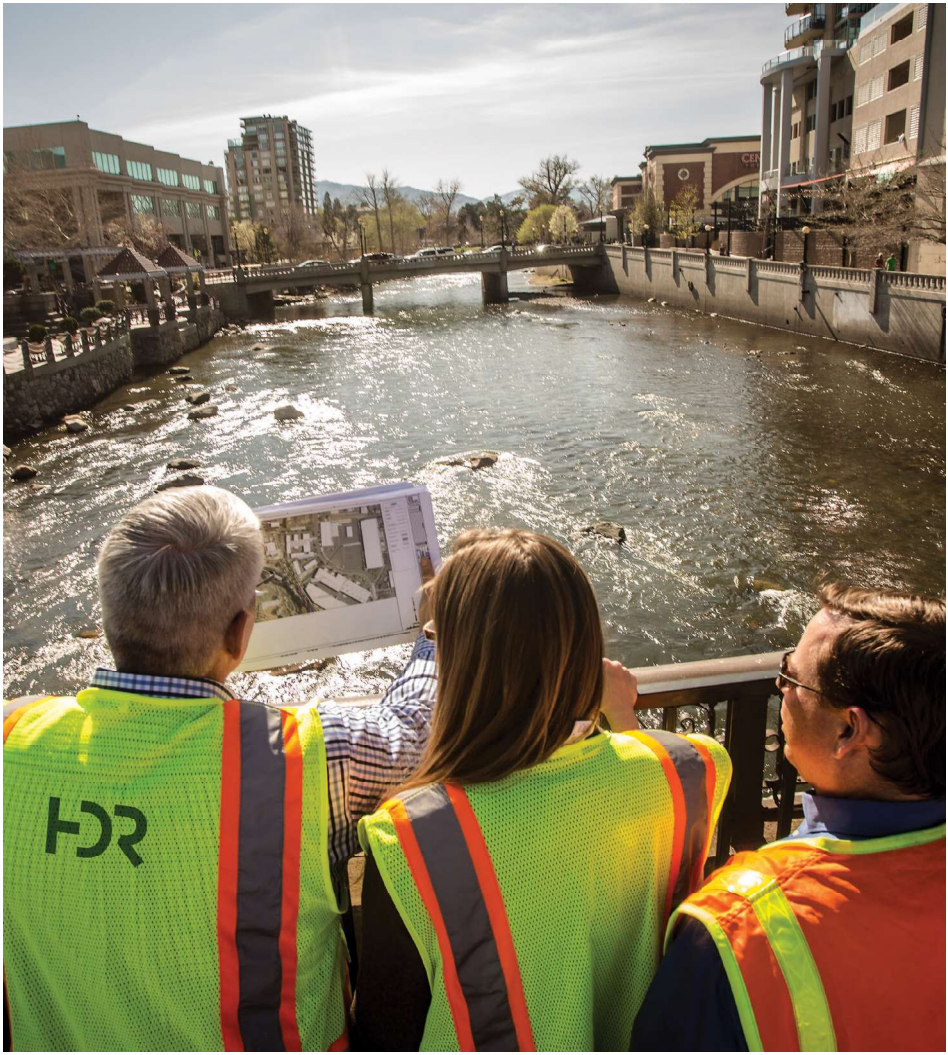
Watch Jason's full interview at **bit.ly/WERPartnership**



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