



## **2019 National Capital Region Water Resources Symposium:**

### **Water Management in Coastal Cities of the Future**

**Friday, April 12, 2019**

**8:30 a.m. – 5:00 p.m.**

**University of the District of Columbia (UDC)**

**David A. Clarke School of Law**

4340 Connecticut Ave., NW, Washington DC

### **Introduction**

This one-day symposium brings together experts from governmental agencies, academia, the private sector, and non-profits to present and discuss innovations in water research, technology, policy and management to respect and reflect the value of water in the National Capital Region, as well as nationally and internationally. We hope that you will make the most of the opportunity to meet other water resources professionals across the region.

The National Capital Region, encompassing the District of Columbia, and parts of Maryland, Virginia and West Virginia, has unique and challenging opportunities for sustainable management of water resources and water infrastructures. The region makes up a large portion of the watershed for the Chesapeake Bay, the largest estuary in the U.S; contains rivers which provide for the water needs of nearly six million people; and hosts many organizations and entities that consider water resources as their primary focus. The role of the AWRA-National Capital Region Section is to focus water resources professionals on water resources issues in the National Capital Region.

The theme of the 2019 Water Resources Symposium is *Water Management in Coastal Cities of the Future*, a critical and futuristic topic that will be discussed by featured speakers in the plenary session.

## Featured Speakers



**Fernando Miralles-Wilhelm**



**William Sweet**



**Phetmano Phannavong**



**Brian Batton**



**Nicholas Bonard**



**Jeff Moeller**

**Dr. Fernando Miralles-Wilhelm** is Professor and Chair, Department of Atmospheric and Oceanic Science at the University of Maryland. He is a hydrologist with research interests in modeling of surface and groundwater systems, climate-hydrology-vegetation interactions, water quality and modeling of the water-energy-food nexus. Dr. Miralles-Wilhelm has been a Principal Investigator in research sponsored by NASA, NOAA, NSF, USDA, USAID, the World Bank and other agencies, and has worked as a consultant in water resources projects in all five continents for over 20 years. Dr. Miralles-Wilhelm is a Fellow of the American Society of Civil Engineers (ASCE) and a Diplomat of the American Academy of Environmental Engineers and the American Academy of Water Resources Engineers; and is a registered Professional Engineer in the States of Massachusetts and Florida. He earned a Mechanical Engineering diploma from Universidad Simón Bolívar in Caracas, Venezuela (1987), a MS in Engineering from the University of California, Irvine (1989), and a PhD in Civil and Environmental Engineering from the Massachusetts Institute of Technology (1993).

**Dr. William Sweet** is a NOAA oceanographer researching changes in nuisance-to-extreme coastal flood risk due to sea level rise (SLR). He has assessed future-changing coastal flood risks for U.S. military assets worldwide and is a lead author for the 4th U.S. National Climate Assessment. He lives in Annapolis, MD and witnesses SLR effects first-hand. He earned a Bachelor's degree in Physics from University of North Carolina at Chapel Hill and a Master's and Ph.D. in Oceanography from North Carolina State University.

**Phetmano Phannavong, JD** oversees DC's flood risk management program that regulates development in flood hazard areas and enhances urban water management. He is the leader of the award-winning interagency DC Silver Jackets team that works to build a resilient DC in a changing climate. He serves as a member of the US DHS Science & Technology Flood Apex Program Research Review Board to improve flood analytics research. He earned his BS and MS in Civil Engineering from Kasetsart University



(Thailand) and the George Washington University, and his JD from the UDC David A. Clarke School of Law, a public interest law school that serves those most in need of legal services. He is a PE registered in DC and VA and admitted to the Minnesota bar.

**Dr. Brian Batten** is a senior coastal scientist and project manager with Dewberry's resilience solutions group. Leveraging his 20+ years of experience, he has provided leadership for federal, state, and municipal clients addressing coastal hazards, climate change, and sea level rise. He had led sea level rise studies for the National Academies of Science, FEMA, states of New York, Florida, and North Carolina, as well as communities such as Virginia Beach, Virginia. Brian has served as a technical lead of FEMA's Sea Level Rise Pilot Studies, and was appointed to the Future Conditions subcommittee of FEMA's Technical Mapping Advisory Council to assist in the incorporation of SLR into the FEMA mapping program.

**Nicholas Bonard** is Branch Chief for Water Resources Protection & Mitigation, Regulatory Review Division at the Department of Energy & Environment, DC Government. Previously he was the Lead at the National Capital Planning Commission (NCPC), the federal government's central planning agency for the National Capital Region where addressing the effects of extreme weather, flooding, and climate change is a primary concern for NCPC as it formulates plans and policies to guide future federal development in the region. Mr. Bonard has led several initiatives on flooding and stormwater, including updating NCPC's floodplain development guidance and publishing the document, "Flood Risk Management Resources for Washington, DC." Mr. Bonard earned a Master's degree in Urban Planning from Harvard University and a Bachelor's degree in Urban and Environmental Planning from the University of Virginia.

**Jeff Moeller** is a Research Unit Leader at The Water Research Foundation (WRF) where he has worked since 1997. Jeff directs two research departments at the Foundation. Jeff has over 20 years of experience and previously worked as an engineer for Hazen and Sawyer designing stormwater, drinking water, and wastewater systems. Jeff has led several major WRF research programs in stormwater, sustainable integrated water management, wastewater, and decentralized systems. He has also directed the LIFT program which is an initiative to accelerate innovation and new technology into practice in the water industry. Jeff has a Bachelor's degree in civil engineering from North Carolina State University, and a Master's degree in civil and environmental engineering from M.I.T. He is a registered professional engineer in Virginia.



**Program**

8:00 a.m.	~~ REGISTRATION ~~	<b>Fifth Floor Lobby</b>
8:45 a.m.	<p style="text-align: center;"><b>Opening &amp; Welcome</b></p> <ul style="list-style-type: none"> <li>• <b>Sandra Pavlovic</b> (NOAA Affiliate), AWRA-NCR Section President</li> <li>• <b>Tolessa Deksissa</b>, Director, Water Resources Research Institute &amp; Professional Science Master’s Water Resource Management Program, University of the District of Columbia</li> <li>• <b>Sabine O’Hara</b>, Dean, College of Agriculture, Urban Sustainability &amp; Environmental Sciences, University of the District of Columbia</li> <li>• <b>Tamim Younos</b>, President, Green Water-Infrastructure Academy, Washington, D.C. Symposium Chair &amp; Vice President AWRA-NCR Section, Fellow Member AWRA <i>Introduction to the Symposium Theme</i></li> </ul>	<b>Room 518</b>
9:15 a.m.	<p style="text-align: center;"><b>Keynote</b></p> <p><b>Dr. Fernando Miralles-Wilhelm</b>, Professor and Chair, Department of Atmospheric and Oceanic Science, University of Maryland Introduction by <b>Joseph Copeland</b>, AWRA-NCR Section Vice President/Program Committee Chair</p>	<b>Room 518</b>
10:00 a.m.	<p>~~ Break ~~</p> <p>Please visit posters on display in the break area</p>	<b>Fifth Floor Lobby</b>





10:30 a.m.	<p><b>Symposium Theme &amp; Invited Panel:</b> Water Management in Coastal Cities of the Future</p> <p><b>Moderator:</b> <b>Nicholas Bonard</b>, Branch Chief for Water Resources Protection &amp; Mitigation, Regulatory Review Division at the Department of Energy &amp; Environment, DC Government</p> <p><b>Panelists:</b> <b>William Sweet, PhD</b>, NOAA Oceanographer <b>Phetmano Phannavong, JD</b>, Leader, DC’s Flood Risk Management Program</p>	<b>Room 518</b>
11:50 a.m.	<p><b>Brian Batten, PhD</b>, Senior Coastal Scientist and Project Manager, Dewberry’s Resilience Solutions Group</p>	
Noon	<p><b>Luncheon Speaker:</b> <b>Jeff C. Moeller, P.E.</b>, Director of Water Technologies, Water Environment Research Foundation Introduction by <b>Elisabeth Ross Eveleigh</b>, AWRA-NCR Section Past President <b>Lunch</b> (provided)</p>	<b>Court Room (5<sup>th</sup> Floor)</b>

**Con-Current & Poster Sessions**

1:15 p.m. - 2:45 p.m.	<p><b>A.</b> Panel: Data Capture, Analytics, and Visualization for Managing Coastal Cities of the Future <b>B.</b> Green Infrastructure &amp; Stormwater Management <b>C.</b> Remote Sensing &amp; Modeling Research</p>	<p>Session A: Room 518 Session B: Room 505 Session C: Room 506</p>
2:45 p.m.	<p>~~ Break ~~ <b>Please visit the posters on display in the break area</b></p>	Fifth Floor Lobby
3:00 p.m.- 4:50 p.m.	<p><b>D.</b> Adapting to Extreme Weather and Climate Change <b>E.</b> Sustainable Water and Environmental Management Strategies &amp; Tools <b>F.</b> Water and Waste Treatment Research</p>	<p>Session D: Room 518 Session E: Room 505 Session F: Room 506</p>
8:30 a.m. – 3:30 p.m.	<b>Poster Presentations</b>	Fifth Floor Lobby
5:15 p.m.	<b>Optional Post- Symposium TOUR: UDC Campus Green Infrastructure</b>	Meet in 1st floor lobby

**Con-Current Sessions (A, B, C)**  
**1:15 p.m. – 2:45 p.m.**

<p><b>A. Special Session - Panel (Room 518)</b></p> <p>Data Capture, Analytics, and Visualization for Managing Coastal Cities of the Future</p> <p><b>Moderator:</b> Sophia Rodriguez, Senior Associate at Booz Allen Hamilton</p> <p><b>Panelists:</b>  <b>Troy Gonzalez</b>, Senior Associate at Booz Allen Hamilton  <b>Gladly Singh</b>, Vice President, Government/Enterprise Services at PrecisionHawk  <b>Josh Lowe</b>, Co-Founder and Chief Customer Officer at AkitaBox  <b>Federal Agency Representative</b>, TBD</p> <p><b>Summary</b>  The panel will present a digital twin of Galveston Bay that was developed to assist in planning and emergency response for extreme weather event flooding in the region using open data imagery from the Hurricane Harvey event and additional real-time data from drones and other sensors; will present examples to illustrate the key phases of effective data capture and utilization; and will discuss the frontiers of evolving technologies.</p>	<p><b>B. Green Infrastructure &amp; Stormwater Mangement (Room 505)</b></p> <p><b>Moderator:</b> Alaina Armel, AECOM</p> <p>Modeling and scenario analysis of a long-term monitored rain garden for rainfall-runoff reduction to a combined sewer systematically  A. Massoudieh, Assoc. Prof., Civil and Enviro. Eng. The Catholic University of America, Washington, D.C.</p> <p>Quantifying urban tree transpiration across different management contexts. Sarah Ponte Cabral<sup>1</sup>, Mitchell Pavao-Zuckerman<sup>1</sup>, T. Phillips<sup>1</sup>, N. Law<sup>2</sup>, N. Sonti<sup>3</sup>  <sup>1</sup> Univ. of Maryland, College Park; <sup>2</sup> Center for Watershed Protection; <sup>3</sup> US Forest Service</p> <p>Effectiveness of foam based green roofs/surfaces for reducing runoff pollutant concentrations relative to conventional roofs.  S. Mucha<sup>1</sup>, G. Williamson<sup>2</sup>, S. MacAvoy<sup>1</sup>  <sup>1</sup> Dept. of Environ. American University, <sup>2</sup> Amber Real Estate, LLC, Washington, DC</p> <p>Real-time optimization of stormwater infrastructure using continuous monitoring and adaptive control. C. Lewellyn, Ph.D., P.E., Senior Water Resources Eng. OptiRTC</p>	<p><b>C. Remote Sensing &amp; Modeling Research (Room 506)</b></p> <p><b>Moderator:</b> Leila Farhadi, George Washington University</p> <p>Investigating the potential of assimilating satellite-based phenology observations in a land data assimilation system. A. Rahman<sup>1</sup>, X. Zhang<sup>2</sup>, V. Maggioni<sup>3</sup>, Y. <sup>2</sup>, P. Houser<sup>4</sup>, T. Sauer<sup>4</sup>  <sup>1</sup> PhD Student, <sup>2</sup> Post-Doctoral Fellow, <sup>3</sup> Assistant Professor, <sup>4</sup> Professor, George Mason University</p> <p>Estimation of key components of terrestrial water and energy budgets by assimilating SMAP soil moisture and GOES temperature data. A. Abdolghafoorian, Graduate Res. Assistant; Leila Farhadi, PhD, Assistant Prof. Civil and Environ. Eng. Depart., George Washington University</p> <p>Assimilation of SMAP soil moisture observations for hyper-resolution land surface modeling. T. Rouf<sup>1</sup>, Y. Mei<sup>1</sup>, Viviana Maggioni<sup>1</sup>, P. Houser<sup>2</sup>  <sup>1</sup> Dept. of Civil, Enviro. &amp; Infrastructure Eng. <sup>2</sup> Geography and Geoinformation Science Dept., George Mason University</p> <p>An Introduction to NOAA's National Water Model. Jennifer McGee, PE, CFM, GISP, Water Resources Engineer, Wood E&amp;IS.</p>
---	--	---



**Con-Current Sessions (D, E, F)**  
**3:00 p.m. – 4:50 p.m.**

<p><b>D. Adapting to Extreme Weather and Climate Change (Room 518)</b></p> <p><b>Moderator:</b> Jason Giovannettone, Dewberry</p> <p>Adapting coastal wastewater and conveyance systems for climate change. B. Wright, PE and E. Rosenberg, PhD, PE, Associate, Hazen and Sawyer</p> <p>Using a novel method to map flood susceptibility of the lower Connecticut River Region. J. P. Giovannettone, PhD, PE, Dewberry</p> <p>Future changes in the coastal road overtopping depths controlled by joint probability of tide-stream flows. K. Zomorodi, PhD., PE, CFM Dewberry</p> <p>Perspectives on adaptation and resilience of urban stormwater management in a changing climate. M. Pavao-Zuckerman, Assistant Professor, Environmental Science and Technology, University of Maryland, College Park</p> <p>Climate change challenges for water resources management in Panama. M. C. Larsen, Director, Smithsonian Tropical Research Institute, Panama</p>	<p><b>E. Sustainable Water and Environmental Management Strategies &amp; Tools (Room 505)</b></p> <p><b>Moderator:</b> Xinxuan Zhang, George Mason University</p> <p>Water quality trading in the Chesapeake Bay Watershed. P. Gleason, USEPA Region 3 Trading and Offset Program Lead</p> <p>Optimizing water reuse in the Potomac River Watershed. K. VandenHeuvel*, J. Mattingly, The Water Research Foundation; S. Kaushal, PhD – Associate Prof. University of Maryland</p> <p>An application of remote sensing to the protection of a regional water supply. S. Prajapati, W.P. Frier, NASA Langley Research Center; P. Koch, Patuxent Reservoirs Watershed Protection Group</p> <p>Using NASA remote sensing for water resources and disasters monitoring and management. A. Mehta PhD<sup>1</sup>, E. Podest<sup>2</sup>, A. Prados<sup>1</sup> <sup>1</sup>NASA-UMBC-Joint Center for Erath Systems Tech(JCET) <sup>2</sup>NASA - Jet Propulsion Lab.</p> <p>Balancing environmental sustainability and infrastructure investments. J. Escurra, Adjunct Faculty, UDC &amp; World Bank Consultant; A. Bassi, Founder &amp; CEO, KnowlEdge Srl and Extraordinary Prof. of System Dynamics, Stellenbosch University, South Africa</p>	<p><b>F. Water and Waste Treatment Research (Room 506)</b></p> <p><b>Moderator:</b> Lorena Kowalewski, Mayor's Office of the Clean City</p> <p>Zhi-Wu Wang, PhD, Assistant Prof., Graduate Students: Y. Sun*, Z. An*, D. Zhang* T. R. Kent, W. Khunjarb, Occoquan Lab, Dept. of Civil and Environ. Eng., Virginia Tech; W. Khunjar, E. Rosenfeldt, M. Selbes, Hazen and Sawyer; C. B. Bott Hampton Roads Sanitation District; T. Broderick, M. Strawn, Arlington County Water Pollution Control Bureau; H. Santha, Alexandria Renew Enterprises</p> <p><b>* Speaker</b></p> <ol style="list-style-type: none"> <li>1. Mathematical modeling of deep-bed biofiltration to describe contaminant control and head loss development for potable water reuse (Y. Sun* et al.)</li> <li>2. Granulation of aerobic granules performing nitrification in continuous flow air-lift bioreactors without hydraulic selection pressure (Z. An* et al.)</li> <li>3. Free ammonia resistance of NOB over long-term operation in continuous flow aerobic granulation reactor performing partial nitrification (Z. An* et al.)</li> <li>4. The control of recalcitrant dissolved organic nitrogen production from the thermal hydrolysis of biosolids (D. Zhang* et al.)</li> <li>5. Process intensification of anaerobic digestion: A comparative assessment of temperature phased anaerobic digestion and thermal hydrolysis pretreatment (D. Zhang* et al.)</li> </ol>
---	---	---



## Poster Presentations

Fifth Floor Lobby

**A Reduced-adjoint variational data assimilation for estimating soil hydraulic parameters.** Parisa Heidary and Dr. Leila Farhadi, Civil and Environmental Engineering Department, George Washington University, Washington, D.C.

**Nanoparticles infused mesoporous material for water treatment processes.** Michael Kamen<sup>1</sup>, Highqueen Sarpoma<sup>2</sup>, Vu, Trinh<sup>1</sup>, Tolessa Deksissa<sup>2</sup>, Jiajun Xu<sup>3</sup> <sup>1</sup>Department of Biology, Chemistry & Physics, DC <sup>2</sup> Water Resources Research Institute, <sup>3</sup>Department of Mechanical Engineering, University of the District of Columbia

**Hyper-resolution mapping of atmospheric variables in northern Virginia.** Ishrat Jahan Dollan<sup>1</sup>, Dr. Viviana Maggioni<sup>2</sup>  
<sup>1</sup>Graduate Teaching Assistant, <sup>2</sup>Assistant Professor, George Mason University

**Effects of Anacostia River water on growth and development in larval zebrafish (*Danio rerio*).** VP Connaughton<sup>1</sup>, W Jessup<sup>1</sup>, R Wilken<sup>1</sup>, and S MacAvoy<sup>2</sup> <sup>1</sup>Department of Biology and <sup>2</sup>Department of Environmental Science, American University, Washington, DC

**Application of electrical conductivity for nutrient measurement in the hydroponic System.** Victoria Mirowski, Project Assistant, Candidate of Professional Science Master's in Urban Agriculture and Tolessa Deksissa, Director, Professional Science Master's Program, College of Agriculture, Urban Sustainability and Environmental Sciences, University of the District of Columbia.

**Effectiveness of green infrastructure in retention and nutrient removal.** Brandon Hunt and Theresa Christian, Professional Science Master's in Water Resources Management, Tolessa Deksissa, Director, Professional Science Master's Program, College of Agriculture, Urban Sustainability and Environmental Sciences, University of the District of Columbia.

**Design and construction of demonstrative green roof systems at Van Ness Campus, UDC.** P. Sanchez<sup>1</sup>, S. Tait<sup>2</sup>, S. Alhuwayshil<sup>2</sup>; J. Badal<sup>2</sup>, P. K. Behera<sup>3</sup>, Professor, Civil Eng. <sup>1</sup>MS PSM, Water Resource Management; <sup>2</sup>BS Civil Eng.; <sup>3</sup>Professor, Civil Eng., University of the District of Columbia.

**Assessing spatial distribution of water quality contamination in Washington, DC: A case study of coliform, trace metals and polycyclic aromatic hydrocarbons.** Mudiyansele Rathnayake, Candidate of Professional Science Master's in Water Resources Management Maryam Sabur, Candidate of Professional Science Master's in Water Resources Management, Sania Rose, Project Assistant, Water Resources Research Institute, Sebhata Tefera, Project Specialist, Water Resources Research Institute, Tolessa Deksissa, Director, Professional Science Master's Program, College of Agriculture, Urban Sustainability and Environmental Sciences, University of the District of Columbia.

**Constraints when designing in developing countries.** Christa Lash, PE, Civil Engineer





**Monitoring nutrient leaching in noncirculating hydroponic systems at an active urban farm in Washington, DC.** Daniel Weisshaar, Research Assistant, Candidate of Professional Science Master’s in Urban Agriculture, Tolessa Deksissa, Director, Professional Science Master’s Program, College of Agriculture, Urban Sustainability and Environmental Sciences, University of the District of Columbia

**The urbanization plastic connection.** Jessica Barthel and Dr. Kathy O’Neill, Environ. Sciences Program, Roanoke College, Salem, Virginia.

**Application of Rough Set Theory to water quality analysis: A case study.** Maryam Zavareh and Dr. Viviana Maggioni, Dept. of Civil, Environmental and Infrastructure Engineering, George Mason University.

**Managing for the future: Certified stormwater student class.** Sarah A. Hughes, Environmental Studies Student at Roanoke College & Program Development Intern at The National Stormwater Center.

**Measuring Runoff from Urban Gardens in the D.C. Area.** Jalen Jones, Undergraduate Student, American University; Anna Spiller, M.S. in Agricultural Sciences and Resource Management University of Bonn Germany; Abigail Dias, Undergraduate Student, Harrison Hyde B.S. in Environmental Science, Keeli Howard M.S. in Environ. Science, Dr. Karen Knee Assistant Professor of Environ. Science American University.

5:15 p.m.	<b>Optional Post- Symposium TOUR: UDC Campus Green Infrastructure</b> Led by <b>Dr. Tolessa Deksissa</b> , Director, DC Water Resources Research Institute & Professional Science Master’s Water Resource Management Program	Meet in 1st floor lobby
-----------	---	-------------------------

### Registration

Please register online by Monday, April 9 for the early bird discount. Payment is accepted online by credit card or by cash/ check payment at the event.

Step 1: Go online to the link: <https://co.clickandpledge.com/sp/d1/default.aspx?wid=58557>

Step 2: Fill out the registration fee section

Step 3: Fill out the contact information section

Step 4: Scroll down and click “SUBMIT” to complete the registration and payment

Registration Fees (includes lunch & coffee breaks)	Professionals		Students	
	Member or Presenter/Moderator	Non-Member	Member or Presenter	Non-Member
On-line thru April 9	\$35	\$50	\$15	\$25
On-site April 12	\$50	\$75	\$25	\$35



The American Water Resources Association National Capital Region Section Leadership  
2018-2019

<b>AWRA-NCR Section Program Planning Committee</b>	<b>Board of Directors</b>
<p>Arash Barsari David Conrad Joseph Copeland Tolessa Deksissa Elisabeth Ross Eveleigh Devan Mahadevan Sreetharan Mathini Sandra Pavlovic Mathini Sreetharan Tamim Younos</p>	<p><b>President - Interim:</b> Sandra Pavlovic, P.E. <b>Past President:</b> Elisabeth Ross Eveleigh <b>President-Elect:</b> Sandra Pavlovic, P.E. <b>Vice Pres. / Program Committee Chair:</b> Joseph Copeland <b>Vice Pres. / Symposium Program Chair:</b> Tamim Younos, PhD <b>Membership Chair:</b> Mathini Sreetharan <b>Outreach Chair:</b> Arash Barsari <b>Secretary:</b> Lorena Kowalewski <b>Website Chair:</b> Devan Mahadevan, PhD, P.E. <b>Treasurer:</b> Seth Lawler <b>Directors-at-Large:</b> Tolessa Deksissa, PhD; David Conrad</p>

## Thanks to Our Sponsors and Partners!



Booz | Allen | Hamilton  
strategy and technology consultants



Metropolitan Washington  
Council of Governments