

<p>1.20 UTILITY-SCALE DATA COLLECTION, VISUALISATION AND UTILISATION</p> <p>Chairs: Stephan Köhler, <i>Sweden</i> and Brooke Mason, <i>United States</i></p> <p>Water analytics digital twin: a platform for improving efficiency in water distribution networks, Socrates Metaxas, <i>Water Board of Lemesos, Cyprus</i></p> <p>Augmented reality for geographical information systems — digital transformation of field services at AdRA, Nuno Soares, <i>AdRA-Águas da Região de Aveiro, SA, Portugal</i></p> <p>A step-wise approach for utilizing real-time data in the water sector, Jon Røstum, <i>Volue, Norway</i></p> <p>Smartphone-based reality capture for subsurface utilities, why settle for less?, Torbjørn Pedersen, <i>Landinspektørfirmaet LE34 A/S, Denmark</i></p> <p>---- POSTERS ----</p> <p>Digital twin for optimal processes at PUB IVP, Otto Icke, <i>Royal HaskoningDHV, Netherlands</i></p> <p>3D printing use in water utilities — Watter FabLab at Aguas e Energia do Porto, Maria Veiga, <i>Aguas e Energia do Porto, E.M, Portugal</i></p>	<p>Room B3 a Technical</p>	<p>Monday 15:45-17:15 Data</p> <p>15:45-16:05</p> <p>16:05-16:25</p> <p>16:25-16:45</p> <p>17:05-17:10</p>
<p>1.13 SEWER OVERFLOW MANAGEMENT AT UTILITY LEVEL</p> <p>Chairs: Jean-Luc Bertrand-Krajewski, <i>France</i> and Vatsal Khandelwal, <i>India</i></p> <p>Future city flow - online value-based decision support for optimized real time forecast and control of sewerage systems, Douglas Lumney, <i>DHI Sverige AB, Sweden</i></p> <p>A novel screening methodology to create a programme to progressively reduce pollution from combined sewer overflows (CSOs) using nature-based solutions, Eddison Ruswa, <i>Jacobs, United Kingdom</i></p> <p>Sewer overflow management at utility level: real time decision making, Pedro Pina, <i>Xylem Inc, United Arab Emirates</i></p> <p>Infiltration and inflow water (I/I-water) and risk assesment, Krisitn Jenssen Sola, <i>Asker Municipality, Norway</i></p> <p>---- POSTERS ----</p> <p>Rainwater-basin monitoring and optimisation using machine learning, Peter Rasch, <i>Dryp A/S, Denmark</i></p> <p>Using flow duration curves for evaluating the hydrological performance of green roofs, Elhadi Abdalla, <i>Norwegian University of Science and Technology, Norway</i></p>	<p>Room B4 d Technical</p>	<p>Monday 15:45-17:15 Sewer overflows</p> <p>15:45-16:05</p> <p>16:25-16:45</p> <p>17:05-17:10</p> <p>17:10-17:15</p>
<p>6.5 TECHNICAL ACHIEVEMENTS FOR SURFACE WATER CONTROL</p> <p>Chairs: Vadim Malkov, <i>United States</i> and Juan José Iervasi Scokin, <i>Argentina</i></p> <p>High-resolution nitrate sensors can help provide better monitoring of water quality in Danish streams, Sofie vant Veen, <i>EnviDan, Denmark</i></p> <p>The dynamic aquatic simulation hub: an agile, integrated model and boundary object for integrated water resources management, Shane Carnohan, <i>RISE Research Institutes of Sweden, Sweden</i></p> <p>Digital solutions and early warning system for decision support and risk management in water reuse for irrigation, Alessia Foglia, <i>Marche Polytechnic University, Italy</i></p> <p>Vortex chamber to trap particulate urban pollution, Rob Collins, <i>The River Trust, United Kingdom</i></p> <p>---- POSTERS ----</p> <p>Performance of a hydrodynamic vortex separator for treatment of road runoff, Kristine Bergseng, <i>Ramboll, Norway</i></p> <p>Evaluating the Paraopeba's River water treatability and water quality after the Tailings Dam rupture in Brazil, Marcelo Libanio, <i>UFMG, Brazil</i></p>	<p>Room B3 e Technical</p>	<p>Monday 15:45-17:15 Surface water</p> <p>16:05-16:25</p> <p>16:25-16:45</p>

<p>2.5.3-2 WASTEWATER EPIDEMIOLOGY: ARGS, SARS-COV-2 AND OTHER PATHOGENS</p> <p>Room B3 d Technical</p> <p>Chairs: Gertjan Medema, <i>Netherlands</i> and Amy Pruden, <i>United States</i></p> <p>Using machine learning to identify discriminatory ARGs and socio-economic factors that shape resistome risk in water systems, Peter Vikesland, <i>Virginia Tech, United States</i></p> <p>Quality assessment of SARS-CoV-2 nanopore sequencing data in wastewater variant monitoring, Livia Bomediano, <i>Federal University of ABC, Brazil</i></p> <p>Comparable data on Norovirus and Rotavirus prevalence, excretion rates and wastewater concentrations are required for microbial water quality modelling, Nancy Mondragon, <i>Wageningen University and Research, Netherlands</i></p> <p>Developing rapid measurement of actinomycetes using quantitative PCR method to prevent proliferation in wastewater treatment plant, Takeshi Nakamura, <i>Tokyo Metropolitan Sewerage Service Corporation, Japan</i></p> <p>--- POSTERS ---</p> <p>Long-term wastewater Norovirus surveillance and its correlation with clinical reports, Yifan Zhu, <i>Tohoku University, Japan</i></p> <p>Using viability quantitative PCR to evaluate the health risk of virus pollution derived from combined sewer overflow, Hiroyuki Katayama, <i>The University of Tokyo, Japan</i></p>		<p>Monday 15:45-17:15 Epidemiology</p> <p>15:45-16:05</p>
<p>2.1.2-2 IMPROVED ANAEROBIC PROCESS</p> <p>Room C3 Technical</p> <p>Chairs: Chris Hertle, <i>Australia</i> and Pabel Cervantes, <i>Mexico</i></p> <p>New circular model for biogas purification coupled with biomass generation and carbon capture, Tanja Radu, <i>Loughborough University, United Kingdom</i></p> <p>Prediction of animal by-products composition, for biogas production, using pocket-size near infrared spectrometer, Ana Otero, <i>IRTA - Institute of Agrifood Research and Technology & UB - University of Barcelona & Mafra, Spain</i></p> <p>Bioelectrochemical anaerobic sewage treatment - from laboratory tests to full scale implementation, Boris Tartakovsky, <i>National Research Council Canada, Canada</i></p> <p>Iron addition for enhancing AnMBR removal efficiency and biofouling control, Argyro Plevri, <i>National Technical University of Athens, Greece</i></p> <p>--- POSTERS ---</p> <p>Conversion of wastewaters and organic waste into valuable chemicals, energy and biofertiliser, Rita Noelle Moussa, <i>University of Aberdeen, United Kingdom</i></p> <p>Mesophilic biodigestion of soybean molasses in sequencing batch reactor: operational optimization and techno-economic viability, Giovanna Lovato, <i>University of Sao Paulo, Brazil</i></p>		<p>Monday 15:45-17:15 Anaerobic process</p> <p>15:45-16:05</p>
<p>6.4 SURFACE WATER ISSUES RELATED TO ECOSYSTEM, RECREATION, DRINKING WATER SOURCE AND MONITORING</p> <p>Room C2 Technical</p> <p>Chairs: Kari Vigerstøl, <i>United States</i> and Farida Gitonga, <i>Kenya</i></p> <p>Becoming uncultured: daily recreational water quality monitoring and public notification at Chicago beaches using QPCR, Abhilasha Shrestha, <i>University of Illinois Chicago, United States</i></p> <p>A satellite-based approach to freshwater ecosystem monitoring and for SDG 6.6.1 progress reporting, Christian Tottrup, <i>DHI, Denmark</i></p> <p>Microbiological whole river surveys: lessons learned and future visions on faecal pollution and antimicrobial resistance analysis, Andreas Farnleitner, <i>ICC Water & Health, KL Krems und TU Wien, Austria</i></p> <p>Ensuring safe drinking water for the greater Toronto Area using the Lake Ontario Water Quality Forecasting System, Patrick Delaney, <i>DHI Water and Environment, Inc, Canada</i></p> <p>--- POSTERS ---</p> <p>DHI's global hydrological model: a real-time and forecasting hydrological system for the entire planet, Alexandra Murray, <i>DHI A/S, Denmark</i></p> <p>Predictive models of algal bloom with sparse modeling and support vector machine, Yohei Miura, <i>Tohoku University, Japan</i></p>		<p>Monday 15:45-17:15 Surface water</p> <p>17:05-17:10</p> <p>17:10-17:15</p>

<p>1.3 INNOVATIVE APPROACH TO NATURE-BASED SOLUTIONS FOR URBAN CLIMATE RESILIENCE</p> <p>Room B3 g Workshop</p> <p>Chairs: Lykke Leonardsen, Denmark and Christian Nyerup-Nielsen, Denmark</p> <p>Nature-based Solutions have the potential to offer a triple win (societal, economic, natural) leverage to build climate-resilient urban spaces. Turning this potential into a reality will require hands-on, context-sensitive approaches.</p> <p>The purpose of this workshop is to present an innovative approach to operationalizing NbS in urban contexts. The approach is based on the selection and prioritisation of specific NbS typologies to address identified urban challenges.</p> <p>Participants will be active players and will learn about different NbS typologies, their values and limits, and the types of contexts in which they apply.</p> <p>The workshop will be an opportunity to exchange knowledge and build capacities on NbS and their applicability to achieve urban resilience.</p> <p>Speakers: Lykke Leonardsen, Copenhagen Region Municipality (DK), Christian Nyerup-Nielsen, Ramboll (DK), Fantine Hureau, Ramboll (DK), Alvaro Fonseca, Ramboll (DK), Barbara Cesar Barros, C40 (BR), Pedro Rolim, Rio City Hall (BR), Trine Munk, Ida Bulow Gregersen, Ida Hansen, Ramboll (DK) & Sari Suvanto</p>		<p>Monday 15:45-17:15 NbS</p>
<p>HIGH-LEVEL SUMMIT — WATER AS A KEY TO ACTION ON CLIMATE AND THE SDGS</p> <p>Room A2 Summit</p> <p>PARTNERSHIPS FOR INNOVATION AND TECHNOLOGY SHARING</p> <p>Chair: Carl-Emil Larsen, DANVA</p> <p>Summit organised by the International Water Association, Danish Water and Wastewater Association, the Municipality of Copenhagen, P4G and the Confederation of Danish Industry, in cooperation with the Ministry of Environment of Denmark and the Ministry of Foreign Affairs of Denmark. With water prominent in the SDG and climate agendas, the Summit will contribute to a powerful message on the need for cities to elevate water as they pursue their ambitions to create smart and secure liveable cities for all.</p> <p>The third session will focus on partnerships for innovation and technology sharing.</p> <p>By invitation</p> <p>Discussion facilitator: Corinne Trommsdorff, Water Cities</p>		<p>Monday 15:45-17:15 Climate and SDGs</p>
<p>GROUNDWATER FORUM III — PROTECTION OF GROUNDWATER QUALITY</p> <p>Room A3 Forum</p> <p>Chair: Martin Rygaard, Denmark</p> <p>The impact of contaminated sites on groundwater. Risk assessment and decisions to treat or not, Niels Døssing Overheu, Environmental Engineer, Environmental Section, The Capital Region of Denmark</p> <p>Agriculture and drinking water from groundwater: vulnerability for diffuse pollutants, Ingeborg Joris, Researcher, Flemish Institute for Technological Research</p> <p>The challenge of PFAS in groundwater: lessons learned and best practice guidance from the United States, Seth Kellogg, Principal Geologist, Geosyntec</p>		<p>Monday 15:45-17:15 Groundwater</p>

<p>PROFESSOR GUSTAF OLSSON: FESTSCHRIFT PRESENTATION AND LEGACY LECTURE</p> <p>Special session marking the contribution of eminent academic Professor Gustaf Olsson</p> <p>The session has been organised to honour Professor Gustaf Olsson as he retires from his Editor role on several IWA Publishing journals.</p> <p>Speakers: Gustaf Olsson, <i>Lund University (SE)</i>, Pernille Ingildsen, <i>Hillerød Utility (DK)</i> & Wolfgang Rauch, <i>University of Innsbruck (AT)</i></p>	<p>Room C0 Lecture</p>	<p>Monday 15:45-17:15 Gustaf Olsson</p>
<p>TRANSFORMING RESEARCH RESULTS INTO INNOVATION UPTAKES</p> <p>The objective of this workshop is to 1. identify the bottlenecks in the innovation uptake process, 2. share experience on tools, incentives, processes, and practices, and 3. develop guidelines for good practises for accelerating innovation uptake.</p> <p>Speakers: Harsha Ratnaweera, <i>Norwegian University of Life Science (NMBU) (NO)</i>, Wendy Francken, <i>VLARIO (BE)</i>, Sudhir Murthy, <i>NEWhub Corp (US)</i>, Harald Kleiven, Thomas Wintgens, <i>Aachen (DE)</i> & Zakhar Maletskyi, <i>Norwegian University of Life Science (NMBU) (NO)</i></p>	<p>Room C1 Research</p>	<p>Monday 15:45-17:15 Innovation uptake</p>
<p>2.1.5 MEMBRANE BIOREACTORS AND FOULING CONTROL</p> <p>Chairs: Eduardo Subtil, <i>Brazil</i> and Rizza Ardiyanti, <i>Norway</i></p> <p>Brine recovery from hypersaline wastewater treatment after selective removal of the organics in a tubing bioreactor, Maria Concetta Tomei, <i>Water Research Institute C.N.R., Italy</i></p> <p>Quorum quenching (QQ) in anaerobic membrane bioreactor: isolation of novel QQ consortia and elucidation of comprehensive anti-fouling mechanisms, Boyan Xu, <i>National University of Singapore, Singapore</i></p> <p>Development of a hydrogen peroxide based cleaning strategy for ultrafiltration processes in wastewater treatment, Maximilian Werner, <i>MANN+HUMMEL Water & Fluid Solutions, Germany</i></p> <p>Dodecyl-β-D-Maltoside blocks bacterial appendage attachment to wastewater treatment membranes, Eakalak Khan, <i>University of Nevada, Las Vegas, United States</i></p> <p>---- POSTERS ----</p> <p>Removal and recovery of ammonium from effluent of AnMBR treating domestic wastewater by polymer hydrogels, Meibo He, <i>National University of Singapore, Singapore</i></p> <p>Antifouling membranes based on PES and optimized ZnO CuO Fe₃O₄ catalyst under dark ambient conditions, Sheng-Jie You, <i>Chung Yuan Christian University, Chinese Taipei</i></p>	<p>Room B5 a Technical</p>	<p>Monday 15:45-17:15 MBRs and fouling</p>

<p>3.5 DECENTRALISED SOLUTIONS AND POTABLE WATER REUSE</p> <p>Chairs: Paul Jeffrey, <i>United Kingdom</i> and Hayat Raza, <i>Canada</i></p> <p>Combination of electrocoagulation with ultra-low-pressure ultrafiltration for arsenic removal from drinking water, Franz-Benrd Frechen, <i>University of Kassel (retired), Germany</i></p> <p>Successful implementation of in-situ microbiological testing of point-of-use water treatment technologies: lessons from the field, Caetano Dorea, <i>University of Victoria, Canada</i></p> <p>Managing potential pathogens in stored rainwater using small-scale in-situ electrochemical activation, Gillian Clayton, <i>University of the West of England, United Kingdom</i></p> <p>Drinking water production from urban wastewater combining planted bio-reactor, activated carbon fluidised bed and hollow fiber nanofiltration, Philippe Sauvignet, <i>Veolia, France</i></p> <p>--- POSTERS ---</p> <p>Microbial investigations on recirculating showers, Tamara Pérez Guillemette, <i>DTU Environment, Denmark</i></p> <p>Discerning differences among non-potable reuse water, potable reuse water, and conventional drinking water — a core microbiome perspective, Matthew Blair, <i>Virginia Tech, United States</i></p>	<p>Room B5 b Technical</p>	<p>Monday 15:45-17:15 Potable water reuse</p>
<p>3.5 PREVENTION AND MANAGEMENT OF TASTE-AND-ODOUR EVENTS IN SUPPLIES</p> <p>Chairs: Ricard Devesa, <i>Spain</i> and Tsair Fuh-Lin, <i>Chinese Taipei</i></p> <p>Consumers associate off-flavours, bad tastes, or unexpected organoleptic changes in tap water with a health risk. As a result, they reject drinking it. International experts will give cutting-edge information about how to prevent, characterise, manage and minimise T&O and algal toxins events (source, treatment, network) and algal toxins. 4-5 talks (60 mins) followed by an open roundtable/discussion (30 mins) about key issues of the talks, their extrapolation, ideas, and solutions to classical problems and new challenges (i.e., climate change).</p> <p>Speakers: Tsair Fuh-Lin, <i>National Cheng Kung University (TW)</i>, Zamyadi Arash, <i>(AU)</i> Jacqueline Frizenschaf, <i>Water Research Australia (AU)</i> & Yi-Ting Chen</p>	<p>Room B4 a Workshop</p>	<p>Monday 15:45-17:15 Taste and odour</p>
<p>5.1 HOW THE WATER INDUSTRY CAN SUPPORT WOMEN INTERNATIONALLY</p> <p>Chairs: Arlinda Ibrahimllari, <i>Albania/Canada</i> and María Estefanía Borthiry Buide, <i>Argentina</i></p> <p>This workshop will provide perspectives from all sectors of the water industry, as well as diverse parts of the globe. Professionals from different regions will share their experiences, providing information on challenges, lessons learned, and strategies for addressing gender equity issues.</p> <p>Speakers: Eugenia Ghiotto, <i>AySA (AR)</i>, Diane d'Arras, <i>Bunzi International (FR)</i>, Louise Dudley, Titilola Bright-Oridami, <i>Lagos Water Corporation (NG)</i> & Farokh Laqa Kakar, <i>Ryerson University (CA)</i></p>	<p>Room B4 b Workshop</p>	<p>Monday 15:45-17:15 Supporting women</p>

<p>1.3 NEW SERVICES AND PERSPECTIVES FOR WATER UTILITIES</p> <p>Chairs: Kazuya Naito, <i>Japan</i> and Mbali Sibiya, <i>South Africa</i></p> <p>From polluted industrial harbour - to residential area with bathing waters, Jes Clauson-Kaas, <i>Hofoor, Copenhagen, Denmark</i></p> <p>Integrated framework for urban water management in secondary cities of India, Mitthan Lal Kansal, <i>IIT Roorkee, India</i></p> <p>The procurement approach that enabled Australia's first biofactory, Rachael Nuttall, <i>SUEZ Water Australia & New Zealand, Australia & Charlie Littlefair</i>, <i>South East Water, Australia</i></p> <p>How do you put people at the centre of business transformation decisions?, Fionn Boyle and Tertius Rust, <i>Anglian Water, United Kingdom</i></p> <p>---- POSTERS ----</p> <p>Water supply and sanitation services in Brazil: regional solutions through a water resources security lens, Sergio Ayrimoraes Soares, <i>National Water and Sanitation Agency - ANA Brazil, Brazil</i></p> <p>The evolution of customer engagement in water service providers (WSPs) in Kenya. A case study of Nakuru Water and Sanitation Services Company Limited (NAWasSCO) Kenya, Emmaculate Mutuku, <i>Kenya</i></p>	<p>Room B4 c Technical</p>	<p>Monday 15:45-17:15 New services</p>
<p>4.4.5 FLOOD RISK MANAGEMENT</p> <p>Chairs: Gerard Luyet, <i>Switzerland</i> and Joachim Bach, <i>Denmark</i></p> <p>The Aarhus Method secures a wise investment decision-making to support flood risk mitigation and liveable cities, Mads Uggerby, <i>EnviDan, Denmark</i></p> <p>Investment cycle of flood protection in Japan: the relationship between budget and damage, Mikio Ishiwatari, <i>The University of Tokyo, Japan</i></p> <p>Dynamic adaptive flood risk management planning in Denmark, Rick Kool, <i>NIRAS A/S, Denmark</i></p> <p>Adaptation strategies to sea level rise and storm surges in Arctic Cities, Torbjørn Friberg, <i>Sweco, Norway</i></p> <p>---- POSTERS ----</p> <p>Delivering smart flood management in Bangkok, Ismail Osman, <i>Mott Macdonald, Singapore</i></p> <p>A method to counter the massive jurisdictional burden from the historic cloudburst event 2014 in Malmö, Patrik Nilsson, <i>VA SYD, Sweden</i></p>	<p>Room B3 b Technical</p>	<p>Monday 15:45-17:15 Flood risk</p>
<p>4.3 NATURE-BASED SOLUTIONS FOR CLIMATE-RESILIENT CITIES IN DEVELOPING COUNTRIES UNDER CHANGE</p> <p>Chairs: Nilo Nascimento, <i>Brazil</i> and Eduardo Mario Mendiondo, <i>Brazil</i></p> <p>We evaluate the experiences of cities from the developing world in planning and implementing nature-based solutions (NbS) in urban water management. To support COP26's Net Zero goals under IPCC's scenarios, the NbS brings solutions to adaptation and mitigation. Various NbS' approaches, i.e., Low Impact Development (LID), Sustainable Drainage Systems (SuDS), Water Sensitive Urban Drainage (WSUD), and Sponge Cities (SC), offer greener pathways. However, climate-resilient cities in developing countries challenge the feasibility of those NbS' approaches, especially after the COVID19 pandemic has set new preferences on planning budgets. Hence, this IWA Session welcomes experiences gained, lessons learnt and visionary scenarios around NbS from a diverse range of stakeholders, i.e., from urban water utilities, municipality agents, water authorities, under-represented groups, technicians and academia.</p> <p>Speakers: Nilo Nascimento, <i>Federal University of Minas Gerais (BR)</i>, Eduardo Mario Mendiondo, <i>University of Sao Paulo (BR)</i>, Juan Pablo Rodríguez Sánchez, <i>Universidad de los Andes (CO)</i>, Neil Armitage, <i>University of Cape Town (ZA)</i>, Maryam Imani, <i>Anglia Ruskin University (UK)</i>, Melissa Graciosa, <i>Iwona Wagner</i>, Hafiz Muhammad Abd-m-Rehman, <i>The University of New South Wales (AU)</i>, Deyvid Rosa, <i>Federal University of Minas Gerais (BR)</i>, Daniela Bemfica, <i>IWA (UK)</i> & Abby Daniela</p>	<p>Room B3 c Workshop</p>	<p>Monday 15:45-17:15 NbS in developing countries</p>

<p>WATER SECURITY AND SANITATION CHALLENGES IN THE SMALL ISLAND STATES</p> <p>Chairs: Amit Chanan, <i>Fiji</i> and Bruno Nguyen, <i>France</i></p> <p>The Small island developing states (SIDS) are characterized by small size, narrow resource base, distant geography, and high vulnerability to climate related environmental challenges. There are over 38 SID states located in the Caribbean, in the Pacific, and in the Atlantic, Indian Ocean, Mediterranean and South China Sea. The Session will bring together key water management players working across these SID states to share their challenges in water and sanitation services in the face of climate change impacted decline in freshwater resources.</p> <p>The session will culminate in announcement of a new Specialist Group focusing on Water Management in Small Island States. It will also serve to mainstream water issues, climate change vulnerability of small island states for broader IWA community.</p> <p>Speakers: Adrian Cashman, <i>AKWATIX: Water Resources Management, Barbados</i>; Bambos Charalambous, <i>Director Hydrocontrol Ltd, Cyprus</i>; Gerard Luyet, <i>COO, Geneva Water & Swiss Humanitarian Aid</i>; Didier Vallon, <i>Suez Water Overseas Territories</i>; Dr Sherub Phuntso, <i>University of Technology Sydney, Australia</i></p>	<p>Room B3 f Workshop</p>	<p>Monday 15:45-17:15 Small island states</p>
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