Session 2 13:30-15:00 Monday

Note that all times are approximate!

4.4.8 | INNOVATIVE MODELLING TOOLS FOR URBAN WATER SYSTEMS Room B4 c **Technical** **Chairs: Martin Gambrill**, *United Kingdom* and **Jiuling Li**, *Australia* Digital twins of urban drainage system — what about trust? Agnethe Pedersen, *VCS Denmark, Denmark* Development of a 'digital twin' as part of a greater bulk water decision support system (DSS) for the City of Cape Town, Petr Ingeduld, *DHI, Czech Republic* Deep learning for modelling of urban drainage networks: a physics-informed surrogate model using measured and simulated data, Salar Haghighatafshar, *Lund University, Sweden* Using data science to optimize meter asset management: a case study in 2 large utilities, Pedro Pina, *Xylem, Inc, United Arab Emirates* ----POSTERS---- An automated SWMM toolkit for optimal planning and design of hybrid decentralized urban drainage systems, Amin Ebrahim Bakhshipour, *TU Kaiserslautern, Germany* IoT as an enabler for distributed online monitoring of the urban water cycle, Malte Ahm, *Aarhus Vand Ltd, Denmark*		Monday 13:30 -15:00 Urban water systems 13:30-13:50 13:50-14:10 14:10-14:30 14:30-14:50 14:50-14:55 14:55-15:00
1.19 | DIGITAL BUSINESS MANAGEMENT APPROACHES AT UTILITY SCALE Room B3 a **Technical** **Chairs: Dragan Savic**, *Netherlands* and **Antti Vuorela**, *Finland* New trends in water utility management: how digitization of water and wastewater service can improve business operation, Alessandro Bettin, *Senior Water Resources Engineer, Italy* From data to insights — utility management from a business intelligence perspective, Rasmus Dahl, *Dryp, Denmark* H2PORTO technological platform for the integrated management of Porto's urban water cycle, Ruben Fernandes, *Aguas e Energia do Porto, E.M, Portugal* Data sharing in publicly owned utilities. why is that not a problem?, Anders Faber, *BIOFOS, Denmark* ----POSTERS---- Comparative leakage detection accuracy analysis of different water network models using artificial neural network, Amlan Chakrabarti, *University of Calcutta, India*		Monday 13:30 -15:00 Business management 13:30-13:50 13:50-14:10 14:10-14:30 14:30-14:50 14:50-14:55
4.2 | EVALUATION CRITERIA AND APPROACHES FOR TOOLS IN NBS PLANNING Room B3 c **Workshop** **Chairs: Martijn Kuller**, *Switzerland* and **Peter Vanrolleghem**, *Canada* Decision-Support Systems (DSS), models, and tools are widely used socio-technical methods to support the planning and implementation of Nature-Based Solutions (NbS) for climate adaptation in cities. The quality of these models and tools is hard to validate, evaluate, or even define appropriately. Lack of agreed and standardised quality evaluation methods has led to underutilization of what could be helpful DSS. This workshop aims to shed light on such critical, yet underreported evaluation methods for socio-technical decision support used by planners and modellers of NbS. Projected outputs include systematically elicited preferences from workshop participants from various backgrounds on the objectives and associated promising evaluation approaches of DSS. These outcomes will contribute to the development of widely agreed and applicable standards and a framework for the evaluation and validation of DSS to support the planning and implementation of NbS. Speakers: **Martijn Kuller**, *Swiss Federal Institute of Aquatic Science & Technology (Eawag) (CH)*, **Peter Vanrolleghem**, *Université Laval (CA)*, **Danielle Dagenais**, *Université de Montréal (CA)*, **Ole Fryd**, *University of Copenhagen (DK)* & **Sandrine Lacroix**, *Polytechnique Montreal (CA)*		Monday 13:30 -15:00 Nature-based solutions (NbS)

2.1.2-1 | ANAEROBIC DIGESTION AND ENHANCED PERFORMANCE

Room C3
Technical

Monday
13:30 -15:00
Anaerobic digestion

Chairs: **Kwok-Wai Richard Tsang**, *United States* and **Pritha Chatterjee**, *India*

Thermal and ultrasound pre-treatment prior to anaerobic digestion, Farokh Laqa Kakar, *Ryerson University, Canada*

Integration of anaerobic digestion and hydrothermal liquefaction for treatment of manure: the influence of microbial adaption, Leendert Vergeynst, *Aarhus University Centre for Water Technology (WATEC), Denmark*

Model-based evaluation of full-scale anaerobic digester failure and recovery strategies, Ramesh Saagi, *Lund University, Sweden*

14:10-14:30

Graphene oxide amended sludge enhances micropollutant removal during anaerobic digestion of waste activated sludge, Oriol Casabella, *Institut Català de Recerca de l'Aigua, Spain*

---- POSTERS ----

Machine learning prediction of biogas production, David Getreuer Jensen, *EnviDan, Denmark*

14:50-14:55

Demonstration of anaerobic wastewater treatment in the UK, Ana Soares, *Cranfield University*

1.2 | METHODOLOGY AND CONTEXT FOR QUANTIFYING YOUR SEWER METHANE

Room B4 d
Workshop

Monday
13:30 -15:00
Sewer methane

Chairs: **John Willis**, *United States* and **Asbjørn Hanning Nielsen**, *Denmark*

This training provides proof of sewer methane's existence and significance and shows how utilities can estimate it in their GHG inventories, closing centralised wastewater's largest GHG vulnerability.

Speakers: **John Willis**, *Brown and Caldwell (US)* & **Asbjørn Hanning Nielsen**, *Aalborg University (DK)* & **Jóannes Gaard**, *Ministry of Environment (DK)*

4.4.2 | DRIVERS AND HAZARDS AT CITY SCALE

Room B3 b
Technical

Monday
13:30 -15:00
Drivers and hazards

Chairs: **Arslan Ahmad**, *Netherlands* and **Shane Morgan**, *Australia*

Interaction between subsurface urban infrastructure and groundwater — ignore at your risk?, Constantin Gogu, *Technical University of Civil Engineering, Bucharest, Romania*

Under pressure: exploring the interdependent challenges of housing and water infrastructure capacity in Irish Towns, Sarah Cotterill, *University College Dublin, Ireland*

Benefits and challenges of having a practical and strong water safety plan implemented: the case of Porto, Flávio Oliveira, *Águas e Energia do Porto, Portugal*

Rainfall series for urban drainage system design and analysis under the impact of climate change, Søren Thorndahl, *Aalborg University, Denmark*

14:30-14:50

---- POSTERS ----

VeVa — a Danish water utility association utilising rainfall and weather radar data for hydrological and hydraulic applications in the urban water cycle, Malte Ahm, *Aarhus Vand Ltd, Denmark*

Flood management in Uddevalla — unexpected challenges, Mattias Salomonsson, *Sweco Sweden, Sweden*

2.5.3-1 | WASTEWATER EPIDEMIOLOGY: SARS-COV-2

Room B3 d
Technical

Monday
13:30 -15:00
SARS-COV-2

Chairs: **Jörg E. Drewes**, *Germany* and **Alexandra Tsitouras**, *Canada*

Tracking SARS-CoV-2 in upstream sewage systems to monitor COVID-19 spread in communities, Jiaying Li, *University of Queensland, Australia*

Environmental surveillance of SARS-CoV-2 and its variants: geospatial predictive analysis in a Spanish municipality sewage network, Nuria Zamorano, *Sociedad de Fomento Agrícola Castellonense S.A, Spain* — 13:50-14:10

1.5-years experience in Covid-19 tracking of Turkey via wastewater based epidemiology (WBE): regional distribution maps, early warning, variants, dashboards, Bilge Alpaslan-Kocamemi, *Marmara University, Turkey*

SARS-CoV-2 signal in wastewater relates to hospitalization occupancy in Austria, Hannes Schenk, *Leopold-Franzens-Universität innsbruck, Austria*

---- POSTERS ----

The development of water quality-based COVID-19 surveillance for non-sewered areas, Sudhir Pillay, *Water Research Commission, South Africa*

Sampling strategies for SARS-CoV-2 wastewater surveillance, Rodrigo de Freitas Bueno, *Federal University of ABC, Brazil*

2.3.2-2 | ADVANCED OXIDATION PROCESSES - GROUP 2

Room B3 f
Technical

Monday
13:30 -15:00
Advanced oxidation

Chairs: **Jouke Boorsma**, *Netherlands* and **Jia-Qian Jiang**, *Scotland*

A new bromate-free ozone micropollutants treatment, Laurent De Franceschi, *Suez Water Technologies and Solutions, Switzerland*

Effective removal of residual pollutants in treated municipal wastewater using in-situ generated ferrate, Yumin Oh, *Pusan National University, Republic of Korea*

Leachate treatment of the landfill sites by electrochemical oxidation (ECO), Jun Hee Lee, *Michigan Technology Corp, Republic of Korea*

Optimization of the AOP to prevent DBPs formation: case of study in DWTP of Figueres, Laura Ferrandez, *Universitat de Girona, Spain* — 14:40-14:50

---- POSTERS ----

Role of electrochemically-generated sulfate radicals on the electro-mineralisation of PFASs in water, Pablo Ledezma, *University of Queensland | Australian Centre for Water and Biotechnology (ACWEB), Australia*

1.18 | UTILITY RESPONSES AND ADAPTATION TO CLIMATE CHANGE IMPACTS

Room B3 g
Technical

Monday
13:30 -15:00
Climate change

Chairs: **Peter Dane**, *Netherlands* and **Shotaro Goto**, *Japan*

Strengthening the blue and green infrastructure in the Ruhr metropolis: the Emscher-conversion as an opportunity for a regional approach to climate change adaptation, Stephan Treuke, *Emschergenossenschaft, Germany*

Climate adaption measures of the Great Belt Link and Oresund Link´s onshore facilities in Denmark to future-proof critical national infrastructure assets, Jan Stæhr, *COWI A/S, Denmark*

Stakeholder and change management in long term climate adaptation projects, Sonia Sørensen, *Ramboll, Denmark*

Sanitation safety plan for a pre-potable use of reclaimed water, Marta Ganzer, *Aigües de Barcelona, Spain*

---- POSTERS ----

Updated rainfall input and new tools for stormwater system design in Denmark, Ane Mollerup, *Novafos, Denmark* — 14:50-14:55

FloodMan - a tool for sustainable management of flood mitigation, Lars Rosén, *Chalmers University of Technology, Sweden* — 14:55-15:00

2.2.1-2 | WATER RECLAMATION FOR NON-POTABLE REUSE Room B3 e **Technical** **Chairs: Aaron Burton**, *United Kingdom* and **Chelsea Hayward**, *Australia* Performance and benchmarking study of newly developed aquaporin inside®CLEAR series low energy BWRO membranes, Khung Hanh Le, *Aquaporin Asia, Singapore* Water reuse in agriculture: Konya Closed Basin case study, Burcu Yazici, *Turkish Water Institute, Turkey* Verification monitoring program for a regional Australian recycled water scheme, Natalie Crawford, *Atom Consulting, Australia* Prevalence of antibiotic resistance genes in drinking and environmental water sources of the Kathmandu Valley, Nepal, Tsubasa Takezawa, *Kitasato University, Japan*		Monday 13:30 -15:00 Potable reuse
HIGH-LEVEL SUMMIT — WATER AS A KEY TO ACTION ON CLIMATE AND THE SDGS Room A2 **Summit** **URBAN WATER GOVERNANCE FOR SUSTAINABLE CITIES** **Chair: Diane D'Arras**, *former IWA President* 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. The second session will focus on urban water governance for sustainable cities. **By invitation** Discussion facilitator: Corinne Trommsdorff, *Water Cities*		Monday 13:30 -15:00 Climate and SDGs
GROUNDWATER FORUM II — GROUNDWATER SUSTAINABILITY Room A3 **Forum** **Chair: Katerina Tsitonaki**, *Denmark* Sustainable management of slow groundwater in a fast-changing world: challenges and opportunities, Mark Cuthbert, *Principal Research Fellow & Reader, Cardiff University, UK* Sustainability assessment of groundwater use. How can we integrate long term water quality in the assessment?, Martin Rygaard, *Associate Professor, Technical University of Denmark* The importance of groundwater in San Francisco and the Bay Area, California, Paula Kehoe, *Director of Water Resources, SF Public Utilities Commission*		Monday 13:30 -15:00 Groundwater

AQUARATING WORKSHOP Room C0 **Workshop** **Chair: Corinne Cathala**, *United States* AquaRating is a performance evaluation system that was developed by the IDB in close collaboration with IWA to improve water and sanitation utilities. The AquaRating standard consists of 112 assessment elements organised into 8 areas of evaluation as well as groups of best practices. AquaRating is based on three pillars consisting of performance indicators, good practices, and the reliability of the information through an audit. The session will describe in detail the tool and will showcase its products as well as several case studies of water utilities from different regions of the world which have implemented the AquaRating tool. Speakers: **Corinne Cathala**, *IDB (US)*, **Carlos Diaz**, *IWA (UK)*, **Francisco Cubillo**, *AquaRating (ES)*, **Veronica Sanchez**, *EPMAPS-Quito*, **Fabio Hernandez**, *AyA Costa Rica (CR)*, **Amit Chanan**, *Water Authority of Fiji (FJ)*, **Daniela Patino Piñeros**, *WIN*, **Umrbek Allakulov**, *WIN*, **Brenda Ampomah**, *IWA (UK)*, **Hector Barreda**, *OTASS Peru (PE)*		Monday 13:30 -15:00 Aquarating
1.1 | NATURE-BASED SOLUTIONS — A WAY TO MAKE OUR CITIES CIRCULAR Room C2 **Workshop** **Chairs: Guenter Langergraber**, *Austria* and **Theis Raaschou Andersen**, *Denmark* The workshop will discuss challenges, possibilities, drivers and implications when implementing NbS in the urban environment in order to make our cities circular in the context of case studies around the world. Speakers: **Guenter Langergraber**, *Institute of Sanitary Engineering and Water Pollution Control; University of Natural Resources and LifeSciences (AU)*,**Theis Raaschou Andersen**, *Research Centre for Built Environment, Energy, Water and Climate, VIA University College (DK)*, **Mia Rix**, *Randers Municiplaity (DK)*, **Natasa Atanasova**, *University of Ljubljana (SI)*, **Bart de Gusseme**, *Ghent (BE)* & **Anja Wejs**, *Niras (DK)*		Monday 13:30 -15:00 NbS and circular economy
2.1.4-2 | BIOFILM REACTORS Room B5 a **Technical** **Chairs: Kim Helleshøj Sørensen**, *Netherlands* and **Tao Liu**, *Australia* Nitrogen removal in MBBR plants at low temperatures - experiences from Norway, Hallvard Ødegaard, *Aquateam COWI, Norway* Designing and building one of the largest MBBR-plants in the world - A SWOT analysis, **Jonas Grunestam**, *Käppalaförbundet, Sweden* Insight into performance in a hybrid membrane-aerated biofilm reactor-AO system under low carbon|nitrogen wastewater, Hsin-Chieh Lin, *National Taiwan University, Chinese Taipei* Drivers and performance of full-scale membrane aerated biofilm reactor (MABR) for sustainable process intensification at existing WWTPs, Daniel Coutts, *Suez, United States* ---- POSTERS ---- Treatment of thermally pre-treated sludge reject water in a novel IFas-SBR process, Statiris Evangelos, *National Technical University of Athens, Greece* Nitrogen removal and nitrous oxide emissions from MABR technology, Nerea Uri Carreño, *VCS Denmark, Denmark*		Monday 13:30 -15:00 Biofilm reactors

3.2 | TECHNOLOGIES AND OPERATIONS II Room B5 b **Technical** **Chairs: Alba Cabrera Codony**, *Spain* and **Muhammad Anique Azam**, *Pakistan* Improving biological stability of drinking water from surface water using ultrafiltration posttreatment - a field case, Leonie Marang, *Evides, Netherlands* Brackish to seawater desalination pilot study with cc-ro for drinking water production at the Flemish coastal region, Evelyn de Meyer, *De Watergroep, Belgium* Investigation of scaling mechanisms and scale inhibition potential of antiscalants in reverse osmosis, Shambhavi Arvind Kaushik, *DVGW-forschungsstelle TUHH, Germany* Enhanced removal of dissolved organic compounds using ethylenediamine modified polyacrylonitrile ultrafiltration electromembranes, Muhammad Usman, *Technische Universität Hamburg, Germany* ---- POSTERS ---- Ten years of advanced surface water treatment piloting with ion exchange, inline coagulation and ceramic microfiltration, Bram Martijn, *PWNT, Netherlands* Synthesis and characterisation of polymeric flocculants for water treatment, Khethobole Sekgota, *Rand Water, South Africa*		Monday 13:30 -15:00 Technologies
6.5 | EARTH OBSERVATION FOR WATER MANAGEMENT — BUILDING A COMMUNITY OF PRACTICE Room B4 a **Workshop** **Chairs: Apostolos Tzima**, *Greece* and **Katherine Cross**, *Australia* This session will be an opportunity to discuss how the recently established IWA Earth Observation Community of Practice can contribute to overcoming barriers in the adoption of EO technologies. Speakers: **Apostolos Tzima**, *EMVIS (GR)*, **Katharine Cross**, *Water Cities/ Australian Water Partnership (AU)*, **Eva Haas**, *EOMAP (DE)* & **Djalia Mutangampundu**, *African Water Association (CI)*		Monday 13:30 -15:00 Earth Observation
5.2 | INCENTIVES AND DRIVERS TO ENABLE CHANGE Room B4 b **Technical** **Chairs: Melissa Meeker**, *United States* and **Emily Ryan**, *Netherlands* Leveraging public expectations to support a water sensitive circular economy in Europe, Heather Smith, *Cranfield University, United Kingdom* Who knows the price of water services, and does it make a difference? An exploratory study with domestic consumers in Portugal, Ligia Pinto, *University of Minho, Portugal* Can digital solutions enhance public involvement in urban water management? Evidence from case studies in Berlin and Paris, Ulf Stein, *Ecologic Institute, Germany* Life cycle assessment to optimize environmental impact of the groundwater treatment plant, Jeppe Poulsen, *COWI, Denmark* ---- POSTERS ---- The Digital Water Revolution: what can go wrong?, Lucia Alexandra Popartan, *University of Girona, Spain* Method for identifying water-related optimisation measures in SMEs as a basis for standardised water audits, Christian Platzer, *AEE - Institute for Sustainable Technologies, Austria*		Monday 13:30 -15:00 Incentives and drivers