

14TH IWA INTERNATIONAL CONFERENCE ON INSTRUMENTATION, CONTROL AND AUTOMATION (ICA)



Organizers:



International
Water Association



Norwegian University
of Life Sciences

29th June - 2nd July 2025 in Oslo

<https://iwa-ica2025.net/>

Pre-conference workshops. 29th June 2025

WS1: 09:00-13:00. Future of ICA in the water sector.

Gustaf Olsson, Michela Mulas, Pernille Ingildsen, Leiv Rieger, Oliver Grievson.

What do we learn from earlier progress and mistakes? New demand pull and technology push. What kind of instrumentation is needed and what is possible to measure? Have we forgotten 'classic' operation and control? How can AI, data mining, and massive computational tools improve ICA operations? Can we handle new risks and cyber security? Are we developing ICA tools for operators so that they trust the system? Will we see a better coupling between design and operation? How can ICA provide better balance between technology and people (operators, customers)? How do we handle the gap between what is theoretically possible and what is practically possible in the 'real reality'?

WS2: 09:00-13:00 Data about data – when, why and how metadata can support the digital plant.

Janelcy Alferes, Prabhushankar Chandrasekeran, Gabriel Fierro, Hanna Molin, Daniel Aguado García, Maria Victoria Ruano García, Queral Planá Puig, Spencer Snowling, Oscar Samuelsson, Jean-David Therrien, Kris Villez.

A structured approach for recording data quality and contextual information about how and why a signal exists – i.e. metadata – is central to interpret and use sensor data correctly. This is becoming increasingly important with the global trend with data-driven applications such as digital twins and AI-models. But a structured metadata collection and organization of sensor data is not routine in most plants, which can result in lost information and missed opportunities to make use of the investments made in the data collection. The aim with this workshop is to both disseminate and to extend the MetaCO task group work on metadata. The workshop targets water professionals that are using data, including utility practitioners, consultants, and academics.

WS3: 13:00-16:00: Potential and Challenges of Hybrid Modelling for Soft-Sensor Development, Control and Automation.

Sina Borzooei, Saba Daneshgar, Cristian C. Gómez Cortéz, Andreas Froemelt, Mariane Y. Schneider, Marcello Serrao, Alireza Dehghani Tafti, Elena Torfs, Kris Villez, Jun-Jie Zhu, Xu Zou

Hybrid modelling (HM) combines mechanistic and data-driven approaches and is a transformative step in advancing mathematical models to address today's complex water-related challenges. By integrating mechanistic components into data-driven frameworks, hybrid models enhance resilience to out-of-scope (training) data, making them particularly suitable for control, automation, and decision-making applications. These models are also inherently adaptable, allowing for real-time updates with new data, which adds practical value for digital twin applications. This workshop will explore the potential applications of hybrid modelling for control and automation while addressing these challenges. Participants will learn about ongoing activities within the IWA Working Group on Hybrid Modelling, such as compiling open-access examples and guidelines to support researchers and practitioners in building their models. Discussions will cover practical case studies, good modelling practices, and strategies to overcome current barriers.

WS4: 13:00-16:00 How can ML/DL and GAI contribute to urban water management

Zhiguo Yuan, Wenchong Tian, How Yong Ng, Peter Vanrolleghem

With the breakthrough advancements in artificial intelligence technologies, an increasing number of research initiatives and practical engineering projects have integrated machine learning (ML), deep learning (DL), and generative artificial intelligence (GAI) into the management and operation of urban water systems, driving the intelligent transformation of the water industry. However, due to the complexities of urban water systems, numerous challenges persist in practical implementation. Thus, how to apply these technologies appropriately remains worthy of in-depth discussion. Join us in this discourse to illuminate potential pathways for addressing these questions and co-create innovative perspectives for the intelligent transformation of urban water management.

14th IWA ICA Conference in Oslo

Overview of the schedule

Auditorium-1: Helsingborg/Copenhagen	Auditorium-2 : Stockholm/Oslo
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29th June Sunday		
09:00-12:00	Workshop 1: Future of ICA	Workshop 2: Data about data
12:00-13:00	Lunch (snacks)	
13:00-16:00	Workshop 3: Hybrid Modelling for Soft-Sensor	Workshop 4: ML/DL and GAI in urban water management
30th June Monday		
08:30-10:05	Opening session and keynotes	
10:05-10:25	Coffee break	
10:25-12:05	Session 1A: Asset management:	Session 2A: Greener utilities
12:05-13:00	Lunch (Buffet)	
13:00-15:00	Session 3A: Risk management	Session 2B: Greener utilities
15:00-15:20	Coffee break	
15:20-17:20	Session 3B: Risk management	Session 4A: Performance optimisation
17:20-18:00	ICA Specialist Group meeting – All are welcome	
19:30	Conference dinner, Høymagasinet, Myntgata 7, Oslo.	
1st July Tuesday		
08:30-10:20	Session 5A: Water quality monitoring	Session 4B: Performance optimisation
10:20-10:40	Coffee break	
10:40-12:00	Session 5B: Water quality monitoring	Session 4C: Performance optimisation
12:00-13:00	Lunch (Buffet)	
13:00-14:40	Session 5C: Water quality monitoring	Session 4D: Performance optimisation
14:40-15:00	Coffee break	
15:00-16:20	Session 5D: Water quality monitoring	Session 4E: Performance optimisation
17:45-18:30	Mayor of Oslo's Reception. City Hall. Rådhusplassen 1, 0037 Oslo	
2nd July Tuesday		
08:30-10:30	Session 6A: Flash presentations	Session 6A: Flash presentations
10:30-11:00	Coffee break	
10:50-11:20	Keynote 4	
11:20-11:30	Closure	
11:30-12:30	Lunch (snacks)	
12:30-	Buses leave for excursions	
16:00-	Return to the conference hotel	

Schedule of the ICA2025

Monday 30.06.2025	
08:30-08:50	Opening & welcome addresses: Harsha Ratnaweera, Conference Chairman Session Chair: Marian Barbu, University of Galati, Romania Greetings from the IWA, Kala Viravamoorthy, Executive Director, IWA Welcome to the 14th IWA conference on ICA, Janelcy Alferes Castano, Chairperson, Specialist Group, ICA
08:50-09:20	Keynote 1: ICA - long way to where we are today. Gustaf Olsson. Professor emeritus, Lund University, Sweden
09:20-09:50	Keynote 2: ICA - the way forward, Dragan Savic. Global Advisor Digital Sciences, KWR, Netherlands; Professor of Hydroinformatics, University of Exeter, UK
09:50-10:05	Presentation of the candidates to host the next ICA
10:05-10:25	Coffee break
10:25-12:05	Session 1A: Asset management: Chair: Ramon Vilanova, Universitat Autònoma de Barcelona, Spain Comprehensive evaluation of real-time control strategies for urban drainage systems based on deep reinforcement learning. Huang, Z., Dong, X., China Select optimal treatment modes and priority villages for investments on rural sewage treatment in China. Meng, W., Hu, X., Jian, Q., Wang, W., Xia, X., Zhang, J., Jiang, J., China AI-Driven predictive maintenance for aeration systems in wastewater treatment: A hybrid and explainable AI framework. Voipan, D., Voipan, A., Barbu, M., Romania Investigation on improving accuracy of predicting filtered water turbidity in rapid sand filtration processes. Yamahara, H., Murayama, S., Yokoyama, S., Kanadani, M., Japan Smart Water Solutions, C. Manganelli and W. Tesser, Spain/Norway
12:05-13:00	Lunch (Buffet)
13:00-15:00	Session 3A: Risk management Chair: Peter Baumann, University of Applied Sciences-Stuttgart Germany Feedback controllers enable automated plant sizing. Samuelsson, O., Lindblom, E., Sweden Exploration of clustering methods for the HIAS process operation. Komulainen, T., Bommo, A., Jansen, K., Keprate, A., Norway Monitoring and control system for the enrichment stage in the production of polyhydroxyalkanoates. Ríos, A., Sandoval, V., Robles, A., Borrás, L., Ruano, M., Spain

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09:50-10:05	Presentation of the candidates to host the next ICA
10:05-10:25	Coffee break
10:25-12:05	Session 2A: Greener utilities Chair: Tiina Komulainen, Oslo Metropolitan University, Norway
	Metadata: challenges and opportunities to support decision making in the wastewater sector. Alferes Castano, J., Aguado, D., Ruano, M., Samuelsson, O., Plana, Q., Villez, K., Belgium, Spain, Sweden, USA Soft sensor enabled carbon source dosing and ozonation control at full-scale WWTPs. Wang, X., Chen, S., Bi, X., China Advancing decentralized water management through digital twin modeling and control of source-separated systems. Garrido Baserba, M., Rosso, D., Poch, M., Verdaguer, M., Jimenez, J., United States Spatiotemporal distribution of ecological risk of antibiotics in seven major river basins of China. Liu, W., Qu, Y. China Data-driven solutions transforming the wastewater sector: towards efficient and sustainable utilities. Alferes, J., Van Bauwel, F., Van Loo, M., Belgium
12:05-13:00	Lunch (Buffet)
13:00-15:00	Session 2B: Greener utilities Chair: Elena Torfs, University of Laval, Canada
	Modelling of a trickling filter bioreactor for ex-situ hydrogenotrophic methanation with gaseous effluent feedback. Ortiz-Ricárdez, F., Muñoz-Páez, K., Vargas-Casillas, A., Mexico Carbon negative emission approach with ICA technology - Proposal of Sewerage Blue Carbon Scheme And Solutions. Embutsu, I., Sangu, Y., Kageyama, K., Sumikura, M., Nishida, Y., Yamanoi, I., Tanaka, H., Kuwae, T., Japan

	Purification resistance index: a new water quality assessment method toward drinking water production. Jiang, J., Zhang, X., Wen, G., China The importance of secondary integral windup protection for controlling biological systems. Rieger, L., Schraa, O., Gagnon, A., Papukchiev, U., Canada Overcoming delays: Effective control strategies for bipolar membrane electrodialysis (BMED) in organic acid extraction. Herold, G., Marien, O., Schneider, M., Rabaey, K., Torfs, E., Belgium
15:00-15:20	Coffee break
15:20-17:20	Session 3B: Risk management Chair: Michela Mulas, Federal University of Ceara Brazil
	Causal vs. computer vision-based risk models for assessing microbiology-driven solids separation problems in WRRFs. Borzooei, S., Scabini, L., Zhu, J., Daneshgar, S., Deblieck, L., Broeck, E., Bruno, O., Nopens, I., Torfs, E., Sweden, Brazil, USA, Belgium, Canada Fault-tolerant control of an advanced nitrogen removal plant: A data pipeline from raw signal to reliable action. Mohebbali, S., Vanrolleghem, P., Canada Evaluation of self-cleaning pH electrodes in factories. Komi, T., Nishio, Y., Muroga, T., Hashimoto, T., Ishihara, A., Japan Novel analysis of microplastics using infrared hyperspectral imaging and machine learning. Kim, S., Kanarkard, W., Kim, H., Kang, S., South Korea Turbinator, a noncontact sensor advancing sewer surveillance through real-time monitoring, ai and predictive maintenance. Galfi, H., Wilhelmsson, J., Wanemark, J., Andrén, J., Folkelind, O., Rahmberg, M., Englund, A., Sweden Advanced analysis of pressure data in a vacuum sewer system for operational assessment and utilisation. Schaefer, A., Oldenburg, M., Jordan, N., Rudolph- Schöpping, G., Germany
17:20-18:20	ICA Specialist Group meeting / Closure Day 1
19:30	Conference dinner, Høymagasinet, Myntgata 7, Oslo

	Mitigating nitrous oxide emissions in a full-scale industrial activated sludge reactor using advanced aeration control. Lei, T., Whale-Obrero, J., Larsen, S., Kjellberg, K., Gernaey, K., Flores-Alsina, X., Denmark Balancing energy recovery and greenhouse gas emissions in wastewater treatment with model-assisted analysis. Li, K., Duan, H., Wang, S., Wu, Z., Wardrop, P., Lloyd, J., Christy, N., Ye, L., Australia Real-time digital twin for high-strength co-digestion: model-based decision support in a large biogas facility. Garrido Baserba, M., Jimenez, J., United States Sustainable real time optimization of energy and chemical consumption in COD & phosphorous removing MBBR plant. Thomsen, H., Kózka, A., Amlen, A., Denmark, Norway
15:00-15:20	Coffee break
15:20-17:20	Session 4A: Performance optimisation Chair: Saba Daneshgar, BIOMATH, Ghent University, Belgium
	Assessing control concepts In a full-scale partial nitrification-anammox granular reactor treating reject water. Flores-Alsina, X., Vangsgaard, A., Uri-Carreno, N., Nielsen, P., Gernaey, K., Denmark An open-source platform for deploying operational digital twins in water resource recovery facilities. Nair, A., Hykkerud, A., Kaluarachchi, C., Norway, Sri Lanka Automated control performance monitoring and automated tuning with alarm-based adjustments. Sadeghassadi, M., Owerdieck, C., Fraser, T., Lander, P., Cash, C., Radke, C., Hübner, C., Canada, USA, Germany Data-driven modelling for filtration process in AnMBR technology. Sandoval García, V., Ruano García, M., Robles Martínez, A., Spain An ontology-driven multi-agent system for decision support in decentralized water management. Latinis, A., Daneshgar, S., Torfs, E., Nopens, I., Belgium, Canada Simple optimisation solutions to control aeration in small WWTPs. Inizan, M., Moatamri, N., Davie, J., Sambardier, E., France
17:20-18:20	ICA Specialist Group meeting / Closure Day 1
19:30	Conference dinner, Høymagasinet, Myntgata 7, Oslo

Tuesday 01.07.2025	
08:30-10:20	Session 5A: Water quality monitoring Chair: Hiroshi Yamamura, Chuo University, Japan
	Use of long-term continuous dissolved oxygen to describe the effects of combined sewer overflows. Njapou Mawa, P., Mouchel, J., Escoffier, N., Mougin, J., France The dissolved oxygen ramp is immoral, but there is hope. Schneider, M., Torfs, E., Carbajal, J., Belgium, Canada, Switzerland Liquid H2S on-line measurement for better sewer systems insights. Inizan, M., Ainsworth, S., Barreto, L., France Classification of waste sludge dry matter ratio by mmWave Radar. Dasbasi, M., Basturk, I., Hocaoglu, S., Aydoner, C., Yaydemir, A., Ozturk, S., Hocaoglu, A., Türkiye, Norway A Simple in-situ biofouling analyses in desalination plants. Vigneswaran, S., Jeong, S., Nguyen, T., Kandasamy, J., Ratnaweera, H., Australia, South Korea, Norway
10:20-10:40	Coffee break
10:40-12:00	Session 5B: Water quality monitoring Chair: Roman Smotraiev, Ukrainian State University of Science and Technologies, Ukraine
	A fault detection framework for imbalanced data distribution using benchmark simulation model no. 2-M. Ramin, P., Zadkarami, M., Safavi, A., Ramin, E., Jeppsson, U., Gernaey, K., Flores-Alsina, X., Denmark, Iran, Sweden Explainable AI for aquatic environmental intelligence: SHAP- enhanced LSTM using high-frequency water quality data. Karahan, S., Verwaeren, J., Alferes, J., Vandenbruwaene, W., Belgium Real-time phosphorus control: a hybrid model-based framework for WRRF optimization. Pizzi, E., Fratini, C., Mishra, A., Lauritzen, B., Mikkelsen, P., Skogestad, S., Valverde, B., Vezzaro, L., Denmark, Norway metEAUdata: a framework for automatic metadata generation for environmental time series pre-processing. Therrien, J., Vanrolleghem, P., Canada
12:00-13:00	Lunch (Buffet)

Tuesday 01.07.2025	
08:30-10:20	Session 4B: Performance optimization Chair: Benedek Plosz, Oslo Metropolitan University, Norway
	Soft-sensing of oxygen and N2O gas mass-transfer using biomass particle characteristics. Bakos, V., Qiu, Y., Nagy-Göde, P., Plosz, B.G., United Kingdom, Norway Potential of unmaintained sensors for continuous monitoring of aerated lagoons. Razeh, L., Lessard, P., Vanrolleghem, P., Canada Reinforcement Learning Boosting Aeration Control. Wambecq, T., Amerlinck, Y., De Bock, B., Belgium Development of aeration control method to achieve balancing between nitrogen removal and energy efficiency. Ueda, R., Yoshida, W., Hayashi, Y., Imamura, E., Kimoto, I., Hon, J., Japan A data-pipeline for autocalibration of soft sensors: a case study from a Norwegian WRRF. Hykkerud, A., Kaluarachchi, C., Yavorska, V., Ratnaweera, H., Sri Lanka, Norway
10:20-10:40	Coffee break
10:40-12:00	Session 4C: Performance optimization Chair: Fumitake Nishimura, Kyoto University, Japan
	Automated influent data generation for digital twin applications. Wärrf, C., Samuelsson, O., Aydin, H., Arnell, M., Jeppsson, U. , Sweden Automated real-time smart dose control for disinfection: digital twin implementation based on integral contact time. Jang, E., Mitobe, S., Cornfoot, E., Manoli, K., Walton, J., Santoro, D., Canada The use of Digital Twins to empower WWTP operators minimizing the energy footprint and greenhouse gas emission. Sorensen, H., Danielsen, T., Polesel, F., Denmark An Ontology-based Digital Architecture And Modelling Ecosystem For Water-fit- for-reuse Applications. Daneshgar, S., Latinis, A., Alferes, J., Ayman, S., Seuntjens, P., Van Winckel, T., Spiller, M., Vlaeminck, S., Nopens, I., Torfs, E., Belgium
12:00-13:00	Lunch (Buffet)

13:00-14:40	Session 5C: Water quality monitoring Chair: Xuejun Bi, Qingdao University of Technology, China
	Fluorescence sensor enabled real-time control of UV and ozone doses during advanced oxidation processes (AOPs). Marino, L., Gagliano, E., Santoro, D., Roccaro, P., Italy, Canada Near real-time control of disinfection by-products in a full-scale distribution system through fluorescence sensors. Marino, L., Beretsou, V., Maragkou, E., Charalambous, S., Neokleous, N., Papaioakeim, P., Elia, E., Agapiou, A., Roccaro, P., Fatta-Kassinos, D., Italy, Cyprus Monitoring of SUVA in drinking water treatment to optimize chemical usage and minimize DBP Formation. Verdonk, B., Malkov, V., Springer, M., Netherlands, Germany, USA Monitoring Of Organic Matter During Water Treatment Processes Using A Continuous EEM Monitor. Kawaguchi, Y., Kojima, R., Kosaka, K., Japan Fourier transform near-infrared spectroscopy for estimating moisture content in waste sludge. Hocaoglu, S., Gulcan, H., Ozdemir, I., Bozcelik, B., Basturk, I., Meegoda, C., Ratnaweera, H., Maletskyi, Z., Türkiye, Norway
14:40-15:00	Coffee break
15:00-16:20	Session 5D: Water quality monitoring Chair: Alejandro Vargas, Instituto de Ingenieria UNAM, Mexico
	Development of alternative method for PFAS detection. Yavorska, V., Cuprys, A., Li, F., Ratnaweera, H., Norway Opportunities and challenges of interoperable open data sharing for decision support in the water domain. Abdelfatah, A., Alferes, J., Colpaert, P., Belgium Application of artificial intelligence with daily operational management data at sewage treatment plants for more energy. Nishimura, F., Hidaka, T., Chun, P., Japan Classification of waste sludge dry matter content through texture analysis for estimating failures. Karatas, E., Gulcan, H., Aydoner, C., Hocaoglu, S., Basturk, I., Meegoda, C., Ratnaweera, H., Maletskyi, Z., Hocaoglu, A., Türkiye
17:00	Closure Day 2
17:45-18:30	Mayor of Oslo's Reception. City Hall. Rådhusplassen 1, 0037 Oslo

13:00-14:40	Session 4D: Performance optimization Chair: Saravanamuthu Vigneswaran, University of Technology Sydney, Australia
	Intelligent judgement of coagulation performance based on settling velocities calculated by floc images. Yamamura, H., Akeyama, R., Nemoto, Y., Kakuda, T., Japan Optimal coagulant dosage control scheme using flocculation image sensor and robust extremum seeking. Yamanaka, O., Onishi, Y., Hirano, M., Arimura, R., Kanadani, M., Japan Developing soft-sensors for a Digital Twin to mitigate GHG emissions at the Viikinmäki WWTP. Haimi, H., Kiran, A., Larsson, T., Blomberg, K., Elvander, F., Petäjä, E., Awaitey, A., Sahlstedt, K., Mikola, A., Finland Plantwide control and multi-objective optimization for sustainable wastewater treatment plants. Baumann, P., Wolf, C., Henneke, L., Stricker, M., Mergelmeyer, M., Mehrani, M., Pirsing, A., Germany Minimizing specific energy consumption using Digital Twins. Melin, A., Ghanem, S., Rezaei, N., Tarroja, B., Villez, K., Rosso, D., United States
14:40-15:00	Coffee break
15:00-16:20	Session 4E: Performance optimization Chair: Diego Rosso, University of California- Irvine, United States
	Computational Fluid Dynamics-based hybrid model for dissolved oxygen prediction in a full-scale wastewater plant. Ukkonen, P., Mulas, M., Mikola, A., Finland, Brazil Hybrid sedimentation models integrating microbial images of activated sludge. Verhaeghe, L., Verwaeren, J., Torfs, E., Belgium Effluent quality vs energy consumption in a temperature based control strategy for wastewater treatment plants. Revollar Chávez, S., Meneses, M., Sánchez, L., Vilanova, R., Vega, P., Francisco, M., Spain
17:00	Closure Day 2
17:45-18:30	Mayor of Oslo's Reception. City Hall. Rådhusplassen 1, 0037 Oslo

Wednesday 02.07.2025	
08:30-10:30	Session 6A: Flash presentations Co-Chairs: Christian Wolf, Cologne University of Applied Sciences, Germany/ Pastora Vega, University of Salamanca., Spain
	Leveraging proactive asset management of water distribution systems in northern province of Sri Lanka. Masanad, E., Sri Lanka Model-based cooperative control of a simulated urban drainage network. Wang, Y., Haugen, F., Norway Critical issues in estimating water losses with the algorithms from IWA Good Practices (EU Reference Document). Ceseri, G., Mesturini, A. Italy Decontamination of hazardous medical wastewater via combined solar driven photocatalytic processes. Tsoumachidou, S., Mitrousi, E., Berberidou, C., Poullos, I., Greece Overview of ICA in Brazilian WWTPs. de Medeiros, G., de Farias, F.P., de Sousa, D.R., Mulas, M., Brazil Water quality monitoring challenges during the war in Ukraine: New contaminants and approaches to their detection. Kyrii, S., Kosogina, I., Shahnovsky, A., Hutsul, H., Dontsova, T., Ukraine Enhancing benchmark simulation models with industry components: Progress towards What-if simulation. Ferraro, A., Gàmitz, J., Barbu, M., Vicaio, J., Vilanova, R., Spain Model predictive reinforcement learning control based on liquid neural networks for global plant-wide control of a WRRF. Gomez Cortes, C., Solon, K., Ramin, P., Flores-Alsina, X., Huusom, J., Kùlahci, M., Torfs, E., Belgium, Denmark, Canada Integrating instrumentation, control, and automation towards sustainable and energy-neutral water treatment in utilities. Masanad, E., Sri Lanka Modeling ultra filtration systems for direct-to-potable reuse of wastewater. Ghanem, S., Villez, K., Melin, A., Mukherjee, S., Hering, A., Cath, T., United States
10:30-11:00	Coffee break
10:50-11:30	Chair: Pierre Berube, University of British Columbia, Canada
10:50-11:20	Keynote 4: Towards the 15th ICA. Peter Vanrolleghem. Professor and Canada Research Chair on Water Quality Modeling at Université Laval, Canada.
11:20-11:30	Closure of the ICA2025 Janelcy Alferes Castano, Chairperson, Specialist Group, ICA
11:30-12:30	Lunch (snacks)
12:30-16:00	Excursion 1: VEAS, Oslo's largest WWTP; Excursion 2: Oslo's 2nd largest WWTP
15:30-16:00	Return to Radisson Scandinavia hotel

Wednesday 02.07.2025	
08:30-10:30	Session 6B: Flash presentations Co-chairs: Serhii Martynov, National University of Water and Environmental Engineering, Ukraine /Jiping Jiang, Southern University of Science and Technology, China
	Sensor fault characteristics and fault detection in wastewater treatment plants: Current status and trend analysis. Chen, S., Wang, X., Bi, X., China A novel UV-Vis online sensor with modeling approach for real-time monitoring of pharmaceuticals in water. Li, F., Wang, X., Zhu, M., Ratnaweera, H., Norway, China Unlocking insights from smart automated aeration tests. Maenhout, W., Wambecq, T., Vanhoof, P., Belgium Research on the performance improvement of coagulant dosing prediction models based on ERA5 data. Li, D., Han, M., Shi, X., Liu, Q., Zhou, F., Xie, R., China Approximation formula-embedded neural network model incorporating operator expertise for a flocculant dosage estimation. Watanabe, A., Sangu, Y., Embutsu, I., Sakimura, S., Yokoi, H., Nakamura, N., Japan Membrane fouling: How data-driven approaches enhance monitoring & control strategies? Arembage, A., Roghani, B., Berube, P., Liland, K., Maletskyi, Z., Ratnaweera, D., Ritigala, T., Norway, Sri Lanka EWatLink: Smart advanced real-time control of activated sludge process aeration at Bastogne WWTP. Abunama, T., Belgium Control of an up-flow anaerobic sludge blanket reactor treating blackwater. Maciel, F., Medeiros, J., Markert, C., Mulas, M., Boiocchi, R., Brazil, Italy Impact of data dimensionality reduction with autoencoders in wastewater treatment denitrification processes. Voipan, A., Voipan, D., Barbu, M., Romania Design of a Digital Twin for stress scenarios of WWTP. Pankow, N., Krause, S., Schaum, C., Germany Prediction of Heavy Metal Adsorption Performance by Biochar Based on Machine Learning. Wang, S., Wang, X. China Predicting initial trans-membrane pressure for optimized operations in UF unit using Random Forest. Mukherjee, S., Villez, K., Melin, A., Ghanem, S., Cath, T., Hering, A., United States
10:30-11:00	Coffee break
10:50-11:30	Chair: Pierre Berube, University of British Columbia, Canada
10:50-11:20	Keynote 4: Towards the 15th ICA. Peter Vanrolleghem. Professor and Canada Research Chair on Water Quality Modeling at Université Laval, Canada.
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12:30-16:00	Excursion 1: VEAS, Oslo's largest WWTP; Excursion 2: Oslo's 2nd largest WWTP
15:30-16:00	Return to Radisson Scandinavia hotel

Title	First name	Last name	Affiliation (Institution/Company Name)	Country
Dr	Jiuling	Li	ACWEB, University of Queensland	Australia
Mr	Murray	Thompson	Murray Thompson Water Services Pty Ltd	Australia
Dr	Haoran	Duan	The University of New South Wales (UNSW)	Australia
Mrs	Senyuan	Gu	The University of New South Wales, Sydney	Australia
Dr	Kaili	Li	The University of Queensland	Australia
Prof	Saravanamuthu	Vigneswaran	University Of Technology Sydney	Australia
Mrs	Shanthini	Vigneswaran	University Of Technology Sydney	Australia
Mr	Wouter	Maenhout	Aquafin	Belgium
Mr	Tom	Wambecq	AQUAFIN	Belgium
Mr	Cristian	Camilo Gómez Cortés	BIOMATH, Ghent University	Belgium
Prof	Saba	Daneshgar	BIOMATH, Ghent University	Belgium
Dr	Kimberly	Tumlos Solon	BIOMATH, Ghent University	Belgium
Mr	Gaétan	Herold	BIOMATH, Ghent University / ModelEAU, Université Laval	Belgium
Mr	Athanasios	Latinis	BIOMATH, Ghent University / ModelEAU, Université Laval	Belgium
Mrs	Loes	Verhaeghe	BIOMATH, Ghent University / ModelEAU, Université Laval	Belgium
Dr	Taher	Abunama	CEBEDEAU -Water purification services in Liège	Belgium
Mr	Antoine	Dellieu	CEBEDEAU -Water purification services in Liège	Belgium
Mr	Sait Mutlu	Karahan	Ghent University	Belgium
Dr	Mariane	Schneider	Ghent University	Belgium
Mrs	Janelcy	Alferes Castano	VITO	Belgium
Mr	Shehabeldeen	Mohamed Abdelfatah	Vito/UGent	Belgium
Mr	Jorge	Medeiros	Cagece / Federal University of Ceara	Brazil
Mr	A. Felype	F. Maciel	Federal University of Ceara	Brazil
Prof	Michela	Mulas	Federal University of Ceara	Brazil
Dr	Fernanda	Cazelato Gaioto	Federal University of Rio de Janeiro-UFRJ	Brazil
Mrs	Mariana	Lima	Federal University of Rio de Janeiro-UFRJ	Brazil
Mr	Victor	Mello	Federal University of Rio de Janeiro-UFRJ	Brazil
Dr	Mahsa	Sadeghassadi	inCTRL Solutions	Canada
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Mrs	Annick	De Meester	ModelEAU - Université Laval	Canada
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Mr	Daniel	Freedman	Metro Water Recovery	USA



**INSTRUMENTATION
CONTROL AND
AUTOMATION**

Our Specialist Group

The ICA-SG provides the monitoring and control tools needed to meet current and future technology innovations for the water and wastewater industries. The methodologies are used to monitor and control unit processes, plant behaviour or large systems involving networks, plants and receiving waters. Research, practical experience, case studies, management problems, operator challenges and integrated solutions of these systems are important parts of the activities of the ICA-SG.

ICA is the technology often considered as an afterthought in traditional urban water management. ICA has become more relevant and essential within the water sector due to increasing digitalization and interest surrounding Internet of Things (IoT) and Artificial Intelligence. Indeed, digitalization for monitoring, control and decision support throughout the urban water cycle – including drinking water production and distribution, wastewater collection and treatment, and water reuse – has become an essential tool to achieve cost-effective, intelligent and safe operation. ICA is also an important tool to mitigate environmental impacts despite challenges with aging equipment and increasing populations. Installation and use of ICA in existing plants is often challenging due to plant design limitations, sensor and data quality problems, and lack of ICA experience within operations staff.

Potable water treatment & distribution systems have historically been well monitored and there are still challenges with tightening standards on persistent organics as well as advanced digitalization, monitoring & control of the distribution network using flow, pressure & potentially quality monitoring. There have been significant advances in the integration of new sensors and the collection, integration & analysis of this data, using advanced data analytics. There still remain a number of future challenges in the adoption of new technologies and how the industry can engage in a more meaningful way with the customer. Wastewater collection and treatment also hold unique challenges with a harsh environment of dynamic nature subjected to numerous interferences and the fact that the system needs to accept all flows. ICA can assist operations in delivering the best service to the customer in the best and most efficient manner. Furthermore, the 21st century promises a growing shift from treating sewage as a waste stream to using it as a resource for added-value products, including energy, nutrients, specialty chemical products, and a new sustainable water resource. ICA will be fundamental for controlling the quality and consistency of these new products.

The priorities for the ICA-SG are disseminating and promoting ICA advances: supporting ICA related conferences, organising ICA webinars, continuing with a 6-month schedule for the ICA newsletter, promote IWA Connect, supporting Task Groups, Working Groups and IWA Clusters and encouraging publications of ICA related papers at conferences and in scientific journals.

The field of ICA continues to evolve as technologies develop: a digitalised platform of the entire urban water sector; development of reliable and cost-effective on-line sensors and advanced controllers; and big data analytics and visualization tools for better cost-benefit analyses. Available data is increasing almost exponentially and can be transformed into valuable information for operator support, improvement of control systems and integrated planning. Plant-wide control will use ICA methodology to coordinate the different systems to attain better energy efficiency, low carbon footprint and enhanced resilience. Resource recovery will require tight control of product qualities, while increased demand of decentralized systems and decision support systems (DSS) will be also important driving forces for ICA development. In summary, ICA will have a key role in the continuing evolution of water/wastewater systems.

Please join the ICA SG via



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Norwegian University of Life Sciences

Norwegian University of Life Sciences: The host, overall planning



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The International Water Association (IWA) is the world's largest network for water professionals, with more than 9,000 members across 140+ countries. It supports over 50 specialist groups, including the Instrumentation, Control, and Automation (ICA) group, which organizes a biennial conference—the premier global event for digital innovation in the water sector.

The 14th ICA Conference will take place in Oslo, Norway, from 29 June to 2 July 2025, hosted at the Radisson Scandinavia Hotel. Previous editions were held in Beijing (2023), Quebec (2021), Narbonne (2019), and Cairns (2017).

Welcome to ICA2025



Hamanth Kasan
President of the IWA, Professor

As the world faces unprecedented challenges, the importance of embracing latest approaches in instrumentation, control and automation toward achieving water security cannot be over emphasised. Looking forward to the engagements and outcomes of this exciting event.



Kala Vairavamoorthy
Executive Director, IWA

Digitalization is a vital tool for making our utilities smarter, more efficient, and cost-effective, which is why it is such a high priority for IWA. Today's huge potential for digital transformation builds on the long and continuing contribution of ICA. The forthcoming ICA conference, the 14th in the series, will introduce key innovations to address the evolving needs of utilities, and I look forward to welcoming you to Oslo in 2025.



Janelcy Alferes
Chair, ICA IWA Specialist Group
Project Leader Monitoring technology & WaterClimateHub – VITO, Belgium

With the increasing challenges that the water sector is facing, ICA is more than ever a crucial enabler towards more efficient and resilient water and wastewater systems. Join us to dive in this transformation journey from data to smart decision making.



Harsha Ratnaweera
Conference Chair,
Professor, Norwegian University of Life Sciences
Founder, DOSCON AS, Norway

We are honoured to host the 14th ICA in Oslo at a time when the water sector is rapidly embracing digitalisation. Join us for an unforgettable stay in Norway, where we will explore the latest innovations and shape the future of ICA in water together.

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