

TUESDAY 5TH SEPTEMBER (MORNING)

	LT3	LT4	LT5
08:00 - 09:00	REGISTRATION AND REFRESHMENTS		
09:00 - 09:15	WELCOME LT1		
09:15 - 10:00	Key note address LT1 <i>A Whirlwind Historical Tour of the Wonderful World of Water Distribution Systems Analysis - Walter Grayman</i>		
10:00 - 10:20			
10:20 - 11:20	Demand forecasting, leakage and energy management Leakage Session Chair - Kobus van Zyl	Advances in sensors, instrumentation and communications technologies Sensing Session Chair - Joost Van Summeren	Water quality modelling, including sediment and pollutant transport Water quality Session Chair - Walter Grayman
	Data Setup for Water Distribution System Supervision Pérez, R. , Grau, S., Jiménez, V., Martínez, X., Tomas, R.	The Role of SMART Water Quality Monitors on the Path to SMART Water Networks Strahand, M.	Reduction in Infection Risk by Automated Rapid Detection of Faecal Contamination of Drinking Water Distribution Systems Blokker, E.J.M. , Smeets, P.W.M.H.
	Model Calibration for Leak Localisation, a Real Application Sanz, G., Meseguer, J., Pérez, R.	SAFEWATER – Application and Results of Innovative Tools for the Detection and Mitigation of CBRN- related Contamination Events in Drinking Water Supply Systems Bernard, T. , Rosenberg, A., Lucas, H., Rieder, A., Moßgraber, J., Deuerlein, J., Brill, E., Boudergui, K., Ilver, D., Ulitzur, N., Madar, A.E.	Infection Delay Time Analysis for Enhancing Water Networks Vulnerabilities to Contamination Intrusions Lifshitz, R. , Ostfeld, A.
	Leakage Modelling: High Leakage Exponents Due To Friction Effects Heckmann, K. , Sievers, J.	Identifiability analysis for pressure sensors positioning Puleo, V., Tarantino, S., Freni, G. , La Loggia, G.	Two-Point Constraint Control of Water Quality in Distribution Networks Maheshwari, A. , Abokifa, A.A., Gudi, R.D., Biswas, P.
11:20 - 11:40	REFRESHMENTS		
11:40 - 12:40	Demand forecasting, leakage and energy management 2 Demands and energy Session Chair - Juan Saldarriaga	Systems modelling, optimisation and decision support Modelling and optimisation Session Chair - Zheng Wu	Water quality modelling, including sediment and pollutant transport 2 Water quality Session Chair - Stewart Husband
	Exploring how Pipe-Level Energy Metrics Relate to Hydraulic Parameters using Multivariate Analysis Hashemi, S. , Filion, Y.R., Speight, V.L.	Dynamic Scenario Selection in Optimal Design Problems and Evolutionary Optimization with Uncertain System Knowledge Sankary, N. , Ostfeld, A.	Online Water Quality Monitoring based on Pattern Analysis Page, R.M. , Waldmann, D., Gahr, A.
	Influence of Pressure, Temperature and Humidity on Water Consumption Suchacek, T. , Tuhovcak, L., Rucka, J.	Spectral Propagation of Parameter Uncertainties in Water Distribution Networks Braun, M. , Piller, O., Deuerlein, J., Mortazavi, I.	Water Network Characterisation Based on Mass Balance with Regards to Discolouration Risk using High Frequency Turbidity Monitoring Starczewska, D. , Gaffney, J., Boulton, S.
	A Comparison of Short-Term Water Demand Forecasting Models Pacchin, E., Gagliardi, F., Alvisi, S. , Franchini, M.	The EPANET Challenge Ostfeld, A.	
12:40 - 13:40	LUNCH		

TUESDAY 5TH SEPTEMBER (AFTERNOON & EVENING)

	LT3	LT4	LT5
13:40 - 15:00	Demand forecasting, leakage and energy management 3 Leakage Session Chair - Alan Lambert	Systems modelling, optimisation and decision support 2 Modelling Session Chair - Luigi Berardi	Sustainable urban water management, including stormwater management and integration of water within smart blue-green cities Urban Drainage Session Chair - Simon Tait
	Optimal Control for Water Loss from Water Distribution System: A Case Study of Beijing Xu, Q. , Liu, K., Zhao, S., Cao, N., Qiang, Z., Ben, W.	Why are Line Search Methods Needed for Hydraulic DDM and PDM Solvers? Piller, O. , Elhay, S., Deuerlein, J., Simpson, A.	Evaluating Classification Algorithms for Improved Wastewater System Calibration Younis, M.C. , Keedwell, E., Savic, D., Raine, A.
	A Theory for Realistic Modeling of Leakage and Intrusion Flows Through Leak Openings in Pipes Van Zyl, J.E. , Lambert, A., Collins, R.	A Rehabilitation Decision-Making Approach for WDNs Based on Extended Period Simulations Darvini, G., Ruzza, V. , Salandin, P.	Prediction of CSO Chamber Water Levels Using Rainfall Forecasts Rosin, T. , Romano, M., Woodward, K., Keedwell, E., Kapelan, Z.
	Pressure: Leak Flow Rates using FAVAD: an Improved Fast-Track Practitioner's Approach Lambert, A. , Fantozzi, M., Shepherd, M.	WDNs calibration using k-means algorithm for pipes clustering and a hybrid model for optimization Freitas, R., Brentan, B.M. , Lima, G.M., Luvizotto Jr. E.	Smart Rainwater Management Systems Powered by the Internet of Things: A UK Case Study Rezaei, H., Melville-Shreeve, P. , Butler, D.
	Investigating Statistical Process Control and Geostatistical Techniques for Approximate Leak/Burst Event Location Boatwright, S. , Romano, M., Mounce, S., Woodward, K., Boxall, J.B.	Optimising valve placement and pressure control for multi-feed sectors in water supply networks using outer approximation Pecci, F., Stoianov, I.	Effects of Manning Coefficients and Absolute Roughness on the Optimized Designs of Urban Drainage Networks Duque, N., Montes, C.R. , Zambrano, J.B., Saldarriaga, J.V.
15:00 - 15:20	REFRESHMENTS		
15:20 - 16:40	Demand forecasting, leakage and energy management 4 Transients and leakage Session Chair - Martin Lambert	Systems modelling, optimisation and decision support 3 Modelling Session Chair - Maria da Conceição Cunha	Asset management and performance modelling Assets and performance Session Chair - Peter Van Thienen
	Probabilistic Modelling of Transient Propagation in Water Distribution Systems Collins, R.	A Dynamic Model for Smart Water Distribution Networks Kaltenbacher, S. , Steffelbauer, D.B., Cattani, M., Horn, M., Fuchs-Hanusch, D., Römer, K.,	Agent-Based Modeling as a Decision Support Tool for Water Conservation Planning Tourigny, A., Filion, Y.R.
	Cumulative Pressure Induced Stress for Characterising Pressure Transients and Variability in Water Supply Networks Stoianov, I. , Hoskins, A.	On the Solvability of the Pressure Driven Hydraulic Steady-State Equations Considering Feedback-Control Devices Deuerlein, J. , Piller, O., Parisini, F., Simpson, A., Elhay, S.	Understanding the Range of Influence of Moderate-Sized and Short-Duration Transients in Water Distribution Systems Stephens, M., Marchi, A. , Gong, J., Lambert, M., Leonard, M., Simpson, A.
	Pipe Leak Diagnostic Using Empirical Mode Decomposition (EMD) and Automatic Selection of the Intrinsic Mode Function (IMF) Yusop, H.M., Ghazali, M.F. , Yusof, M.F.M., Remli, M.A.P.	Hydraulic Reliability analysis of a Real Network with Remotely Real-time Controlled Pressure Control Valves Laucelli, D.B., Berardi, L. , Simone, A., Raspati, G., Ugarelli, R.M., Giustolisi, O.	Modelling Capitol Costs of Sewer System Assets Cabral, M., Pinheiro, A., Loueiro, D., Covas, D.
	Application of Least Squares Support Vector Machines and Acoustic Measurements for Leak Flow Rate Prediction Butterfield, J.D., Meruane, V., Collins, R. , Meyers, G., Beck, S.B.M.		Management-Indicators Consulting System for Potable Water Utilities Hansen Rodríguez, M.P. , Rodríguez Varela, J.M., Laurel Varela, Y., Fernández García, H., Martínez Ocampo, G., Antúnez Leyva, E., Gómez Lugo, L.
17:00 - 18:45	Networking and Lab Tours in the Pam Liversidge Building		
18:30 Drinks Reception at Kelham Island. Coaches will depart after lab tours 18:00, 18:15, 18:30, 18:45 Return coaches from 20:30.			

WEDNESDAY 6TH SEPTEMBER (MORNING)

	LT3	LT4	LT5
08:30 - 09:00	REFRESHMENTS (AND DAY REGISTRATION)		
09:00 - 09:45	Key note address LT1 <i>Trends and opportunities in water management - Maria da Conceição Cunha</i>		
09:45 - 10:00			
10:00 - 11:00	Real time monitoring, modelling, control and uncertainties Real time Session Chair - Ramon Perez	Demand forecasting, leakage and energy management 5 Demand forecasting Session Chair - Yves Filion	Water quality modelling, including sediment and pollutant transport 3 Water quality Session Chair - Vanessa Speight
	An Integrated State Estimation Approach to Enhance the On-line Monitoring Capabilities of Water Distribution Systems Díaz, S. , González, J., Mínguez, R.	A Model Pre-processing Approach for Improving Calibration-based Leakage Detection using a Genetic Algorithm Sophocleous, S. , Savic, D., Kapelan, Z., Shen, Y., Sage, P.	Optimal Positioning of Water Quality Sensors in Water Distribution Networks: Comparison of Numerical and Experimental Results Piazza, S., Sambito, M., Feo, R., Freni, G. , Puleo, V.
	A Real Time System for Detecting Events in Water Networks Meeus, S. , Marshallsay, D.	A Perspective on Reducing Uncertainties in Water Distribution Networks Management Using Clusters Lifshitz, R. , Ostfeld, A.	Can a Valve Closure Transient Cause Mobilisation of Adhered Particles? Weston, S. , Collins, R., Boxall, J.B.
	Extracting Temporal Patterns for Contamination Event Detection in a Large Water Distribution System Cheifetz, N. , Kraiem, S., Mandel, P., Féliers, C., Heim, V.	A Python Tool for Generating Synthetic Demand Scenarios Santopietro, S. , Granata, F., Tricarico, C., de Marinis, G., Gargano, R.	Inline Mobile Water Quality Sensors Deployed for Contamination Intrusion Localization Sankary, N. , Ostfeld, A.
11:00 - 11:20	REFRESHMENTS		
11:20 - 12:40	Real time monitoring, modelling, control and uncertainties 2 Pumps and valves Session Chair - Bogumil Ulanicki	Demand forecasting, leakage and energy management 6 Demands and metering Session Chair - Olivier Piller	Water quality modelling, including sediment and pollutant transport 4 Discolouration Session Chair - Mirjam Blokker
	Unsteady Flow Modelling of RTC in Water Distribution Networks Creaco, E. , Campisano, A., Franchini, M., Modica, C.	Identifying Relationships between Weather Variables and Domestic Water Consumption using Smart Metering Xenochristou, M. , Kapelan, Z., Hutton, C., Hofman, J.	Using Hydraulic Models and Real Time Monitoring to Provide Resilience for Birmingham Rimmer, C.
	Real-time whole-cost optimization of water production and distribution Sunela, M.I. , Puust, R.	Analysis of shower water use and temperature at a South African University campus Botha, B.E., Jacobs, H.E. , Biggs, B., Ilemobade, A.A.	Discolouration Risk Management and Chlorine Wall Decay Sunny, I. , Husband, S., Moore, G., Drake, N., Mckenzie, K., Boxall, J.B.
	Mechanical reliability analysis of a real network to support the design of Isolation Valve System Laucelli, D.B., Berardi, L. , Simone, A., Raspati, G., Ugarelli, R.M., Giustolisi, O.	Leak Detection in a DMA, a Real Application of Flow Modelling Jiménez, V., Grau, S., Pérez, R. ,	Application of Water Distribution Models in Mains Cleaning- A Case study Mansoor, M.A.M. , Bleakley, E., Yan, J., Vairavamoorthy, K.
	Self-tuning Pump Operation Mode for Fluid Storages to Increase Energy Efficiency Hieninger, T. , Schmidt-Vollus, R.	End-Use Estimates of Water Demand Within Certain Residential Categories in the City of Johannesburg Jacobs, H., Ilemobade, A.A. , Botha, B.E.	Rusby Wood a Smart Network for Sustainable Discolouration Risk Reduction Cook, D. , Husband, S.
12:40 - 13:40	LUNCH		

WEDNESDAY 6TH SEPTEMBER (AFTERNOON & EVENING)

	LT3	LT4	LT5
13:40 - 15:00	Systems modelling, optimisation and decision support 4 Optimisation Session Chair - Marco Franchini	Asset management and performance modelling 2 Asset performance Session Chair - Heinz Jacobs	Data driven and soft computing analytics and visualisation Machine learning Session Chair - Michele Romano
	Operational interventions in WDS to improve water quality: a comparison of multi-objective optimization formulations Quntiliani, C. , Marquez-Calvo, O., Alfonso, L., Di Cristo, C., Leopardi, A., de Marinis, G.	Urban Water Infrastructure Asset Management Plan: A Practical Approach Ferreira, B., Carriço, N.J.G.	Pattern Recognition in Residential End Uses of Water Using Artificial Neural Networks and Other Machine-Learning Techniques Carranza, J.C.I. , Morales, R.D., Sánchez, J.A.
	Pumping Cost Optimization in Looped Water Networks with Storage Capacity through the Searching of the Setpoint Curve León-Celi, C.F., Iglesias-Rey, P. , Martinez-Solano, F.J., Savic, D., Vamvakeridou-Lyroudia, L.S.	Continuous Robotic Inspection of Pipes for Data Rich Asset Management Van Thienen, P. , Maks, M., Yntema, D., Janssens, J.P., Bergmans, B., Diemel, R., Helgers, M., Horst, P., Trietsch, E.	Automatic Detection of Sewer Faults Using Continuous CCTV Footage Myrans, J. , Kapelan, Z., Everson, R.
	Costs Functions Proficiency over the Urban Drainage Networks Optimal Design Duque, N., Aguilar, A., Saldarriaga, J.	A Fast Method to Identify the Criticality of Individual Components in Water Supply Networks Meijer, D. , Clemens, F.	Applying Deep Learning with Extended Kalman Filter and Genetic Algorithm Optimization for Water Distribution Data Driven Modeling Wu, Z.Y. , Rahman, A., Li, Q.
	Comparison between Optimal and Real Design in Water Distribution Systems (WDS). Effect of Population Growth during the Project Lifespan. Posada, A., Bohórquez, J., Robles, J., Saldarriaga, J.	Fault Detection and Diagnosis for Pressure Control Valves in Water Supply Networks Changklom, J. , Stoianov, I.	
15:00 - 15:20	REFRESHMENTS		
15:20 - 16:40	Systems modelling, optimisation and decision support 5 Modelling Session Chair - Avi Ostfeld	Flood modelling and management Flood modelling and management Session Chair - Kieran Williams	Data driven and soft computing analytics and visualisation 2 Data driven analytics Session Chair - Shuming Liu
	Fractality in Water Distribution Systems Diao, K. , Butler, D., Ulanicki, B.	A 3D Web Gis Interactive Visualisation System For Animated Floods Khoury, M. , Gibson, Chen, A.S., Savic, D., Vamvakeridou-Lyroudia, L.S., Djordjevic, S.	Clustering-Based Burst Detection using Multiple Pressure Sensors in District Metering Areas Wu, Y. , Liu, S.
	Segments Identification in Water Distribution Systems by Using Network Topological Matrices Mahmoud, H. , Kapelan, Z., Savic, D.	Optimising a Fuzzy Logic Real-Time Control System for Sewer Flooding Reduction using a Genetic Algorithm Shepherd, W. , Mounce, S., Ostojin, S., Abdel-Aal, M., Schellart, A., Skipworth, P., Tait, S.	Online Burst Detection in Water Networks with an Ensemble of Flow Prediction Models Adachi, S. , Takahashi, S., Takemoto, T.
	Comparison of Different Controllers for Equitable Water Supply in Water Networks Anjana, G.R., Mohan Kumar, M.S. , Amrutur, B.	Optimal Location and Sizing of Stormwater Storage Units: Case Study in Bogota Zeferino, J.A. , Cunha, M., Simões, N.E., Saldarriaga, J.G.	Online Advanced Uncertain Reasoning Architecture with Binomial Event Discriminator system for novelty detection in smart water networks Mounce, S. , Fergus, A., Weeks, M., Young, J., Ejimbe, D., Goya, E., Holburn, M., Jackson, T., Boxall, J.B.
	An Improved Simulated Annealing Algorithm for Solving Complex Water Distribution Networks Cunha, M. , Marques, J.	Analysis and Simulation of Drainage Capacity of Urban Pipe Network Gomes, R. , Vellando, P., Sousa, J., Sá Marques, J., Muranho, J.	Data-driven Approach to Short-Term Forecasting of Turbidity in a Trunk Main Network Meyers, G. , Kapelan, Z., Keedwell, E.
19:00 Conference dinner in Firth Hall.			

THURSDAY 7TH SEPTEMBER

	LT3	LT4	LT5
08:30 - 09:00	REFRESHMENTS (AND DAY REGISTRATION)		
09:00 - 09:45	Key note address LT1 <i>Building Blocks For A Resilient Water And Wastewater Service - Simon Parsons</i>		
09:45 - 10:00			
10:00 - 11:00	<p style="text-align: center;">Water and wastewater treatment modelling, optimisation and control <i>Treatment</i> Session Chair - Will Shepherd</p>	<p style="text-align: center;">Demand forecasting, leakage and energy management 7 <i>Leakage</i> Session Chair - Joby Boxall</p>	<p style="text-align: center;">Security, reliability and resilience <i>Resilience</i> Session Chair - Dominic Boccelli</p>
	<p style="text-align: center;">Integrated Treatment Plant and Distribution Network Models To Predict The Drinking Water Quality From Source To Tap Heinsbroek, A.R., Wolthek, N.B.A., Wuestman, R.</p>	<p style="text-align: center;">Water Advisory Demand Evaluation and Resource Toolkit Paluszczyszyn, D., Illya, S., Goodyer, E., Kubrycht, T.</p>	<p style="text-align: center;">Water Distribution System Recovery Strategies Considering Economic Consequences from Business Loss Lee, S., Shin, S., Judi, D., McPherson, T., Burian, S.</p>
	<p style="text-align: center;">Multimechanism Fouling Model for Micro and Ultrafiltration Membranes for Wastewater Treatment Janus, T., Ulanicki, B.</p>	<p style="text-align: center;">Tactical Leakage Targeting, A Modelling and Control System to Aid Efficient Leakage Strategies Rogerson, S.</p>	<p style="text-align: center;">A new Index System for Intermittent Water Supply Loubser, C., Jacobs, H.E.</p>
		<p style="text-align: center;">A Multivariate Geospatial Data-Driven Approach to Descriptive Modelling of Burst Behaviour in a Small Island Context Mackey, T., Mounce, S., Boxall, J.B., Cashman, A.</p>	<p style="text-align: center;">Augmented Resilience of Water Distribution Systems following Severe Abnormal Events Piller, O., Sedehizade, F., Bernard, T., Braun, M., Cheifetz, N., Deuerlein, J., Wagner, M., Lapébie, E., Trick, I., Weber, J.-M., Werey, C.</p>
11:00 - 11:20	REFRESHMENTS		
11:20 - 12:40	<p style="text-align: center;">Systems modelling, optimisation and decision support 6 <i>Modelling</i> Session Chair - Zoran Kapelan</p>	<p style="text-align: center;">Demand forecasting, leakage and energy management 8 <i>Energy</i> Session Chair - Didia Covas</p>	<p style="text-align: center;">Advances in sensors, instrumentation and communications technologies 2 <i>Sensing</i> Session Chair - Ivan Stoianov</p>
	<p style="text-align: center;">A Particle Filter Model for Online Demand Estimation of Non-Geographical Distributed Demand Pattern Networks Do, C.N., Simpson, A., Deuerlein, J., Piller, O.</p>	<p style="text-align: center;">An Energy Evaluation of Common Hydraulic Thresholds in Water Mains Hashemi, S., Filion, Y.R., Speight, V.L.</p>	<p style="text-align: center;">One-Class SVM - Leak Detection In Water Distribution Systems Cody, R., Narasimhan, S., Tolson, B.</p>
	<p style="text-align: center;">Multi-object approach for WSN Partitioning in the framework of Pressure Driven Analysis Creaco, E., Di Nardo, A., Di Natale, M., Giudicianni, C., Santonastaso, G.E.</p>	<p style="text-align: center;">Assessment of Alternatives for Energy Efficiency Improvement using a Hydraulic Simulation Model Santos-Tellez, R.U., Rodriguez-Varela, J.M., Silvestre, J.M., Tzatchkov, V.G.</p>	<p style="text-align: center;">Valve Status Verification and Sensor Error Detection via Causal Inference from Sensor Data Vries, D., van Summeren, J.</p>
	<p style="text-align: center;">Adaptation of Physarum Polycephalum Evolution for Least-Cost Design of Water Distribution Networks Skulovich, O., Ostfeld, A.</p>	<p style="text-align: center;">New test-rig for micro hydropower turbomachines Delgado, J., Ferreira, J.P., Covas, D., Avellan, F.</p>	<p style="text-align: center;">Feasibility Study on Water Temperature and Pressure Sensing Based on Wireless Passive SAW Technology Tang, Z., Wu, W., Gao, J.</p>
	<p style="text-align: center;">Case Study: Improvements to a Real-Time Network Modelling Framework Masud Rana, S.M., Oliveira, P.J., Qin, T., Boccelli, D.L.</p>	<p style="text-align: center;">Water and Energy Efficiency in Bulk Water Systems Monteiro, L., Mamade, A., Figueiredo, D., Alves, R., Póvoa, P., Covas, D.</p>	<p style="text-align: center;">Design of an Observational Study for Investigating the Impact of Pressure Transients on Pipe Failures in Water Supply Networks Rezaei, H., Stoianov, I.</p>
12:40 - 12:50	REFRESHMENTS		
12:50 - 13:10	Conference close LT1		
13:10 - 14:00	LUNCH		