

# LIST OF ORAL PRESENTATIONS

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### Acoustic Leak Detection Using Data From Smart Meters

K. Andersen, J. Sorensen, S. Dupont. Kamstrup A|S (Denmark)

### Asset Management Customer Value 2020 Benchmarking Industry Outcomes

F. Ibrahim, J. Goode. Isle Utilities (Australia)

### CALM NETWORK TM: The Next Generation Of Pressure Management For A Healthier Lifestyle For Water Systems

P. Bonardet, A. Chazerain, D. Duccini, A. Rossi, H. Yin, G. Cussonneau, R. Wright. SUEZ Water Technology & Solutions (France)

### Data Driven Decisions - Operational Analytics To Inform Network Performance And Operations

P. Bonk, J. Klaric. Innovyze (Australia)

### Data-Driven And Model-Based Framework For Smart Water Grid Anomaly Detection And Localization

Z. Wu, Y. He, A. Chew, M. Chen, LK. Cheong, SF. Hew, JJ. Wong. Bentley Systems, Inc. (United States)

### Digital Twins For Resilient Water Infrastructure

Z. Wu, R. Kalfarisi, LK. Cheong, SF. Hew, JJ. Wong, G. Teopilus, I. Song, JM. Yip. Bentley Systems, Inc. (United States)

### EchoShore® - TX Leak Monitoring System For Transmission Mains – Using An Integrated Approach Using Single Channel And Correlation Analysis

V. Burtea, R. Madhavaneswaran. Mueller Water Products (Canada)

### Efficiency And Commitment: Guaranteeing The Sustainability Of Water Supply In The Future

FJ. Fernández, N. San Román. Canal de Isabel II, S.A. (Spain)

### Failure Risk Analysis For Asset Renewal Prioritisation

M. Nicol, (Mueller Water Products, Singapore), GC. Yong (PUB, Singapore), K. Claudio (SUEZ, Singapore), E. Goh (Mueller Water Products, Singapore)

### Incorporating Behaviour Insights in Smart Water Meters Programme

S. Seah, I. Toh, S. Koh, H. Ang, HH. Koh. Public Utilities Board (Singapore)

### Leak Detection Through Mobile Acoustic Monitoring

O. Fruchtmann. Aquarius-Spectrum (Israel)

### NETSCAN: Condition-driven Health Diagnosis Of Water Infrastructure For The Optimization Of The Network's Life-cycle

P. Bonardet, T. Van Becelaere, K. Claudio, G. Fay. SUEZ Water Technology & Solutions (France)

### Optimisation Of Pump Operations: NRW Management And OPEX Reduction

K. Garcia. Maynilad Water Services, Inc. (Philippines)

### Real-time Data Analytics Of Advanced Metering Infrastructure And IoT Based Sensors To Quantify And Reduce Non-Revenue Water

B. Skeens V. Singh, R. Kadiyala. Jacobs (Singapore)

### Streamlining Delivery Of A 24X7 Water Supply Scheme In India

A. Askar, N. Bockhoff, J. Cantone. SUEZ India (India)

### TWINET TM: Operational Real-Time Tool Based On The Hydraulic Model And Sensors Data

F. Figuères, A. Chazerain. SUEZ Water Technology & Solutions (France)

### **Using Data Science to Drive Water Utility Decisions: A Case Study in a Medium-Sized Utility**

C. Boyle, J. Poff. Xylem (United States)

### **Water Metering Evolves -- Yesterday's Billing System Is Tomorrow's Sensor Network**

B. Drijzen, T. Wise, D. Nicklin. Xylem (United Kingdom)

## **Theme 2: Delivering Water from Source to Tap (Treatment)**

### **A Novel Hollow Fiber Nanofiltration Membrane For Domestic Water Application**

ET. Saw, Y. Tang, J. Liu, W. Wang. Century Water Systems & Technologies Pte Ltd (Singapore)

### **Advanced 3D Modelling For Virtual Piloting: Accelerating The Development Of The Next Generation Water And Wastewater Treatment Technologies**

W. Audenaert, U. Rehman, J. Plooi, I. Nopens. AM-TEAM (Belgium)

### **AMOZONE: A Novel Kinetic Ozonation Model For Prediction Of Bromate Formation, Bromate Mitigation and Trace Organic Contaminant Removal**

W. Audenaert, G. Bellandi, M. Pearce, I. Takacs. AM-TEAM (Belgium)

### **Chemical-grafting of Graphene Oxide Quantum Dots (GOQDs) onto Microfiltration Ceramic Membranes (CMs) for Anti-organic Fouling Potential**

Q. Gu, T. Ng, I. Zain, X. Liu, L. Zhang, Z. Zhang, Z. Lyu, Z. He, HY. Ng, J. Wang. National University of Singapore (Singapore)

### **Development And Application Of A Novel Integrated Drinking Water Treatment Plant Model For Better Operational Decision Making**

W. Audenaert, U. Rehman, J. Plooi, I. Nopens, R. van der Neut, B. Martijn. AM-TEAM (Belgium)

### **Effect Of Stabilized Chlorine-Based Agent In Controlling Biofilm Formation And Its Impact On Reverse Osmosis (RO) Membrane Degradation**

LN. Sim, JS. Ho. Nanyang Technological University (Singapore)

### **Evaluation Of Ceramic Adsorption Filter As Pretreatment For Seawater Reverse Osmosis Desalination**

TH. Chong, J. Wang, LN. Sim, K. Nakano, Y. Kinoshita, K. Sekiguchi. Nanyang Technological University (Singapore)

### **Flux Enhancement Of Ceramic Membrane Filtration By Coagulation And Ozonation Pretreatment For WWTP Effluent Reuse**

M. Spruijt, B. Martijn, M. Hoekstra, J. Kruithof. PWNT (The Netherlands)

### **Improvement of the Resilience of the NEWater Treatment Processes: A 1.7 MGD Demo Plant of Low Pressure UV Based Advanced Oxidation Processes in Singapore**

S. Rütting, Y. Zhang, MX. Tan, J. Scheideler, J. Chin, PC. Siow, PW. Chue, E. Huang, KY. Lim, D. Lee, BR. Liu, FK. Chwee, B. Viswanath, GR. Ong, YH. Lou, AN. Puah, MH. Lim, Xylem Water Solutions Singapore Pte Ltd (Singapore)

### **Improving Operational Efficiency Through Alarm Management In Water Treatment Processes Using Artificial Intelligence**

K. Ghosh. Yokogawa Engineering Asia Pte Ltd. (Singapore)

### **Machine Learning For Reverse Osmosis Shows Up To 18% Energy Savings**

M. Dixon, N. Palmer, J. Quaintance, K. Brockman, N. Herold, T. Pritchard, H. Le, C. MacLean. Synauta (Canada)

### **Membrane Bioreactor For Indirect And Direct Potable Reuse Applications To Treat Primary Or Non-nitrified Secondary Wastewater Effluent**

S. Liang, J. Lehman, H. Collins, M. Chaudhuri, J. Bednarski. Metropolitan Water District of Southern California (United States)

### **Mitigating PFAS - An Emerging Concern For The Global Community, Demanding Technical Solutions**

K. Amstaetter, R. Bufler, D. Chiang, J. Frangos. CDM Smith Consult GmbH (Germany)

### **Monitoring The Integrity Of Reverse Osmosis Membranes Using Novel Indigenous Freshwater Viruses And Bacteriophages**

E. Cornelissen, T. da Silva, B. Blankert, L. Heijnen, E. Beerendonk, L. Hornstra, G. Medema. KWR Water Research Institute. Ghent University (The Netherlands)

### **Next Generation Of Process Monitoring And Diagnostics: Applications Of AI And Machine Learning To Enable Early Equipment Fault Prediction And Diagnostics**

A. Minisankar, K. Ghosh, GK. Sivaprakasam. Yokogawa Engineering Asia Pte Ltd (Singapore)

### **Pulse Flow RO (PFRO) Technology**

B. Liberman, L. Eshed, G. Greenberg. IDE Technologies (Israel)

### **Removal of Disinfection By-product Precursors in Drinking Water Treatment Processes: Is Fluorescence Parallel Factor Analysis A Promising Indicator?**

H. Dong, Y. Wang, Z. Qiang. Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences (China)

### **Solving Algae Based Taste And Odor Issues With Ozone AOP In South Carolina**

T. Puehmeier, S. Dominguez, S. Besser, A. Ried, H. Stapel. Xylem Services GmbH (Germany)

### **State Of The Art On Suspended Ion Exchange (SIX®): Essential Design Parameters For A Full-scale Application**

E. Vaudevire, E. Koreman, M. Sijm. PWNT (Netherlands)

### **Sustainable Water Desalination By Means Of A Solar PV-T Powered MED-MVC Technology**

J. Cen. Desolenator (The Netherlands)

### **Upgrading Of Choa Chu Kang Waterworks With Ozonated Ceramic Microfiltration**

V. Lam, H. Shorney-Darby, M. Mun, Y. Wang. PWNT (Singapore)

### **UV-LED/Chlorine For Water Treatment: Do Tailored Wavelengths Make Things Better Or Worse From A DBP Perspective?**

I. Carra, J. Fernandez, O. Autin, J. Bolton, P. Jarvis. Cranfield University (United Kingdom)

### **Why Your RO Membrane Cleaning May Not Be Effective. The Benefits Of Reverse Cleaning**

K. Andes, CR. Bartels, G. Hijo. Nitto Hydranautics (Australia)

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M. Theodoulou, G. Stock, Y. Hong, W. Wong. SUEZ Water Technologies & Solutions (Canada)

### **Anaerobic Co-digestion Of Food Waste And Municipal Wastewater Sludge At Demo Scale**

J. Josse, YKK. Koh, XQ. King, J. Low, Y. Gu, J. Oh. Anaergia Inc. (United States)

### **An Overall View Of Management Decision Impacts On Wastewater System Emissions Using Integrated Urban Wastewater Modelling**

T. Maruejous, J. Ledergerber, P. Vanrolleghem. LyRE – SUEZ Group (France)

### **Application Of Ultrafiltration Coupling Processes To Tackle Challenges In Industrial Wastewater Treatment**

J. Liu. CITIC Envirotech Ltd (Singapore)

### **Assessing Resilience Of A Regional Sludge Strategy Incorporating Advanced Anaerobic Digestion (AAD)**

D. Buxton. Mott MacDonald Ltd (United Kingdom)

**A Systematic Approach To Select BNR Technologies To Retrofit Manila Water's 36 Sewage Treatment Facilities**

SH. Koh, E. Polloso, L. Hayag, J. Teodoro, A. Shaw, J. Barnard, YS. Tse. Binnies (Singapore)

**A Systems Thinking Approach To Asset Optimization**

T. Debruyne, G. Simpson, T. Önnérth. Veolia Water Malaysia (Malaysia)

**Biological Hydrolysis Pretreatment For Enhanced Sludge Anaerobic Digestion And 'Class A' Biosolids**

M. Theodoulou, Y. Hong, A. Bentham, Z. Xu, T. Robertson, J. Lim, H. Ding, H. Chen, S. Chang. SUEZ Water Technologies & Solutions (Canada)

**Building A Smart Water Reclamation Plant**

L. Tai, KM. Phua, K. Koh, G. Tao, WJ. Chan, J. Ng. PUB, Singapore's National Water Agency (Singapore)

**Carbon Management In Water Infrastructure**

M. Manidaki. Mott Macdonald (United Kingdom)

**Costs And Considerations When Implementing Process Intensification Technologies At A Wastewater Treatment Facility.**

T. Koodie, T. Chan, Z. Bhumgara. Binnies (United Kingdom)

**Co-treatment Of Faecal Sludge With Wastewater In Bijnor, India To Achieve Sanitation For All -- A Case Study**

S. Padhi, B. Luthra, S. Rohilla. Centre for Science and Environment (India)

**Demonstrative-scale SIAM Technology Trials In Dairy And Slaughterhouse Factories**

A. Silva-Teira, X. Bernat, J. Dominguez, L. Rodriguez-Hernandez, B. Saenz, J. Malige, JM. Garrido, A. Arias. Cetaqua - SUEZ Group (Spain)

**Denitrifying PAOs For Low-Carbon And Low-Energy Nutrient Removal At The Ejby Mølle WRRF**

N. Uri Carreno, T. Constantine, P. Nielsen, F. Szép, K. Chandran, C. Hoar, C. DeBarbadillo. VCS Denmark (Denmark)

**Designing a Robotic Platform for Deep Tunnel Sewerage System**

H. Dinh, WC. Law, B. Burhan, SH. Yeo, GL. Seet. Nanyang Technological University (Singapore)

**Development Of Potato Chip Process Water Treatment & Reuse Technology**

A. Sathyagal, R. Verma, SK. Kota, S. Gupta, A. Anand. PepsiCo Inc. (United States)

**DHS System: Quick And Compact Package Type DHS Pilot Plant In Khon Kaen City, Thailand**

Y. Kirishima. NJS Consultants Co., Ltd. (Japan)

**Efficient Integrated Real-time Control in Urban Drainage Systems for Environmental Protection**

J. Meseguer, B. Joseph-Duran, X. Bernat, G. Cembrano, T. Maruéjols, M. Martínez, R. Guasch, P. Rouge. Cetaqua – SUEZ Group (Spain)

**Efficient Operating Conditions For Variable Frequency Drive Based Vertical Pumps Under Structural Looseness Due To Ageing**

SC. Athikessavan, A. Vijaya Bhaskar, E. Jeyasankar, SK. Panda, S. Mulpuri, P. Chella, SS. Muthuraj. National University of Singapore (Singapore)

**Evaluation Of Toxicity In Industrial Wastewater Treated By Electro-Fenton**

R. Muzzi, H. Olvera-Vargas, O. García-Rodríguez, R. Marks, O. Lefebvre. National University of Singapore (Singapore)

**From Validation To Full-Scale Design: Dedicated Zoo Animal Wastewater Treatment And Reuse**

SH. Koh, S. Athreya. Binnies (Singapore)

**Going For Mainstream Anammox For Municipal Wastewater Treatment Via Partial Denitrification Providing Nitrite**

R. Du, Y. Peng. Beijing University of Technology (China)

**Implementation of Side-Stream Nitrogen Removal at Changi Water Reclamation Plant**

D. Lye, J. Tan. PUB, Singapore's National Water Agency (Singapore)

**Improving Used Water Plant Resiliency And Asset Performance Through Condition Based Smart Digital Pressure Monitoring Trial For Aeration Diffusers At Ulu Pandan Integrated Validation Plant**

PC. Siow. Xylem Water Solutions Singapore Ptd Ltd (Singapore)

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B. Stinson. AECOM (United States)

**Integration of MBR and Hybrid Constructed Wetlands for Enhanced Treatment of Rural Domestic Wastewater**

J. Zhang CITIC Envirotech Ltd (Singapore)

**Integration Of Sludge Ultra-dewatering Into The Energy Positive WWTP Of Tomorrow**

M. Choo-Kun, M. Chevrel, P. Camacho, JL. Bourdais, A. Poignant, A. Fournot-McGill. SUEZ (France)

**In-sewer Purification Pipe Technology In Wastewater Management**

TJ. Sotelo, R. Lyu, H. Satoh. The University of Tokyo (Japan)

**LESSWATT Model-Based Protocol For Mitigation Of N<sub>2</sub>O Emissions**

S. Daneshgar I. Nopens, Y. Amerlinck, A. Amaral, C. De Mulder, A. Di Nisio, G. Bellandi, R. Gori, C. Caretti, F. Spennati, U. Rehman, J. Porro. Ghent University (Belgium)

**MABR - An Innovative Solution For Resilient Wastewater Treatment**

J. Peeters, D. Christenson, D. Houweling, Dwight, A. Shaw, L. Stadler. SUEZ Water Technologies & Solutions (Canada)

**Managing Emerging Contaminants In Biological Treatment When Developing A Broad Reuse Portfolio**

S. Sathyamoorthy, C. Hoar, CA. Ramsburg, K. Chandran. Binnies (United States)

**Maximising AOB Activity The Key To Optimised Performance In Short-cut Nitrogen Demonstration Trial**

A. Vellacott. Jacobs (Australia)

**Maximizing Asset Capacity And Performance Via Process Intensification Using MABR Technology**

W. Bagg, E. Joubert, A. McNeil, J. Peeters. Water Corporation (Australia)

**Microbial Acclimation Towards Substrate Overloading Via Recurring Solids Retention Time Disturbances in Anaerobic Digesters**

AF. Mohidin Batcha, TCA. Ng, AA. Cokro, Y. Lu, S. Wuertz. Nanyang Technological University (Singapore)

**New Technologies And Methods For Optimizing Wastewater Treatment Plant Processes**

H. Karaila. Valmet (Finland)

**Novel Nutrients Removal Pathway in Wastewater Treatment Plants**

Q. Wang, G. Tao, SL. Low, J. He. National University of Singapore (Singapore)

**Optimisation of Wastewater Treatment Process Improvement Through The Use of “Live” Dashboards, Process Engineering, Artificial Intelligence and Machine Learning**

R. Brice, C. Borges, V. Tang, J. Bishop, J. Scheri. Mott Macdonald (United Kingdom)

**Performance Of Newly Developed Intermittent Aerator For Flat-sheet Ceramic Membrane In Industrial MBR System**

H. Noguchi, SC. Lee, T. Xia, T. Niwa, W. Lay, SC. Chye, L. Yu, SL. Lim, MJ. Nassir, G. Tao, C. Gudipati, ST. Ooi, A. Dhalla. Meiden Singapore (Singapore)

**Performance Tracking Of RO Units In A Hybrid RO-EDR Configuration Treating Municipal Wastewater At 90% Recovery**

K. Wee, G. Gunasheela, KK. Kee, B. Abolmaali. SUEZ Water Technologies & Solutions (Singapore)

**Holistic Approach To Planning And Prioritizing Investments - From Chaos To Order**

N. Kroghsbo, PH. Nielsen, P. Hallager, N. Askjær. VCS Denmark (Denmark)

**Process Intensification Of Continuous Flow Bioreactors In Europe: Controlled-shift Of Microbiome Towards Densified Biomass Outstanding Performance Results Challenging Status-quo**

S. Donnaz, C. Roche, B. Wett, S. Murthy. SUEZ International (France)

**Simultaneously Anaerobic Digestion and Low-Carbon Denitrogenation in Sewage Mainstream by Integrating Anaerobic Membrane Bioreactors With Nitrification-Anammox**

Z. Lei, S. Yang, R. Chen. Xi'an University of Architecture and Technology (China)

**Sustainable And Efficient Aeration Control -- Improved Quality And Energy Savings With Next Generation Of Self-learning AI Process Controller**

H. Hermann, M. Charatjan. Binder GmbH (Germany)

**TERI Advanced Oxidation Technology (TADOX®) As An Integrated Approach To Treat Industrial Wastewater: Case Studies from India**

N. Bahadur, N. Bhargava. The Energy and Resources Institute (TERI) (India)

**Testing MABR technology at Ejby Mølle**

N. Uri Carreno, T. Constantine, P. Nielsen, J. Sandino, A. Willoughby. VCS Denmark (Denmark)

**Thermal Hydrolysis Process For Enhancement Of Anaerobic Digestion**

L. Yu, B. Jeyanathan, SL. Low, Z. Ibrahim, R. Tan, G. Tao, W. Lay, SC. Chua. PUB, Singapore's National Water Agency (Singapore)

**The Application Of Computational Fluid Dynamics With Integrated Biokinetics To Accelerate Process Innovation In The Water Industry**

W. Audenaert, U. Rehman, I. Nopens AM-TEAM (Belgium)

**The Implementation Of A Whole Plant Digital Twin Simulation For Changi WRP**

B. Johnson, YP. Mak, KYA. Tan, J. Curl, R. Kadiyala. Jacobs International Consultants (Singapore)

**The Resource Efficient Integrated Membrane Bioreactor System**

G. Tao. PUB, Singapore's National Water Agency (Singapore)

**Ultralow Energy - No Bubble Deammonification**

G. Kicsi, N. Hu. SUEZ (Singapore)

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D, Mak, J. Gebhardt, A. Nink. Xylem (United States)

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**Achieving Water Resilience Amidst Climate Change Via Closed Loop - Circular Water System Innovations & Technologies For Urban & Rural Water Sensitive Design To Ensure Water For All.**  
S. Samuel, ECOSOFTT Pte Ltd. A Social Enterprise (Singapore)

**Amsterdam And The City Swim (ACS): Swimming In Surface Water In The Dense Urban Area of Amsterdam**  
S. Holthuijsen. Waternet (Netherlands)

**An Integrated Approach To Coastal Climate Resilience**  
A. Hosking, J. Bird, P. King, M. Wilson, C. Schelpe, C. Clifton. Jacobs (United Kingdom)

**A Smart Transition To Water Resilient Communities**  
C. Port, J. Cullis, D. Romain, M. Cobeldick, K. Werksman. Aurecon (Australia)

**Bangladesh Delta Plan 2100: Bangladesh In The 21<sup>st</sup> Century**  
G. Choudhury. Bangladesh Delta Plan 2100 Formulation Project (Bangladesh)

**Circular Water 2050: Impact and Opportunities For The Fully Circular Urban Water Cycle**  
K. Roest, L. Snip, A. De Jong, H. Van Alphen, A. Segrave, B. Römgens KWR Water Research Institute (Netherlands)

**CWOS**  
O. Pison, A. Mahadevan. SUEZ Singapore (Singapore)

**Developing New Blue-Green Futures: Multifunctional Infrastructure To Address Water Challenges**  
N. Dolman, E. O'Donnell, N. Netusil, F. Chan. Royal HaskoningDHV (Netherlands)

**Energy And New Resources Out Of Water To Create A Circular Economy For A Metropolitan Area**  
A. Struker. Waternet (Netherlands)

**Owner And Operator Benefits Of The Digital Delivery Of Infrastructure**  
C. Newbery, L. Connor Jacobs (Singapore)

**Potential Of Floating Urban Development For Coastal Cities. A Global Analysis Of Flood Risk And Population Growth**  
R. De Graaf-van Dinther B. Dal Bo Zanon, B. Roeffen, K. Czapiewska. Rotterdam University of Applied Sciences (Netherlands)

**Realising Dying Wisdom: Contribution Of Green Infrastructure In Making The City Flood Resilient**  
S. Rohilla, B. Luthra. Centre For Science and Environment (India)

**Safeswim: A Predictive Digital Twin For Recreational Water Quality In Auckland, New Zealand**  
A. Osti, S. Couper, N. Brown, M. Neale. Mott MacDonald (New Zealand)

**Semarang 2040: Re-orienting Central Java's Relationship With Water To Ensure An Economic Future**  
T. Bunt, P. Letitre, B. Beagen, S. Carpaij. One Architecture (USA)

**The Integration Of Infrastructure Hardening And Longer Term Equitable Resilience Strategies In The New York City And New Jersey Region**  
E. Westerhof. Arcadis U.S., Inc. (United States)

**Wastewater Reuse Certificates - A Tradeable Permit Mechanism Using IoT, ML, AI, And Blockchain**  
R. Khemka. World Bank (India)

### **WaterUP: Empowering Local Communities Through Sustainable Water Management**

L. Bingham, D. Hetherington. Arup (United Kingdom)

## **Theme 5: Water Quality & Health**

### **An Innovation Framework For The Philippine Water Market**

V. Yang, J. Zheng, M. Bennett, Y. Villa. Isle Utilities (Singapore)

### **A 'Risk Index' Approach To Catchment-Scale Microbial Modelling**

L. Cetin, P. Pedruco, S. Easton. Jacobs (Australia)

### **Community-based Microbial Source Tracking of Fecal Impairment in Watersheds and Reservoirs in Singapore**

S. Zhao, M. Rogers, J. He. National University of Singapore (Singapore)

### **Detection Of Antibiotic Resistant Opportunistic Pathogens And Resistant Genes In Domestic Wastewater And Various Surface Waters Impacted By Anthropogenic And Farming Activities.**

F. Charles, L. Glass-Haller, SG. Goh, H. Chen, H. Tran, W. Li, K. Gin. National University of Singapore (Singapore)

### **Estimating the Burden of Waterborne Infectious Disease in the United States**

V. Hill, S. A. Collier, L. Deng, K. M. Benedic, K. E. Fullerto, J. S. Yoder, M. J. Beach. Centers for Disease Control and Prevention (CDC) (United States)

### **Examining The Biological Relevance Of The Environmental Fields Estimated Using Adaptive Monitoring Frameworks**

R. Mishra, A. Bandla, K. Teong Beng, M. Chitre, S. Swarup. National University of Singapore (Singapore)

### **Impact Of Floating Solar Panels On Surface Water Reservoirs For Drinking Water Production**

B. Martijn, E. Prest, A. Waagenvoort. PWNT (Netherlands)

### **Online Flow Cytometric Fingerprinting For Microbial Water Quality Management In A Full-scale Drinking Water Tower.**

J. Favere, B. Buysschaert, N. Boon, B. De Gusseme. Ghent University (Belgium)

### **Quantitative Microbial Risk Assessment Of Viral Pathogens For Recreational Uses In Singapore's Reservoirs**

SG. Goh, N. Saeidi, X. Gu, GG. Vergara, M. Kitajima, A. Kushmaro, K. Gin. National University of Singapore (Singapore)

### **Rapid Monitoring Of Algal Bloom Dynamics With Flow Cytometry**

ZY. Sim, F. Mao, Y. He, K. Gin. National University of Singapore (Singapore)

### **Risk Exposure During Showering & Water-saving Showers**

H. Niculita-Hirzel, C. Jackson, S. Goecke, G. Suarez, L. Amgwerd. Center for Primary Care and Public Health, Unisanté (Switzerland)

### **Tracking Short-term Microbial Dynamics Throughout Drinking Water Distribution Systems In Realtime 24/7 With Online Flow Cytometry**

M. Besmer, S. Teng, YJ. Lee, LK. Yong, R. Hu. onCyt Microbiology AG (Switzerland)

### **Wastewater-based Epidemiology For SARS-CoV-2 Virus In South Korea**

LH. Kim, YS. Shim, Z. Yun, SP. Kim. Korea University (Republic of Korea)

### **Water And Sanitation Safety In The Control Of Acute Watery Diarrhoea And Cholera**

P. Byleveld. Australian Red Cross (Australia)

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W. Khan, P. Murray, J. Koh. PUB, Singapore's National Water Agency (Singapore)

### Corrosion Monitoring With Coupled Multielectrode Array Sensors For Predictive Maintenance Of Water Network

Q. Li, L. Yang. PUB, Singapore's National Water Agency (Singapore)

### Degradation Of Carbamazepine By UVA-LED/WO<sub>3</sub>/peroxydisulfate Process: Effects Of Light Wavelength And Water Matrix

D. Han, J. Hu. National University of Singapore (Singapore)

### Design Methodology for Next-Generation Smart Water Quality Analyser System in Water Supply Network

D. Yong, MH. Teh, KK. Toh, CW. Lim, ZY. Ye. PUB (Singapore)

### Developing A Novel Non-Invasive Method For Imaging Of Flow Profile Using Ultrasonic Flowmeters

Q. Yi, MH. Teh, RA. Ooi, MR. Mohd Akip. PUB (Singapore)

### Enabling Operational Efficiencies Through Decision Intelligence In The Water Supply Network Of Singapore

M. Iqbal, A. Preis, KC. Lai, SF. Hew, JK. Pang, N. Lim. Xylem (Singapore)

### Encouraging Prudent Water Use: Do Prosocial Incentives Encourage Water-Saving Behavior?

T. Lai, Y. Lu. Institute of Water Policy, Lee Kuan Yew School of Public Policy (Singapore)

### Fuzzy Logic-based Geographic Network Reconstruction Planning

Z. Toth. Budapest Waterworks Private Company Limited by Shares (Hungary)

### IIOT Thermodynamic Pump Condition Monitoring System For Maintenance & Performance Management

S. Barrett, MA. Samadi, SC. Cheung, Y. Qin, R. Hale, T. Lam. Public Utilities Board (Singapore)

### Looking In From Space To Detect Leaks In Rand Water Drinking Water Pipelines Using Satellite Technology

M. Padayachee. Rand Water (South Africa)

### Singapore's Smart Shower Programme: Real-Time Feedback And Water Conservation

C. Leong, ML. Reganon, LF. Goette, J. Buurman, S. Seah, I. Toh. Public Utilities Board (Singapore)

### Smart Water Model - A Case Study At Anderson Road Quarry Site Development, Hong Kong

H. Lee, HS. Tsang. Government of Hong Kong Special Administrative Region (China)

### Sustainable Predictive Maintenance At PUB For Improved Reliability Of Water Supply System

V. Goh, ES. Tan, D. Ahmet. Public Utilities Board (Singapore)

### The Importance Of Designing For The Real-world And Not Just To Meet The Specification

D. Nicklin, L. Rusiecki. Xylem (United Kingdom)

### Towards Drinking Water Quality Monitoring Directly At The End-point Of Use: Evaluating An In-pipe Monitoring System For Drinking Water Networks

C. Wagner, B. Buysschaert, B. De Gusseme, A. Weingartner. s::can Messtechnik GmbH (Austria)

## Theme 2: Delivering Water from Source to Tap (Treatment)

### [A Comparison Of Real World And Modeled Performance For An Osmotic Brine Concentration System -- Defining The Process Window](#)

A. Al Amoudi, E. G. Beaudry, S. Ihm, J. E. Tracy, N. Voutchkov (United States)

### [Advanced Nephelometry Coupled with Real Time Membrane Integrating Turbidity Monitoring](#)

V. Rajasekharan, C. Jackson, R. Leggett. Hach Co (United States)

### [An Effective Measure For Evaluating Sewer Condition: UAV Screening In Comparison With CCTVs And Manhole Cameras](#)

H. Ikeda, Y. Inagaki, PK. Takeuchi, Y. Yato. NJS Co., Ltd. (Japan)

### [An Integrated Countercurrent Two-stage Adsorption And Membrane Separation Process For Decontamination Of Radioactive Iodide Water](#)

X. Zhang, Y. Liu, G. Zhang, P. Gu. Tianjin University (China)

### [Benchmarking Study Of Newly Developed Aquaporin Inside™ LE-BWRO Membrane](#)

XT. Nguyen, MS. Lee, WH. Ho, Y. Zhao. Aquaporin Asia (Singapore)

### [Case Study - Demonstration Plant Of Water Recycling Of Treated Industrial Wastewater Using Microfiltration/Reverse Osmosis And Activated Carbon Filter For Process Use In A Petrochemical Plant](#)

KS. Sim, F. Tan, BS. Ee. Petrochemical Corporation of Singapore (Private) Limited (Singapore)

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S. Vafakhah, HY. Yang. Singapore University of Technology and Design (Singapore)

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W. Vogl, J. Koschel, I. Dubek. VWMS GmbH (Austria)

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U. Erdal, Z.Erdal. ARCADIS (United States)

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F. Li, C. Fang, S. Zhang. National University of Singapore (Singapore)

**Inactivation of methicillin-resistant *Staphylococcus aureus* by Chlorination, Chloramination, UVC irradiation, and UVC based advanced oxidation processes**

S. Ghosh, L. Wang, Y. Chen, S. Peng, Q. Cai, and J. Hu. Department of Civil and Environmental Engineering, National University of Singapore (Singapore)

**Integrated Anaerobic Fixed-Film MBR-Reverse Osmosis-Chlorination Process: An Environmentally Sustainable Approach For Reclamation Of Municipal Used Water**

S. Wang, Y. Liu, H. Liu, J. Gu, M. Zhang. Nanyang Technological University (Singapore)

**Macro-patterning Of Micro-crumpled Nanofiltration Membranes By Spacer Imprinting For Low-scaling Desalination**

C. Shang, S. Zhang. National University of Singapore (Singapore)

**Management Of Anion Exchange Spent Brine Through Secondary Products Creation: Humic Substances And NaCl**

E. Vaudevire, J. Post, W. van der Meer, I. Daniel. PWNT (Netherlands)

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R. Salenga, E. Malahito, MS. Orticio. Maynilad Water Services Inc (Philippines)

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M. Boyd, M. Plumlee, H. Gu, J. Lozier, M. Hwang. Desalitech (United States)

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D. Lu, FYS. Li. National University of Singapore (Singapore)

**Performance Of Reverse Osmosis Membrane For Water Reuse And Reclamation -- Rejection And Fouling Investigation**

J. Ogier, U. Doelchow, J. Lipnizki, D. Lau. IAB Ionenaustauscher GmbH (Germany)

**Pilot Gravity-driven Membrane (GDM) Reactor For Seawater Reverse Osmosis Desalination Pretreatment**

B. Wu, S. Lee, TH. Chong. University of Iceland (Iceland)

**Polyamide Thin Film On PTFE Hollow Fibres For Nanofiltration**

JY. Chong, G. Yang, H. Yi, L. Du, R. Wang. Nanyang Technological University (Singapore)

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L. Lei, CM. Yeo, Z. Wang. Zweec Analytics Pte Ltd (Singapore)

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S. Vafakhah, HY. Yang. Singapore University of Technology and Design (Singapore)

**Replaceable Skin Layer Membranes™- Manipulating The Electric Double Layer On Colloidal Solids To Create 10-fold Improvement In Flux Rates**

D. Bromley. DBE Hytec Ltd (Canada)

**Review of 100 Commercial MABR Installations in China**

Y. Gilad, L. Dagai, X. Chen, M. Qi, H. Zhang. Fluence Corporation (Israel)

**Seawater RO Facility Optimizes Membrane Performance With Novel Hydro-Optic UV Technology**

Y. Rozenberg, A. Felder. Alantium Technologies (Israel)

**Selection And Operation Of SWRO Energy Recovery Devices For Maximum Operational Flexibility And Reliability**

E. Tynes. Energy Recovery (United States)

**Short-Term Water Quality Prediction Using Tree-Based Classification For Coagulation Control In Drinking Water Treatment Plant To Improve Waterworks Operation Efficiency And Event Detection**

P. Cai, V. Sim. Surbana Jurong Consultants Pte Ltd (Singapore)

**Shouldn't Ground Water Be Stable And Easy To Treat? Or Why Full Cycle Water Quality Monitoring Matters**

V. Malkov. Hach (United States)

**Smart Asset Management Using Acoustic And Vibration Sensors To Detect And Distinguish Between Cavitation And Aeration**

A. Gulam. Adzaan Consulting Pte Ltd (Singapore)

**Smart Filtration Suite, A Data Analytics Solution For Membrane Filtration Systems**

D. Dominiak, V. Yangali-Quintanilla, C. Persner, M. Witte, H. Rehmeier. Grundfos Holding A|S (Denmark)

**Tai Po Water Treatment Works: A Model Of Sustainability Innovation**

S. Chan. Government of the Hong Kong Special Administrative Region (China)

**The Promises Of Next-Generation Membranes For Seawater Desalination**

YJ. Lim, K. Goh, M. Kurihara, R. Wang. Nanyang Technological University (Singapore)

**Use Of Simultaneous Absorbance-Transmittance And Excitation-Emission Matrix (A-TEEM) Spectroscopy To Monitor Source Water For Waterworks**

A. Gilmore, L. Chen, S. Teng, C. Kow, E. Mok, N. Afira. HORIBA Instruments Inc. (United States)

**Wetting Characteristics And Progression Of Polyvinylidene Fluoride Hollow Fibre Membrane Contactors**

W. Ge. Memstar (Singapore)

**Theme 3: Effective & Efficient Wastewater Management**

**Beyond Ultra-low Effluent Phosphorus Concentration: The Benefits Of Using Rare Earth Elements In Wastewater Treatment**

M. Haneline, S. Ng. Neo Chemicals & Oxides (United States)

**Conserving Freshwater From Existing Cooling Tower Water System Via Indirect Supplemental Seawater Cooling**

BS. Ee, L. Ng, CK. Eu. Petrochemical Corporation Of Singapore (Singapore)

**DeCalon™ Ultimate Solutions For Cooling Water Management**

BK. Ng, Innovative Polymers P|L (Singapore)

**Design Features And Initiatives At Tuas Water Reclamation Plant**

ZE. Lim. Public Utilities Board (Singapore)

**Deterioration Diagnosis For Underwater Equipment By Vibration Analysis**

J. Nakazawa, Y. Masuya, D. Kawataka, A. Nagao, N. Kanemaru. NJS Co., Ltd. (Japan)

**Effect of Data Quality on AI Prediction Capability in WWTPs**

E. Ekklesia, A. Sipila, T. Koskinen, S. Pattanayak. Ramboll (Singapore)

**Energy Efficiency And Generation Opportunities For Wastewater Services - Perspective From A Developing Country**

J. Zvimba, E. Musvoto. Water Research Commission (South Africa)

### **Full Scale Reality Of Micropollutant Removal With Ozone**

T. Puehmeier, A. Wieland, H. Stapel, S. Bressmer, C. Abegglen. Xylem Services Germany GmbH (Germany)

### **Green Deep Eutectic Solvents For Pulp And Papermaking Industry**

LY. Ee, S. Li. National University of Singapore (Singapore)

### **Improvements In Ceramic MBR System For Industrial Used Water To Achieve Higher Operational Stability And Energy Efficiency**

SC. Lee, N. Hiroshi, Q. Yin, T. Xia, T. Niwa, W. Lay, SC. Chua, L. Yu, SL. Lim, MJ. Nassir, G. Tao, C. Gudipati, ST. Ooi, A. Dhalla. Meiden Singapore (Singapore)

### **Influence Of Solids Retention Time On Process Performance And Microbial Community Dynamics In Mesophilic Anaerobic Digestion Of Sludge**

AA. Cokro, A. Ng, E. Santillan, K. Arumugam, R. Williams, S. Wuertz. Singapore Centre for Environmental Life Sciences Engineering (Singapore)

### **Investigating Adsorption Of Natural Organic Matter By HAOPs Via Molecular Dynamics Simulation**

Y. Ma, S. Velioglu, MB. Tanis-Kanbur, R. Wang, JW. Chew. Nanyang Technological University (Singapore)

### **Membrane Fouling Control In A MBR System Under Higher MLSS Concentration**

Z. Peng, J. Liu. CITIC Envirotech Ltd (Singapore)

### **Microbubble Ozonation - Biological Activated Carbon System For Reverse Osmosis Concentrate Treatment**

WH. Loh, J. Lakshmi, R. Li, J. Guo, S. Ong, J. Hu. National University of Singapore (Singapore)

### **New Method For Integrity Monitoring Of Membrane Bioreactors**

S. Katz, P. Cote, D. Mosqueda-Jimenez. SUEZ Water Technologies & Solutions (Canada)

### **Portland Cement Based Calcium Aluminate Cement (Cac) Concretes For Corrosion Resistant Sewer Application**

BK. Yeo, M. Schmid, G. Walenta. Calucem Pte Ltd (Singapore)

### **Process Intensification By Using Hybrid Integrated Fixed Film - Membrane Bio Reactor (IF-MBR) For Treatment And Reuse Of Refinery Wastewater**

SK. Chee, G. Wu, KP. Chiu, K. Khoo, C. Koh, HQ. Li, SK. Woon. AECOM (Singapore)

### **Reduction Of Energy Consumption In MBR With New High Performance (NHP) Module**

KK. Latt. Toray International Singapore Pte.Ltd. (Singapore)

### **Removal Of Organic Micropollutants From Wastewater By Ozone-Activated Carbon Filtration And Porous Cyclodextrin Polymers Adsorption: A Laboratory Batch Study**

JP. van der Hoek, C. de Jong, TK. Liu, T. Spit, H. Schijfsma. Delft Univesrity of Technology (Netherlands)

### **Soft Sensing Of Water Depth In Combined Sewers Using LSTM Neural Networks**

R. Palmitessa, M. Borup, PS. Mikkelsen, WKA. Law. Nanyang Technological University (Singapore)

### **Sustained Organic Loading Perturbation Favors Nitrite Accumulation In Bioreactors With Variable Resistance And Resilience Of Nitrification And Nitrifiers**

E. Santillan, WX. Phua, F. Constancias, S. Wuertz. Singapore Centre for Environmental Life Sciences Engineering (SCELSE) | Nanyang Technological University (Singapore)

**Taking MABRs Out Of The Box And Into Practice -- BNR Intensification With Bubbleless Aeration**  
S. Sathyamoorthy, K. Gordon, D. Coutts. Binnies (United States)

**The Water and Resources Refinery® Concept: Innovative Separation Technologies Enabling A Completely New Used Water Approach**  
A. van Nieuwenhuijzen, H. Evenblij, J. Dan, F. Visser. Witteveen+Bos Consulting Engineers | AMS-institute (Netherlands)

**Towards High Recovery In Water Reclamation Processes: High Performance NF-MBR+RO System**  
H. Xu, S. Lee, MF. Tay, K. Jeong, C. Liu, E. Cornelissen, B. Wu, TH. Chong. Nanyang Technological University (Singapore)

**Understanding The Needs Of The Individual User Leads To Organisational Adoption Of Digital Twins**  
P. Bonk. Innovzye (Australia)

#### Theme 4: Cities of the Future

**A Pilot Aquaponics Project On The An Intermediate Floor Of A High Rise Building In Malaysia**  
Y. Wong. EcoClean Technology Sdn Bhd (Malaysia)

**An Integrated Approach To Smart Water Remineralization**  
SY. Chew. Pro-health Water Technologies Pte Ltd (Singapore)

**Application Of Deep Learning Models In Radar Rainfall Nowcasting And Flood Forecasting: A Case Study Of Singapore**  
KW. Teo, D. Solomatine. Ministry of Sustainability and the Environment (Singapore)

**Assetmanagement And Safe Drinking Water For Amsterdam**  
S. Holthuijsen. Waternet (Netherlands)

**Case Study For The Implementation Of A Digital Solution To Optimise Wastewater Treatment Plant Operations**  
CMJ. Hui, WPA. Yuen, M. Wu, SZ. Goh, M. He, E. Leow. Sembcorp Utilities Pte Ltd (Singapore)

**Cities Of The Future -- What Role Does Water Play?**  
F. Barbour. Mott Macdonald (United Kingdom)

**Development Of 3D Visualization Platform For Compound Flooding and Transport Resiliency In Coastal Cities**  
P. Yang, AW. Law, F. Zhu, H. Ho, VST. Sim, X. Wu, Y. Liang, JH. Loh, H. Chan, D. Chitwatkulsiri, KN. Irvine. Nanyang Technological University (Singapore)

**Digital Twins For Sustainable Water Infrastructure Development In Cities Of The Future -- An Intellection Of The Opportunities Available In Singapore**  
S. Barthbiban, J. Tong, S. Barthbiban, D. Dean, R. Wood. Mott Macdonald (Singapore)

**Driving Economic Prosperity, Through BIM Adoption**  
D. Murray, S. Kearney. Mott MacDonald (Singapore)

**Effect Of The Home Improvement Programme On Residential Water Consumption In Singapore**  
M. Fan, S. Agarwal, E. Araral, Y. Qin, H. Zheng. Lee Kuan Yew School of Public Policy, NUS (Singapore)

**Empowering Water Communities: Co-Engendering Solutions For Water Security And Social Resilience**  
C. Ong, WK. Lim. Institute of Water Policy (Singapore)

**Estimating The Cost Of Climate Change To Water Utilities In Victoria, Australia**  
K. Karunaratna. Marsden Jacob Associates (Australia)

### **Field Experiment On SMS And Household Water Conservation**

M. Nakajima. Lee Kuan Yew School of Public Policy, National University of Singapore (Singapore)

### **Financial District And Seaport Climate Resilience Master Plan: Building A Comprehensive Resilience Strategy For Lower Manhattan**

R. Deitz, E. Hutchinson. Arcadis (United States)

### **Flood Risk Assessment in Ungauged Catchment: Open Data and Open Models**

A. Saha, Y. Zhang, A. Goedbloed, S. Tay, G. Pijcke, R. Karanam. Hydroinformatics Institute (Singapore)

### **How Water Sensitive Is Your City? Benchmarking And Navigation In Planning For Climate Adaptation Of Midsize Cities In The North Sea Region.**

N. Dolman, G. Özerol, H. Bormann, S. Lijzenga. Royal HaskoningDHV (Netherlands)

### **Improved Transparency With Digital Twins Of Urban Drainage Systems**

A. Pedersen, M. Borup, A. Brink-Kjær, LE. Christiansen, PS. Mikkelsen. VCS Denmark (Denmark)

### **Inter-Basin Water Transfer - Planning To Implementation Solution To Water Crisis In India**

U. Joshi. Xylem Water Solutions India Pvt. Ltd. (India)

### **Keppel Marina East Desalination Plant (KMEDP) Design Approach To Energy And Water Sustainability**

KP. Chiu, EK. Goh, PT. Tay, TM. Leong, KS. Goh. AECOM (Singapore)

### **Leveraging Dual Polarimetric X-band Radar Rainfall And Nowcast For Urban Flood Management In Singapore**

M. Keem, A. Goedbloed, M. Vierstra. Hydroinformatics Institute (Singapore)

### **Potable Water Reuse: Communication As A Policy Instrument**

C. Tortajada, I. Bindal. Lee Kuan Yew School of Public Policy, National University of Singapore (Singapore)

### **Prediction Accuracy And Effectiveness Of ICT Systems For Urban Flood Control**

Y. Sakae, T. Matsuura. NJS Co.,Ltd. (Japan)

### **Project Implementation And Strategies For Design, Procurement And Implementation For Upgrading Of Online Large Scale Water Treatment Plants Development Projects**

R. Salenga, N. Lethan, S. Moore. Maynilad Water Services Inc (Philippines)

### **Regional Water Security Study (RWSS): Defining No-regret Measures And Investments To Sustainably Improve Water Security In The Short And Medium Term In The Yangon Region In Myanmar**

T. Huizer, R. Steijn, J. de Groot, D. Spaans, H. Nandar Aye. Arcadis (Netherlands)

### **Relationships Of Water And Mineral Ion Channels With Mineral Balance**

SY. Chew. Pro-health Water Technologies Pte Ltd (Singapore)

### **Rethinking Urban Resilience: The Impact Of The COVID-19 Pandemic On Urban Water Resilience**

P. Dircke, D. de Weerd. Arcadis (Netherlands)

### **Strategy For Phosphorus Recovery And Wastewater Treatment In Amsterdam**

M. Amosov, JP. van der Hoek. Organic Village (Netherlands)

### **Sustainability Reporting By Companies Listed In SGX**

C. Tortajada, W. Lim, I. Bindal. National University of Singapore (Singapore)

### **Tailor-made Procurement Features To Facilitate Operation Of The Tseung Kwan O Desalination Plant In Hong Kong**

CK. Lee, SCC. Ko. Water Supplies Department, Government of the Hong Kong Special Administrative Region (China)

### **The Bankable Resilience Tool (BaRT)**

P. Dircke, E. Schellekens. Arcadis (Netherlands)

### **WOW! - A New Business Approach For Resource Recovery From Sewage**

S. Venditti, J. de Best, G. Kolisch, A. Christen, J. Hansen, K. Bijl. Regional Water Authority Vallei en Veluwe (Netherlands)

## **Theme 5: Water Quality & Health**

### **A Solution to Cyanobacterial Blooms: Insights from Thousands of Field Applications Using the Lake Guard® Technology**

M. Harel. BlueGreen Water Technologies (Israel)

### **Automated Micro-invertebrate Detector**

L. Lei, Y. Du, M. Tay. NM3 Tech(s) Pte Ltd (Singapore)

### **Automated Nutrient Loading Computation for Identification of Hotspots in Catchments**

J. Wang, A. Mahadevan. PUB, Singapore's National Water Agency (Singapore)

### **Bacterial Community Dynamics Of Biofilms In Two University Campus-based Drinking Water Distribution Networks**

D. Cheng, M. Leifels, C. Miccolis, E. Hill, S. Wuertz, J. Thompson, U. Szewzyk, A. Whittle. Singapore Centre for Environmental Life Sciences Engineering (Singapore)

### **Colorectal Cancer And Nitrates: Implications For Health And The Economy**

A. Humphrey, M. Savill, J. Mike. Affordable Water (New Zealand)

### **Improved Management Of Legionella Risks Using Rapid On-Site Testing**

G. Rankin, M. Connolly. Hydrosense Ltd (United Kingdom)

### **Maximum Likelihood Estimation Of Inactivation Kinetic Parameters For Escherichia coli In Concentrated Urine**

W. Oishi, D. Sano, I. Kato, O. Nishimura. Tohoku University (Japan)

### **Novel Method For Selective Enrichment Of Nitrososphaera Viennensis-like Ammonia-oxidizing Archaea Over Ammonia-oxidizing Bacteria From Freshwater Environments**

Y. Woo, MC. Cruz, S. Wuertz. Singapore Centre for Environmental Life Sciences Engineering (Singapore)

### **Phytoplankton Monitoring Based On Deep Learning**

H. Liu, Y. Wang, H. Liu, S. Hu, Y. Peng. Zweec Analytics Pte Ltd (Singapore)

### **Siloxane Based Ions Imprinted Sensor For Lead Ions Detection Using Quartz Crystal Microbalance**

S. Li, XH. Lin, Q. Li. National University of Singapore (Singapore)

### **Towards A Rapid On-Site Test That Can Detect All Serogroups Of Legionella Pneumophila**

M. Connolly, G. Rankin. Hydrosense Ltd (United Kingdom)

### **Water Quality Monitoring Using Machine Learning**

T. Farahmand, S. Hamilton. Aquatic Informatics (Canada)

### **WaterWise - An Operational Testbed For Real-Time Assessment Of A Drinking Water Distribution System**

M. Leifels, D. Cheng, S. Wuertz. Nanyang Technological University (Singapore)

**Wet Chemical Analyzer With Minimum  
Reagent Consumption**

F. Honold, M. Rosenauer, P. Rauch, R.  
Schuhmacher, U. Franke, N. Leiprecht. Xylem  
Analytics Germany GmbH (Germany)