

WRRmod2021

Virtual 7th IWA Water Resource Recovery Modelling seminar

Conference program

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Saturday 21st (all times are in CEST/UTC+2h)			
12:00 – 17:00	Young Water Professional workshop		
Sunday 22nd			
12:00 -17:00	Workshops		
Monday 23rd			
11:45	Welcome		
12:00	Reporting on workshops		
30'	Hybrid modelling: integrating data-driven and mechanistic modelling techniques in WRRFs	Quaghebeur, Ward; Borzooei, Sina; De Jaegher, Bram; Wade, Matthew; Nopens, Ingmar; Torfs, Elena	
30'	Transition of WRRF models to digital twin applications	Torfs, Elena; Daneshgar, Saba; Johnson, Bruce; Nicolai, Niels; Porro, Jose; Snowling, Spencer; Takacs, Imre; Vanrolleghem, Peter; Nopens, Ingmar	
30'	Plant-wide modelling: challenges with data and bottlenecks at full-scale water resource recovery facilities	Gillot, Sylvie; Filali, Ahlem; Grau, Paloma	
13:30	Cup of coffee around a poster		
14:00	Session “data-driven models and digitalization”		
Debates	3 min by presenters	Moderators: Ilse Smets (KU Leuven) and John Copp (Primodal)	
	Data: Why bother?	Wade, Matthew John	
	Practicality of Big-data in WRRF modelling?	Stewart, Heather Ann; Gagnon, Alexandria; Bott, Charles	
Technical session	3 min by presenters followed by prospective by moderators	Moderators	
	Analysis of functions to represent data in water system models	Mukherjee, Rani; Snaith, William; Yeow, Louise; Clarke, Matt; Plosz, Benedek	
	A Model Predictive Control using a data-driven ASM model for online optimization of WRRFs under different performance objectives	Stentoft, Peter A.; Munk-Nielsen, Thomas; Valverde Pérez, Borja; Vezzaro, Luca	
	Digital Twinning of Water Resource Recovery Facilities – From concept to implementation	Polesel, Fabio; Remigi, Enrico; Sanford, Ryan; Merrild, Mads; Nissen, Rasmus; Thage, Kristian; Lynggaard-Jensen, Anders; Ramin, Pedram; Drejer, Lars Haslev; Andreassen, Peter; Sorensen, Henrik Refstrup; Dalkvist, Trine	
15:30	Cup of coffee around a poster		
16:00	Modelling and Integrated Assessment (MIA) specialist group meeting		
17:00	End of the session		

Tuesday 24th (all times are in CEST/UTC+2h)

12:00	Reporting on workshops		
30'	Quo vadis integrated urban wastewater system modelling?	Tik, Sovanna; Amaral, Andreia; Bach, Peter M.; Benedetti, Lorenzo; Bott, Charles; Corominas, Lluís; Elduayen-Echave, Benat; Maruejols, Thibaud; Sandino, Julian; Vezzaro, Luca; Weijers, Stefan; Vanrolleghem, Peter A.	
30'	Can detailed models assist wastewater-based epidemiology – the COVID “boost”	Maere, Thomas; Corominas, Lluís; Ort, Christoph; Rauch, Wolfgang; Krebs, Peter; McCarthy, David; Vanrolleghem, Peter A.	
30'	MBR modelling jam – who reproduces the full-scale data “best”?	Smets, Ilse; Robles, Angel; Mannina, Giorgio; Comas, Joaquim; Ruano, Victoria; Brepols, Christoph; Harmand, Jérôme; Rodriguez-Roda, Ignasi; Héran, Marc; Alliet, Marion	
13:30	Cup of coffee around a poster		
14:00	Technical session on “ Clarification models ”		
	3 min by presenters followed by prospective by moderators	Moderators: Elena Torf and Tom Johnson	
	Development of a primary clarifier model with characterized settling velocity groups	Ikumi, David S.	
	Extracellular polymeric substance composition forms the glue between process and clarifier models	Ngo, Khoa Nam; Hauduc, Hélène; Massoudieh, Arash; Wett, Bernhard; Bott, Charles; Sturm, Belinda; Miller, Mark; Al-Omari, Ahmed; Regmi, Pusker; Jimenez, Jose; Takács, Imre; de Barbadillo, Christine; De Clippeleir, Haydée	
14:45	Cup of coffee around a poster		
15:15	Technical session on “ N cycle ”		
	3 min by presenters followed by prospective by moderators	Moderators: Peter Dold and 2 nd moderator	
	Modelling Partial Heterotrophic Denitrification in Mainstream Nitrogen Removal Processes – Model Development and Evaluation	Al-Omari, Ahmed; De Clippeleir, Haydée; Ladipo-Obasa, Mojolaoluwa; Klaus, Stephanie; Bott, Charles; McCullough, Kester; Fofana, Rahil; Wadhawan, Tanush; Murthy, Sudhir; Fevig, Stephanie; Jimenez, Jose; Wett, Bernhard; Nopens, Ingmar	
	Model-based evaluation of strategies to mitigate N ₂ O emissions from a full-scale nitrifying biofilm reactor	Gonzalez, Beatriz; Filali, Ahlem; Bernier, Jean; Rocher, Vincent; Gillot, Sylvie; Spérandio, Mathieu	
16:00	End of the session		

Wednesday 25th (all times are in CEST/UTC+2h)

12:00	Reporting on workshops	
30'	Keep, tweak, or abandon: developing a path forward to modelling EBPR	Downing, Leon; Wells, George
30'	Mainstream Shortcut Nitrogen Removal Modelling: From research to full-scale implementation, do we have what we need?	Kirim, Gamze; Torfs, Elena; Al-Omari, Ahmed; Jimenez, Jose; Klaus, Stephanie; McCullough, Kester; De Clippeleir, Haydée, Vanrolleghem, Peter A.
30'	Anaerobic Digestion Modelling: quo vadis?	Yu, Dawei; Alsina, Xavier Flores; Arnell, Magnus; Shi, En; Steyer, Jean-Philippe; Batstone, Damien
13:30	Cup of coffee around a poster	
14:00	Technical session on "Aerobic Granular Sludge systems"	
	3 min by presenters followed by prospective by moderators	Moderators: Bruce Johnson and Mathieu Spérandio
	Modelling of aerobic granular sludge sequencing batch reactors: introduction to the Eawag AGS model	Layer, Manuel; Stähle, Matthias; García Villodres, Mercedes; Házi, Ferenc; Bencsik, Dániel; Takács, Imre; Morgenroth, Eberhard; Derlon, Nicolas
	How to grow aerobic granular sludge?	van Dijk, Edward; Haaksman, Viktor; van Loosdrecht, Mark; Pronk, Mario
14:45	Technical session on "Integrated/plant-wide modelling: case of the sulfur cycle"	
	3 min by presenters followed by prospective by moderators	Moderators: Colin Fitzgerald and Peter Vanrolleghem
	Real-time optimisation of sulfide control by dosing ferrous salt in sewer networks	Li, Jiuling; Sharma, Keshab; Yuan, Zhiguo
	Plant-wide investigation of sulfur flows in a water resource recovery facility (WRRF)	Forouzanmehr, Farhang; Le, Quan; Solon, Kimberly; Maisonnave, Virginie; Daniel, Olivier; Buffiere, Pierre; Gillot, Sylvie; Volcke, Eveline
16:00	Closing remarks	
	Outlook WRRmod2022 and WRRmod2024	
16:30	End of the conference	

LIST OF AVAILABLE VIDEOS from August, 14th:

Session “data-driven models and digitalization”		
Opinion	Data: Why bother?	Wade, Matthew John
	Practicality of Big-data in WRRF modelling?	Stewart, Heather Ann; Gagnon, Alexandria; Bott, Charles
Technical session	Analysis of functions to represent data in water system models	Mukherjee, Rani; Snaith, William; Yeow, Louise; Clarke, Matt; Plosz, Benedek
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Session “Clarification models”		
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Session “N cycle”		
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	Model-based evaluation of strategies to mitigate N ₂ O emissions from a full-scale nitrifying biofilm reactor	Gonzalez, Beatriz; Filali, Ahlem; Bernier, Jean; Rocher, Vincent; Gillot, Sylvie; Spérandio, Mathieu
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Technical session	Modelling of aerobic granular sludge sequencing batch reactors: introduction to the Eawag AGS model	Layer, Manuel; Stähle, Matthias; García Villodres, Mercedes; Házi, Ferenc; Bencsik, Dániel; Takács, Imre; Morgenroth, Eberhard; Derlon, Nicolas
	How to grow aerobic granular sludge?	van Dijk, Edward; Haaksman, Viktor; van Loosdrecht, Mark; Pronk, Mario
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List of workshops

Title	Organizers
Global Perspective on Climate Change Resiliency and Mitigation in Water Resource Recovery (Young Water Professionals workshop)	Stewart, Heather Ann; Rahman, Arif
MBR modelling jam – who reproduces the full-scale data “best”?	Smets, Ilse; Robles, Angel; Mannina, Giorgio; Comas, Joaquim; Ruano, Victoria; Brepols, Christoph; Harmand, Jérôme; Rodriguez-Roda, Ignasi; Heran, Marc; Alliet, Marion
Transition of WRRF models to digital twin applications	Torfs, Elena; Daneshgar, Saba; Johnson, Bruce; Nicolai, Niels; Porro, Jose; Snowling, Spencer; Takacs, Imre; Vanrolleghem, Peter A.; Nopens, Ingmar
Mainstream Shortcut Nitrogen Removal Modelling: From research to full-scale implementation, do we have what we need?	Kirim, Gamze; Torfs, Elena; Al-Omari, Ahmed; Jimenez, Jose; Klaus, Stephanie; McCullough, Kester; De Clippeleir, Haydee; Vanrolleghem, Peter A.
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Keep, tweak, or abandon: developing a path forward to modelling EBPR	Downing, Leon; Wells, George
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Hybrid modelling: integrating data-driven and mechanistic modelling techniques in WRRFs	Quaghebeur, Ward; Borzooei, Sina; De Jaegher, Bram; Wade, Matthew; Nopens, Ingmar; Torfs, Elena
Quo vadis integrated urban wastewater system modelling?	Tik, Sovanna; Amaral, Andreia; Bach, Peter M.; Benedetti, Lorenzo ; Bott, Charles ; Corominas, Lluís ; Elduayen-Echave, Benat ; Maruejols, Thibaud ; Sandino, Julian ; Vezzaro, Luca ; Weijers, Stefan ; Vanrolleghem, Peter A.

List of posters

Nr.	Title	Authors
111	Stoichiometry in anaerobic digestion model is fixed or variable?	Shi, En; Zhang, Miao
112	Which vertical gradients are a priority in liquid-gas transfer modelling: pressure, kLa, liquid or gas phase composition?	Baeten, Janis E.; van Loosdrecht, Mark C.M.; Volcke, Eveline I.P.
113	Evaluating capacity liberation projects using a plant-wide model-based approach.	Monje López, Vicente Tomás; Nobel, Per; Junicke, Helena; Batstone, Damien; Kjellberg, Kasper; Gernaey, Krist; Flores-Alsina, Xavier
114	Integrated modelling for systems of hydraulically connected WRRFs. Analysis on the potential to holistically reduce energy use, costs and indirect GHG emissions.	Reifsnnyder, Samuel; Cecconi, Francesca; Rosso, Diego
121	Evaluating two control structures for aeration energy reduction in a nutrient removal wastewater treatment plant	Zhu, Zhengyu; Li, Yongmei; Zheng, Xingcan
122	Energy- and CFD-modelling for the Why and How of the Triple-A high-rate carbon process	Aichinger, Peter; Rehman, Usman; Takacs, Imre; Audenaert, Wim; Wett, Bernhard
123	Development and application of a benchmark simulation model for the biofiltration treatment lane of the 5 million PE Seine Aval WWTP	Zhu, Jialu; Bernier, Jean; Pauss, André; Rocher, Vincent; Vanrolleghem, Peter. A.
124	CFD modelling of N ₂ O emission from surface aerated activated sludge reactors – Systematic mesh refinement and sensitivity analysis	Qiu, Yuge; Griffin, Christopher T.; Ekström, Sara; Valverde-Pérez, Borja; Smets, Barth F.; Climent, Javier; Domingo-Félez, Carlos; Cuenca, Raúl Martínez; Plósz, Benedek G.
131	An influent generator for WRRF design and operation based on a recurrent neural network using a genetic algorithm for multi-objective optimization	Li, Feiyi; Vanrolleghem, Peter
132	The last barrier to accurate aeration design: the alpha factor - how to predict in time and along the reactor	Bencsik, Dániel; Takács, Imre; Budai, Péter; Rosso, Diego
133	QSDsan: An Integrated Platform for Quantitative Sustainable Design of Sanitation and Resource Recovery Systems under Uncertainty	Li, Yalin; Zhang, Xinyi; Rowles, Lewis S.; Morgan, Victoria L.; Lohman, Hannah A.C.; Mittal, Smiti; Kogler, Anna; Aguiar, Samuel E.; Tarpeh, William A.; Cusick, Roland D.; Guest, Jeremy S.
134	To calibrate or not to calibrate, that is the question	Samuelsson, Oscar; Lindblom, Erik U.; Björk, Anders; Carlsson, Bengt
141	Acclimatization changed microbial community, stoichiometric and kinetic in anaerobic digestion under ammonia stress	Yu, Dawei; Wei, Yuansong
142	Analysing the impact of food waste disposal through the sink by combining the BSM1 with EASETECH modelling framework for life cycle assessment	Lyager, Julie; Takou, Vasiliki; Glottrup, Casper; Boldrin, Alessio; Ebbabou, Maklawe; Valverde Pérez, Borja
143	Integrated hybrid modelling of water resource recovery facilities by coupling mechanistic and data-driven ODE models	Quaghebeur, Ward; Torfs, Elena; De Baets, Bernard; Nopens, Ingmar

144	Modeling EPS recovery using SUMO software: from bacterial production to reactor extraction	Durieux, Sidonie; Bessiere, Yolaine; Paul, Etienne
211	Analysis and modelling of iron reduction kinetics in activated sludge	Varga, Erika; Bounouba, Mansour; Hauduc, Helene; Takacs, Imre; Azimi, Sam; Rocher, Vincent; Spérandio, Mathieu
212	Mass-balance-based approach in planning a measurement campaign for energy factory Tilburg	Le, Quan; Weijers, Stefan; Schemen, Ruud; Volcke, Eveline
213	Integrating whole-plant simulation and a novel kinetic ozonation model for indirect potable reuse based on ozone-biofiltration advanced water treatment	Bellandi, Giacomo; Stewart, Heather; Johnson, Bruce R.; Audenaert, Wim; Hauduc, Hélène; Takacs, Imre; Bott, Charles
214	New challenges require new models: the AMOZONE model for virtual piloting and engineering of secondary effluent ozonation	Bellandi, Giacomo; Muoio, Roberta; Daza, Miguel; Rehman, Usman; Nopens, Ingmar; Weijers, Stefan; van Dijk, Peter; Schemen, Ruud; Weijtmans, Tom; Hogard, Samantha; Pearce, Robert; Bott, Charles; Hauduc, Hélène; Takacs, Imre; Audenaert, Wim
221	Photo-anaerobic model 2: a mechanistic model for resource recovery using enriched purple phototrophic bacteria grown outdoors	Capson-Tojo, Gabriel; Batstone, Damien J.; Grassino, Maria; Hülsen, Tim
222	PyADM1: An open-source Python implementation of Anaerobic Digestion Model number 1	Sadrimajd, Peyman; Mannion, Patrick; Howley, Enda; Lens, Piet N. L.
223	Impact of Nitrifier Kinetics on TIN Removal in AvN Systems – Comparison of Intermittent and Continuous Aeration	McCullough, Kester; Klaus, Stephanie; Regmi, Pusker; Vanrolleghem, Peter A; De Clippeleir, Haydee; Kirim, Gamze; Bott, Charles
231	URRmod: linking nitrification biokinetics and physico-chemical equilibria in a urine stabilisation bioreactor	Arce Velasquez, Juan David; Heran, Marc; Lesage, Geoffroy; Laurent, Julien
232	Using plant data to estimate biodegradable COD fractions – Case Study KwaMashu WWTP	Brouckaert, Barbara Maria; Brouckaert, Christopher John; Singh, Akash; Pillay, Kaverajen; Flores-Alsina, Xavier; Ikumi, David
233	Evaluation of Parallel-Connected Microbial Fuel Cells by a Diffusion-Based Model	Fujinaga, Aiichiro; Kishimoto, Noyuki; Taniguchi, Syogo
241	Knowledge-Based Integrated Modelling of a Super Large Scale Submerged Membrane Bioreactor for Process Simulation and Energy Consumption Estimation	Nadeem, Kashif; Plana, Queral; Albasi, Claire; Bernier, Jean; Azimi, Sam; Rocher, Vincent; Alliet, Marion
242	Simulation and optimization of the deammonification process for treating mainstream WWTP under decreasing temperature	Mehrani, MJ., Azari, M., Denecke, M., Makinia J.
243	Application of hybrid mechanistic/machine learning technique for liquid N ₂ O prediction during the nitrification process	Mehrani, MJ., Bagherzadeh, F., Zheng, M., Sobotka, D., Kowal, P., Makinia J.