

Eawag Seminar Invitation

Digital twins in support of wastewater management – Getting the theory into practice

Speaker ***Prof. Peter Vanrolleghem, Department of Civil and Water Engineering, Université Laval, Canada***

When **November 24, 2022, 16.00 – 17.00, CET**

Where **Eawag Dübendorf, room FC C20 and online via Zoom.**

Please contact seminars@eawag.ch for access details.

Abstract Digital Water, Smart Water, Internet of Water, Water 4.0, there sure is a hype around the digital transformation of the water sector. However, some of us experience déjà vu's when presented with reports on digital transformation, leading to frustrated "we did this ... years ago" comments. The objective of this Eawag seminar is to shed light on that and separate out what is just repackaging of developments that were done in the past and what should truly be considered digital transformation. The presentation will start from "the why" of digital transformation? For instance, according to Global Water Intelligence, 5-year savings on total expenditures in the drinking water sector could globally amount to 176 billion USD and the wastewater sector 143 billion and this is just the beginning. New benefits of digital water, next to the ones that have already been obtained thanks to the adoption of earlier digitalization successes (e.g. model-based design, process control, ...), are especially found at utility management level where system complexity is larger. Big data and data analytics allow long-term planning, better engagement with customers, infrastructure optimization and pro-active maintenance. However, in a 2017 survey of the international urban water community conducted by an Eawag team, it was demonstrated that this community may not yet be prepared for the digital transformation and requires further developments, with the most important ones in the areas of data-push and data-pull issues. Illustrations that identify future research directions will be provided. Next to these needs for further research before the full potential of digitalization may be exploited, other challenges lay ahead: (i) digital anxiety in the workforce; (ii) standards for digital communication; (iii) data quality guarantees; (iv) how to leverage knowledge-based models with data-mining; (v) public safety issues. To relate the above to actual digitalization practice, the presentation will present a number of machine learning methods applied at modelEAU to actual wastewater treatment processes, allowing to achieve better environmental protection and at the same time reduced consumption of resources

(energy, chemicals, etc.). Examples covered include projects at large scale facilities in Quebec, Bordeaux, Paris and Virginia.

This period is just fantastic for water professionals that have been advocating modelling and data analysis for improved water management. Before the digitalization era, the necessary technical arguments for use of the developed methods had probably been given, but their adoption in practice suffered from a lack of buy-in from management, that remained risk-averse. However, with the digitalization hype, CEOs and boards are now leading the way, installing Chief Digital Officers (CDO) to make it all happen in the short-term and empowering personnel to develop new approaches. “If you have any doubt, just try it”, is certainly something this profession always wanted to hear and is now heard all over.

The ultimate message of the seminar therefore is: Let’s grab this opportunity with both hands and make digital water happen: “It’s hammer time” (Formula 1 pilot Lewis Hamilton).