PhD-position: Advancing the control strategies for biological wastewater treatment in remote locations

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In close collaboration with David Weissbrodt (AS-TUDelft) and Siegfried Vlaeminck (UAntwerpen) for work on the PHBR			

Research field: Anaerobic digestion, Photoheterotrophic bioreactor, System / Control Engineering, Biokinetic modelling

The SARASWATI 2.0 Project

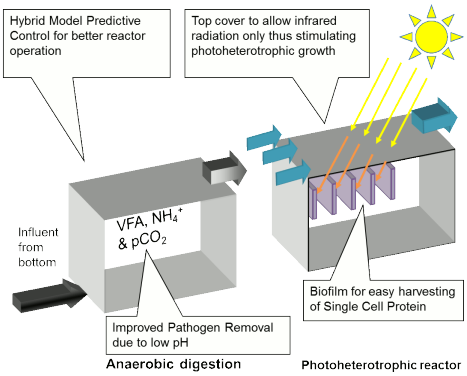
Globally, and particularly in India, there are hundreds of thousands not properly functioning anaerobic digesters. In India, the operational failure leads to wastewater being discharged directly in the Ganga, thereby polluting the main water resource for millions of their neighbours. As a result of poor maintenance often due to the lack of skilled labour, many digesters operate at a too short retention time, thereby inhibiting biogas production. With the lack of biogas production, the added value of operation reduces to a minimum, subsequently worsening operators' maintenance efforts and eventually leading to the complete abandonment of treatment plants. The SARASWATI 2.0 project (H2020 EU-India) aims to demonstrate new concepts that could mitigate water pollution in India. As one of the pilot projects within SARASWATI 2.0 program we have proposed a combination of a pressurized digester and a photoheterotrophic bioreactor as an alternative more robust treatment.

Your task is to develop a hybrid model predictive control strategy that ensures the performance of biological wastewater treatment in remote locations and offsets the limited availability of skilled labour and maximizes the production of value-added byproducts. The aim of the PhD project is therefore to base the control system on for example the existing mechanistic ADMno1 model and complement it with cost-effective robust data collection by real-time and/or offline monitoring. The robustness of the entire treatment plant is essential and therefore you will have the ability in the lab to test your control strategy. Your research is connected to other PhD students working on autogenerative pressure digesters and photoheterotrophic bioreactors in our Delft and/or Antwerpen laboratories.

Requirement

We are looking for highly talented and driven candidates, who

- have a relevant MSc degree in Systems / Control Engineering, Operations Research, or a related Applied Sciences field (such as chemical and/or environmental engineering, biotechnology),...
- have a proven background and interest in mathematical modelling and data analytics skills or be willing to invest in developing expertise in these research techniques;
- have an analytical and quantitative approach toward problem solving and proficient in a programming language (eg. Matlab, Python)
- have affinity for biological wastewater treatment processes
- willingness to work in India and Delft in an EU-India H2020 project
- have excellent writing skills, as evidenced by a writing sample, such as a chapter from your Master's Thesis or a (forthcoming or published) article or presented conference paper.



For more information about this position, please contact r.e.f.lindeboom@tudelft.nl. The official vacancy is not opened yet. To apply you will need to submit a detailed CV, proof of English language proficiency, abstract of your MSc thesis (1 page), a 1 page motivation about your ideas of an approach and methodology. Details on the application procedure will follow. Please make sure to include in your document examples of projects in which you successfully demonstrate your mathematical modelling and technical and analytical skills.