

The Chancellor of Ghent University has the honour of inviting you to attend the public defense of the doctoral dissertation of

**ir. Pieter De Cocker**

Title of the doctoral dissertation:

*Cold anammox for energy-positive sewage treatment: impact of temperature and organic carbon on performance and microbiota.*

The public defense will take place on May 25<sup>th</sup> 2018 at 15:00 in room E1.015 at Campus Coupure, Coupure 653, 9000 Ghent.

There will be a contiguous reception to which you are heartily invited.  
Please confirm your attendance before 18/05/2018 to [Pieter.Decocker@UGent.be](mailto:Pieter.Decocker@UGent.be)

**Dissertation supervisors**

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**Board of examiners**

**Prof. dr. ir. Peter Bossier**  
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**Prof. dr. ir. Stijn Van Hulle**  
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**Abstract of the doctoral research**

The development of mainstream partial nitritation/anammox (PN/A) processes is a crucial step towards reaching a more sustainable, energy neutral or even energy positive wastewater treatment. However, mainstream conditions e.g. low temperatures and ammonium concentrations as well as the presence of residual organic carbon can impact the kinetics in the system and disturb the balance between different (desired/undesired) bacterial groups implicated in the process, rendering it unstable and inefficient. This PhD focused on the short and long-term impact of low temperature on the performance, enrichment and adaptation of anammox bacteria (AnAOB), as well as their ability to compete with heterotrophic bacteria (HB) in the presence of organic carbon.

Short-term activity tests on different biomass types allowed to obtain more accurate modelling parameters and provided insights on factors influencing the temperature sensitivity. The operation of two lab-scale reactors, at constant (30°C) and decreasing temperature (down to 10°C), showed the long-term impact of temperature on anammox performance, microbial community dynamics and granulation. Very high removal rates were observed at 10°C due to enrichment and adaptation. Finally, the reactor influent was modified to gain new insights on the impact of slowly biodegradable organic carbon on the competition between AnAOB and HB at 30°C and 10°C. The findings from this research project show the potential of 'cold anammox' and provided insights that can contribute to the development of a suitable microbial resource management strategy for the implementation of mainstream PN/A applications.

**Brief Curriculum Vitae**

Pieter De Cocker (°Ghent, Belgium, September 20<sup>th</sup> 1991) went to the Sint-Pietersinstituut in Ghent before attending Ghent University from which he graduated in 2014 as MSc. in Bioscience engineering, specialization Chemistry and Bioprocess Technology. Next, he started his joint PhD in collaboration with SUEZ (CIRSEE, Paris), le Laboratoire d'Ingénierie des Systèmes Biologiques et des Procédés (LISBP, INSA Toulouse) and the Center for Microbial Ecology and Technology (CMET, UGent). This project was partially funded by a French ANRT grant.

Pieter spent the first 2,5 years of the PhD in Toulouse where he had the opportunity to guide several master students during their research internship. The last 9 months of the PhD were completed in Ghent. He has presented his research on several (inter)national symposia and (co)authored several scientific articles published in international peer reviewed journals.