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

**Cristina Cagnetta**

Title of the doctoral dissertation:

*Innovative strategies to maximize carbon and energy recovery*

*from domestic wastewater*

The public defence will take place on **September 25st 2017 at 4 pm** in the Zaal August Vermeylen at Het Pand, Onderbergen 1, 9000 Ghent.

There will be a contiguous reception to which you are heartily invited.

Please confirm your attendance before September 18th to Cristina.Cagnetta@UGent.be

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| **Dissertation Supervisors** |  |  | |
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**Abstract of the doctoral research**

Wastewater is not just waste but a valuable source of (bio)energy, organic carbon and nutrients that can be recovered and reused. Conventional wastewater treatment systems are energy inefficient and focus on the removal of these resources rather than in their recovery. High-rate activated sludge systems allow to recover organic carbon in the form of sludge and increase the (bio)energy produced via biogas formation, allowing to obtain an energy neutral wastewater treatment. Production of sludge in high-rate systems is not without its problems, due to the poor settling capacity of the sludge formed that is thus highly diluted and needs to be further thickened prior to digestion. This increases the land-footprint and the operational costs, and requires chemical dosage (polyelectrolytes) to increase sludge concentration.

In this work, an alternative strategy to thickening was explored by applying a forward osmosis based concentration, which could reduce the land-footprint and avoid expenses related to polyelectrolyte addition. A second approach investigated was the use of a dissolved air flotation system instead of a settler and a thickener, which could reduce the land-footprint by 85 %, and generate sludge with a concentration similar to that of a combination of settling and thickening.

This thesis also focused on an alternative route to biogas formation, whereby the sludge organics are fermented to added-value carboxylic acids that can be converted into a broad range of chemicals and products, such as plastics, solvents and fuels, amongst others. Carboxylic acids are currently produced from petroleum resources, thus their generation from sustainable carbon sources (waste) could reduce the use of non-renewable petroleum resources and bring further added value to wastewater treatment processes.

**Brief Curriculum Vitae**

Cristina Cagnetta was born in Terlizzi (Bari), Italy on October 31st, 1988. She graduated with highest distinction from the University of Bari with a Bachelor of Industrial and Environmental Biotechnology and from the University of Bologna with a Master of Science in Molecular and Industrial Biotechnology. From 2013, she started her PhD as FWO-fellow at the Center for Microbial Ecology and Technology (CMET), and from 2014 also at the Particle and Interfacial Technology Group (PaInT) (Ghent University). Her research focused on optimization of high-rate activated sludge systems and conversion of the sludge organics into added-value carboxylic acids. During her PhD, Cristina spent three months as a visiting scientist at the Department of Environmental Science and Engineering of Tsinghua University (Beijing, China).

During her PhD research, Cristina has had the pleasure of (co)guiding six Master students in their research projects. She presented her work at conferences in Belgium, The Netherlands and China, authored two publications and she is currently preparing three more publications as a first author.