

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

(Eng.) Thomas Pluym

Title of the doctoral dissertation:

Drinking water from source to tap: Unravelling microbiome dynamics through monitoring and novel biological indicators

The public defence will take place on 22nd October 2026 at 17:00 in the Feestzaal, Auditorium A.1 at Campus Coupure, Coupure Links 653, 9000 Ghent.

There will be a contiguous reception to which you are heartily invited.
Please confirm your attendance by filling out [this form](#) before 14th of October 2026.

Dissertation supervisors

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Board of examiners

Prof. dr. ir. Mia EECKHOUT
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Abstract of the doctoral research

Before drinking water reaches the consumer's tap, it travels through a complex system of natural and engineered environments, from its original source through treatment plants and distribution networks to household plumbing. Throughout this journey, microbial communities are continuously shaped by environmental conditions, treatment processes, and interactions between microorganisms. Capturing and monitoring these changes is essential for maintaining safe and high-quality drinking water.

This doctoral research investigated how microbial communities change from source to tap, how they respond to environmental and operational disturbances, and how these changes can be monitored more effectively. The results demonstrate that source water characteristics, including nutrient availability and temperature, strongly influence microbial communities and can have effects that persist throughout treatment and distribution. Microbial communities responded to changes in temperature, water composition, nutrient availability, and disturbances such as rainwater backflow. To better capture these dynamics, this research evaluated advanced monitoring approaches, including flow cytometry, metagenomic sequencing, and analysis of the bacterial and eukaryotic communities. These methods provided faster and more detailed information on microbial abundance, diversity, and functional potential than conventional approaches. Overall, this research shows that drinking water microbiology is dynamic and interconnected from source to tap. Combining an ecological understanding of microbial communities with advanced monitoring technologies can improve our ability to detect changes, understand their significance, and support more informed management of drinking water systems.

Brief Curriculum Vitae

Thomas Pluym (*Izegem, Belgium, 11/03/1997) graduated summa cum laude from Ghent University in 2021 as a master of Biochemical Engineering Technology, receiving the VWR international prize for best thesis. Immediately after his graduation, he started his PhD research within the BIOSTABLE project at the Center for Microbial Ecology and Technology (CMET) research group at Ghent University under the supervision of Prof. Nico Boon and Prof. Bart De Gusseme. The following year, he obtained the highly-competitive predoctoral scholarship from the Fonds Wetenschappelijk Onderzoek (FWO) to start a joint-PhD with KU Leuven, under the supervision of Prof. Ellen Decaestecker and Prof. Bart De Gusseme, with Prof. Nico Boon and Prof. Klaus Schwenk as co-promoters, to continue his work on drinking water microbiology.

His research efforts have resulted in the publication of 10 scientific papers and one book chapter in international peer-reviewed journals. One of these articles was recognized as one of the most-viewed articles in *Microbial Biotechnology* in 2024. Additionally, he has presented his research at seven national and international symposia, including the Young Water Professionals (YWP) Europe conference, ISME20, and the 2nd Emerging Microbial Technologies (EMT) Symposium. He delivered oral presentations at each of these, and his presentation at the latter was awarded the Best Oral Presentation Prize.

During his PhD, Thomas successfully (co-)supervised nine master's thesis students and one bachelor's thesis student. Alongside his research activities, he also taught the practical sessions of the course *Microbial Ecological Processes*. In addition, he contributed to the CMET community by organizing the Youngster Cluster and co-organizing a teambuilding event.