

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

ir. Benjamin Buyschaert

Title of the doctoral dissertation:

*Single-cell optical fingerprinting for
microbial community characterization*

The public defense will take place on Friday the **26th January 2018 at 17:00** in the “grote vergaderzaal” at the Koninklijke Academie voor Nederlandse Taal- en Letterkunde (KANTL), Koningstraat 18, 9000 Ghent.

There will be a contiguous reception to which you are heartily invited.
Please confirm your attendance before the 19th January to: Benjamin.Buyschaert@ugent.be

Dissertation supervisors

Prof. dr. ir. Nico Boon
Center for microbial ecology and technology
(CMET)
Faculty of Bioscience
Engineering,
Ghent University, BE

Prof. dr. ir. Bart De Gussemé
Center for microbial ecology and technology
(CMET)
Faculty of Bioscience
Engineering,
Ghent University, BE

Board of examiners

Prof. dr. ir. Colin Janssen
Chairman,
GhEnToxLab,
Faculty of Bioscience
Engineering,
Ghent University, BE

Prof. dr. Andre Skirtach
Secretary,
Nano-Biotechnology Group,
Faculty of Bioscience
Engineering,
Ghent University, BE

Prof. dr. David Berry
Division of microbial ecology
(DOME),
Departement of microbiology
and ecosystem science,
University of Vienna, AT

Dr. Aleksandra Knezev
Senior research consultant,
Het Waterlaboratorium N.V.,
Arnhem, NL

Prof. dr. ir. Arne Verliefde
Particle and interfacial technology
(PaInT),
Faculty of Bioscience
Engineering,
Ghent University, BE

Abstract of the doctoral research

Bacteria are ubiquitous on earth and typically form complex microbial communities of coexisting genotypes and phenotypes. These communities are important for our modern society as many different industrial applications are facilitated by bacteria. Furthermore, the behavior of these communities can provide information on the environment in which they are present. To improve bioprocesses or to monitor microbial communities for quality purposes, techniques for community characterization are necessary. Today several techniques are available but are either complex, expensive or time-consuming.

In this doctoral research easy, cheap, and fast optical methods were explored for community characterization. First, existing flow cytometric fingerprinting methods were improved and the sensitivity of this technique was tested for the taxonomic and phenotypic characterization of microbial communities. Since flow cytometry relies on staining and since staining can decrease the resolution and speed of the method, Raman spectroscopy, a label-free alternative, was also investigated for community characterization. Finally, the usability of flow cytometry was demonstrated for the monitoring of water quality.

Brief Curriculum Vitae

Benjamin Buyschaert (Ghent, Belgium, 23rd July 1990) obtained his high school degree in Latin-Mathematics at the St Barbara College of Ghent in 2008. In 2013 he graduated from the Ghent University with a master's degree in bioscience engineering in the field of cell and gene biotechnology. He started his PhD as IWT-fellow at the Center of Microbial Ecology and Technology (CMET) in 2014. His research focused on the development of methods to quickly and easily characterize microbial communities to improve our understanding and enable the management of microbial communities. During his research, Benjamin spent three months as a visiting scientist at DC Water (Washington DC) in the United States of America.

During his PhD, Benjamin Buyschaert successfully guided four students during their graduation research project and was responsible for the practical exercises of the course 'microbial ecological processes'. Benjamin presented his work in several national and international symposia and won a prize for one of his publications and the Ernest Dubois prize for his research. He is author and co-author of several scientific articles published in international peer-reviewed journals.