FACULTY OF BIOSCIENCE ENGINEERING

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

ir. Britta De Pessemier

Title of the doctoral dissertation:

Multi-Omics Insights into the Skin Microbiome of Healthy and Diseased Skin

The public defense will take place on 15 December 2025 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 before 10/12/2025 by filling out this form or via mail to britta.depessemier@ugent.be.

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Abstract of the doctoral research

The skin is one of the body's largest organs and is constantly exposed to the external environment. It hosts a complex microbial ecosystem of bacteria, fungi, viruses, and micro-eukaryotes that supports the skin barrier, provides colonization resistance, and interacts with the immune system, but may also contribute to disease when homeostasis is disrupted. Over the past century, lifestyle changes associated with industrialization (e.g., altered hygiene, diet, pollution, and physical activity) have coincided with a rise in immune-mediated skin disorders such as acne, dandruff, rosacea, and psoriasis.

This doctoral dissertation investigates the skin microbiome and metabolome in sebaceous (oil-rich) skin regions affected by conditions such as psoriasis capitis and acne vulgaris. By integrating advanced sequencing and untargeted metabolomics, it compares inflamed and healthy sebaceous skin to identify microbial and metabolic biomarkers. Sebaceous skin showing inflammation, ranging from mild erythema to severe acne, consistently exhibited reduced microbial diversity, altered community composition, increased sebum production, and enrichment of fatty acid esters and long-chain fatty acids. Using an artificial sebum model, the growth and biofilm-forming capacity of *Malassezia* species were further demonstrated under physiologically relevant conditions. These findings emphasize the role of microbial diversity in preserving skin homeostasis. Multi-omics and *in vitro* models provide opportunities to identify candidate biomarkers and to develop curative and preventive strategies that restore microbial homeostasis and improve skin health.

Brief Curriculum Vitae

Britta De Pessemier (°Zottegem, Belgium, 02/03/1997) graduated from Ghent University in 2020 with a Master of Science in Bioscience Engineering: Cell and Gene Biotechnology (*magna cum laude*). She worked for one year as a scientific assistant before obtaining a pre-doctoral Strategic Basic Research Fellowship from the Research Foundation – Flanders (FWO) to start her PhD at the Center for Microbial Ecology and Technology (CMET) at Ghent University. A central part of her PhD was a 15-month research stay in the Knight Lab at UC San Diego, supported by an FWO long research stay grant and a grant from the Commission for Scientific Research (CWO). During her PhD, she (co-)authored seven peer-reviewed publications and supervised six master's thesis students. She is an active member of the European Academy of Allergy and Clinical Immunology, contributing to two review papers and an educational video on maintaining a healthy skin microbiome. She has presented her research at several national and international conferences, including the Society for Investigative Dermatology (SID) conference in Dallas, USA. She will continue her career as a postdoctoral fellow at UC San Diego, funded by the prestigious Belgian American Educational Foundation (BAEF).