

The Research Group  
Microbiology

has the honor to invite you to the public defence of the PhD thesis of

## Simon Vandelook

to obtain the degree of Doctor of Bioengineering Sciences

Title of the PhD thesis:

**Investigating the potential of white rot fungi  
to produce sustainable leather-like materials**

Promotors:

**Prof. dr. ir. Eveline Peeters**

**Prof. dr. Elise Vanden Elsacker**

The defence will take place on

**Tuesday, November 12, 2024 at  
4 p.m.**

VUB Etterbeek campus, Pleinlaan 2,  
Elsene, auditorium I.2.01

### Members of the jury

Prof. dr. ir. Wim De Malsche (VUB, chair)

Prof. dr. ir. Ronnie Willaert (VUB, secretary)

Prof. dr. ir. Niko Van den Brande (VUB)

Prof. dr. François Rineau (UHasselt)

Dr. Nazanin Saeidi (Karlsruhe Institute of  
Technology, DE)

### Curriculum vitae

Simon obtained his MSc. in biology molecular and cellular life sciences at the VUB. For his thesis he worked on the characterization of turkey tail mushroom strains for mycelium biomaterial applications. He then developed a PhD research project proposal on leather-like material applications using mycelium, for which he then obtained a grant. This established a new line of research on leather-like mycelium materials at the microbiology research group (MICR). Over the years, numerous interactions with industrial and academic partners arose. The expertise that was developed ensured recognition and led to various requests such as for example contributing to the Belgian pavilion during the Venice Biennale for architecture in 2023. Afterwards, the handbag that was designed with the new leather-like mycelium material made national news and brought Simon's research into the spotlight.

### Abstract of the PhD research

The kingdom of fungi represents a highly diverse group of eukaryotic microorganisms essential to natural ecosystems as well as human prosperity. Often portrayed as nature's recyclers, a subgroup of Basidiomycota filamentous fungi called white rot fungi have gained significant attention for their application in sustainable biomaterials. Their robust mycelium network can be used as a resource to generate practical alternatives to environmentally problematic materials such as polystyrene packaging, synthetic insulation material, polyurethane faux leathers and genuine leather.

This PhD thesis focuses on harnessing the potential of mycelium from white rot fungi as a new leather-like material alternative, addressing the limited available knowledge in this area. The research explores various scientific disciplines and methodologies, including diversity of white rot species, cultivation techniques, substrate optimization, enzyme production, gene expression analysis, genetic engineering tools, post-growth processing and material characterization. This project successfully expanded the scientific understanding and established a dedicated research environment for an expanding multidisciplinary research team.

Key achievements include the isolation of a performant *Trametes versicolor* strain used for pure mycelium material production, the optimization of a liquid-state surface cultivation setup for the generation of mycelium mats and the development of a novel layered composition strategy to produce leather-like mycelium materials. The culmination of these efforts resulted in the creation of a prototype mycelium handbag made entirely from a biobased and sustainable material by colleague Anouk Verstuyft.

The conclusions of this PhD project open new avenues leading to potential valorisation and industrial collaboration with regards to a novel class of biomaterials.