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THE HUMAN-MOULD-FASHION RELATIONSHIP: FUNGI APPLICATIONS FOR FUTURE DESIGN SCENARIOS IN FASHION AND TEXTILES FABRICATION

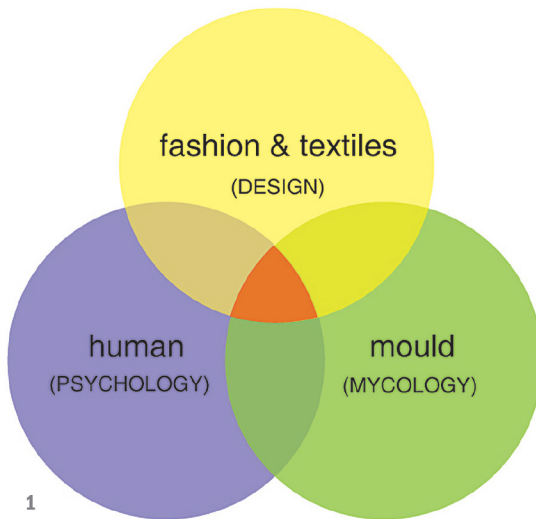
FUNGI | SOCIETY | PERCEPTION | DESIGN | TEXTILES



ABSTRACT

A CONTEMPORARY SCIENTIFIC DEBATE ABOUT THE ROLE OF MICROORGANISMS IN OUR ECOSYSTEMS ARGUES THAT PEOPLE'S OBSESSION WITH ERADICATING "GERMS" FROM THE URBAN ENVIRONMENT IS THE CAUSE FOR TODAY'S "ACHES OF MANKIND".

This paper offers a synopsis of the early stages of a practice-based PhD project, co supervised by Design and Science academics. While science has proposed applications of fungi in a variety of every day contexts – including materials for the built environment, packaging, in the food and beverages production industries and in the form of dyes, flavours and fragrances, there is very little research on the role of fungi in fashion. Through a series of 'Mould Perception' workshops, my initial research methodology has been aimed at understanding the psychology of human interaction with fungi. Exploring the role of human perception of this media has helped scope creative opportunities to further explore the properties of fungi in fashion and textiles contexts.



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INSPIRING MOULDS

The Human-Mould-Fashion Relationship: fungi applications for future design scenarios in fashion and textiles fabrication, is a practice-based PhD project that develops in the cross-disciplinary field of design, social and life sciences.

It is aimed at exploring the interaction between people and fungi – further referred to as the human-mould relationship, in order to propose a potential use of fungi in fashion and textile design processes (figure 1).

The research inquiry stems from Dmitry Vassilev's (2009) Russian documentary film 'Mould', which explores the positive and negative effects of mould on mankind, from fungal diseases caused by *Aspergillus niger* to medical and food applications with the discovery of penicillin and blue cheese:

'It first appeared on Earth 200 million years ago. It kills and saves lives. It is often called the "devil's bread" and "God's spit". We don't even think what ancient secrets and hidden powers might be concealed in this cursed and blessed phenomenon... mold.'

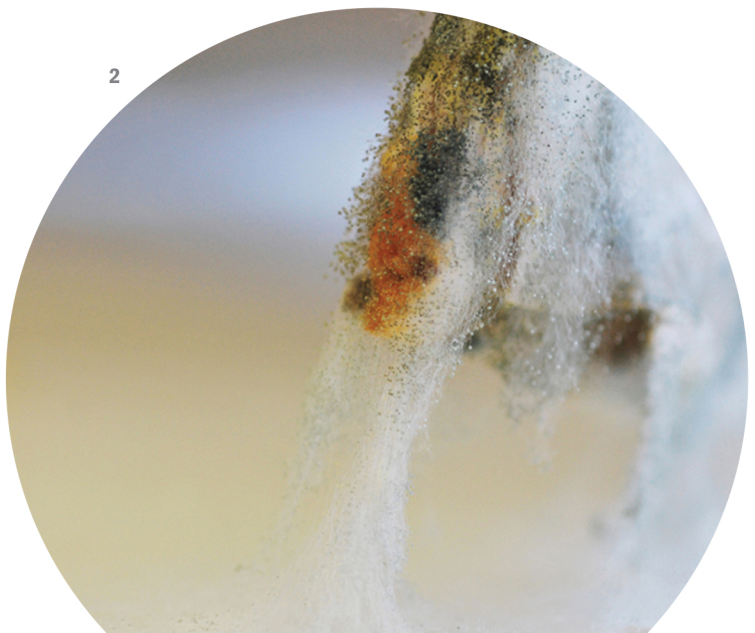
Vassilev 2009

The film inspired my MA Fashion project at Kingston University – 'Moulded Mind' (Ivanova 2011), which suggested the aesthetic potential of mould in fashion and textiles contexts. Dr Lori Snyder, reader in biotechnology at Kingston University, who is now supervising my research project, helped develop a series of experiments with mould growth on textiles and paper (figure 2).

The project explored the interaction between the body, the garment and the environment. Different textile

techniques, including digital printing on silk chiffon, flocking and laser cutting were then used to translate this narrative into a fashion collection.

The design explorations were presented as part of London Fashion Week and Tent London in September 2011. The enthusiastic response from both the public and media to the use of moulds for fashion encouraged a further investigation into the role of human perception of this medium for the design process.



THE ROLES OF FUNGI

Conversations with scientists during the TechTextil fair for innovative materials and textile technologies (Frankfurt, 2011) and a revisit of the 'hygiene hypothesis' (Bloomfield et al 2006) have further informed the research project. Today's market is flooded with products promising to turn our everyday surroundings into a sterile environment. According to biologist and science journalist Robb Dunn (2011), even though 'clean living' has benefited us in some ways, our disconnection from the natural world has made us 'sicker in others'. His book *The Wild Life of Our Bodies: predators, parasites and partners that shape who we are today* states that the move towards an urban way of living, is the cause of contemporary 'aches' of mankind (Dunn 2011). This scientific debate suggests that there could be wellbeing potential in designing fungi back into our every day through new materials and textiles for product, the built environment and fashion.

The roles fungi play for life on Earth have been predominantly the subject of scientific research. Understanding the importance of fungi as plant, animal and human pathogen has been explored by a field of mycological research, i.e. medical mycology. This has led to widespread negative perception of 'mould' – a colloquial term used to describe microfungi. On the other hand, fungal biotechnology has developed a variety of useful applications based on these organisms (Wainwright 1992; Moss 1987). The 'Fungal Biotechnology Roundup' by Moss (1987) underlines the fact that the "good" uses of fungi outnumber their associations with spoilage, disease and allergies (figure 4).

Some of the beneficial activities of fungi for humans include yeast fermentation and fungi's enzyme activity which find applications in the food and beverages production industries, for mycoprotein production and in food flavouring and

colouring. Fungi have also played an essential role in the development of antibiotics since the discovery of penicillin by Alexander Fleming (Diggins 2003).

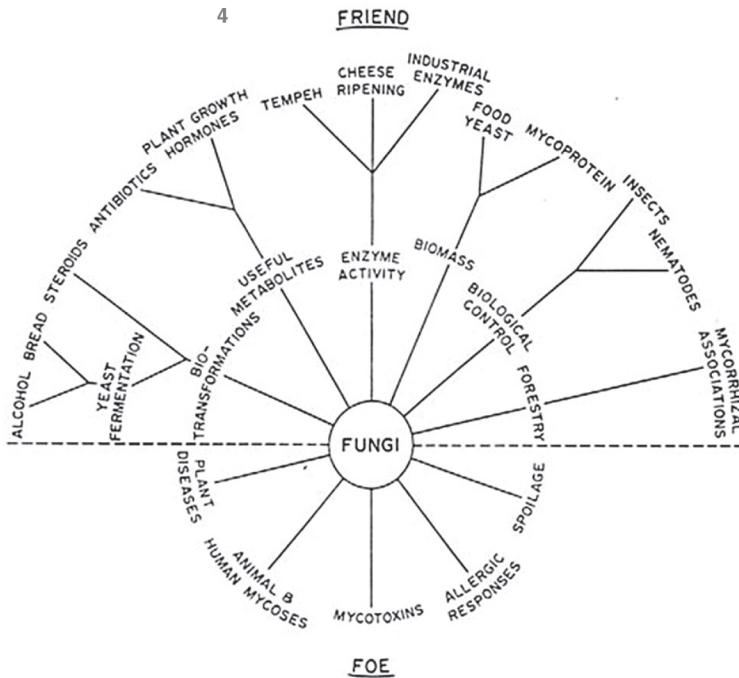
Fungi are of key importance for sustaining the planet's ecosystem biodiversity and dynamics. *'Mycellium Running: how mushrooms can help save the world'* (Stamets 2004) is a manual for '...the mycological rescue of the planet...' and explores the properties of mycelium – the filamentous body of a fungus, to produce enzymes which break down dead matter. Paul Stamets (2004) calls fungi '...the interface organisms between life and death...' as they recycle carbon, nitrogen and other essential elements that feed the soil. In addition to the well-known nutritional and medicinal applications of mushrooms, Stamets (2004) suggests novel applications of fungi for mycofiltration – the use of mycelium membranes to filter polluting matter; mycoforestry – for restoration and preservation of forests and ensuring sustainability of ecosystems, mycoremediation, which adopts fungi as chemical and biological warfare agents; and as mycopesticides – to fight harmful insects.

FUNGI FOR DESIGN

The continuous development of fungi scenarios that benefit humankind encourages the pursuit of applications of these organisms' in a design context for sustainability and human wellbeing. In recent years, collaborations between scientists, engineers and designers have begun to explore fungi as resource for the development of novel materials and products.

In 2007 Ecovative Design LLC was founded by Eben Bayer and Gavin McIntyre (2012) after graduating from Rensselaer Polytechnic Institute (RPI), New York (NY). This company applies the properties of mycelium to self-assemble lignin and cellulose to transform





agricultural byproducts into composite materials. Ecovative's two products, EcoCradle™ and Greensulate™, are based on this process. These products offer sustainable mushroom alternatives to packaging and insulation materials respectively, which are normally made of synthetic foams or when bio-based, from food crops. The mycelium bonding technology, that the company has developed, suggests various applications from the built environment, through consumer and automotive products, to new generation materials.

The properties of mycelium to break down both organic and inorganic matter also inspired Maurizio Montalti's (2010) Conceptual Design in Context Master's project 'Continuous Bodies: cycles of decomposition triggering a symbiotic partnership between humans and fungi'. With the help of mycologists Maurizio developed a mycelium impregnated non-woven textile and proposed its

use as a mycelium shroud and for decomposing plastic (figure 5).

The shroud would break down the toxins a dead body carries in the ground when buried, and feed the soil to turn the human being into part of nature's eternal cycle. The 'Continuous bodies' project and Maurizio's further work with fungi have been aimed at inspiring a re-evaluation of the general perception of the Fungi Kingdom for 'a symbiotic relationship' between humankind and fungi species (Montalti 2010).

MOULD PERCEPTIONS

Psychologically, mould brings about a behaviour of disease-avoidance. It is related both to humans' evolutionary past and the "fear of contamination" (Rachman 2004). Rachman's (2004) paper states that '...contamination is an intense and persistent feeling of having been polluted or infected or endangered as a result of contact, direct or indirect,

with a person/place/object that is perceived to be soiled, impure, infectious or harmful...'. This perceived state evokes emotions such as disgust and impurity, which cause compulsive cleaning and phobias. The state of disgust, as Rachman (2004) describes it, is usually influenced by visual and olfactory stimuli and is related to the stench from bodily waste and decaying matter.

As previously mentioned by Moss (1987) and in accordance with Rachman's (2004) description of the stimuli of disgust, most people have negative associations with 'mould'. This is why I believe it is important, at these early stages of design research, to understand the psychology of human interaction with fungi, in order to consider fungi applications for materials which explore an intimate relationship with the human body. This is aimed at developing fashion and textiles design scenarios that go

beyond future concepts and materials research, and have market viability. My secondary research has not found any psychological or social survey data that explores human perception of fungi besides mould's connotations with disgust (Cormier 2012; Rachman 2004; Jones 2007; Dunn 2011).

'MOULD PERCEPTION' WORKSHOPS

During the first year of my PhD I created and held a series of 'Mould Perception' workshops, aimed at developing understanding of the psychology of human interaction with fungi (figure 6).

There were two workshops, the first was hosted at Kingston University, London on 17th April 2012 (figure 7).

The second was part of Sofia Design Week's (Bulgaria) programme, 4th June 2012 (figure 8).

The choice of two different locations additionally tested if cultural or demographic factors, e.g. age,

gender, educational/professional background could define the way people perceive fungi.

MOULD-YOUR-TEE WORKSHOP, KINGSTON UNIVERSITY LONDON, MAY-JUNE 2012

A further aspect engaged Kingston's students in the development of a 'Mould-Your-Tee' workshop (Kingston University, London, May-June 2012). This element of the project took an individual's favourite mould image to create a desirable wearable form – the T-shirt, an artifact renowned for its activist and interactive potential (Hamnett 1983). It is the intention that the 'mouldy' tees (figure 9) generate live debate on the subject of mould and human interaction with fungi in the everyday environment.

Captured by the wearer at social events (parties, shopping and the pub) the information from this design tool will be fed back into the project. An online platform has been set-up to host further discussion (Ivanova 2012).

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CONCLUSION

Scientific research informs the benefits of fungi for humankind. Recent collaborations between scientists, engineers and designers have begun to explore fungi applications within design scenarios. The 'Mould Perception' workshops have demonstrated a way we can apply design methods within a social research study into human interaction with fungi, aimed at understanding the psychology of the human-mould relationship. The alteration of the visual image of mould has led to a positive shift in perception of this media, which indicates creative opportunities to further propose fungi for fashion and textiles fabrication processes. The introduction of these organisms into everyday design contexts will enable us to explore the potential of materials and processes based on fungi, pertaining to sustainability and human wellbeing.



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FIGURE CAPTIONS AND CREDITS

Figure 1: Venn diagram of research inquiry.

Figure 2: 'Moulded Mind': mould growth on textiles. Author's archive.

Figure 3: 'Moulded Mind', digitally printed "mouldy" dress.

Figure 4: Summary of the activities of fungi as they relate to humans (Moss 1987) by permission of the British Mycological Society.

Figure 5: 'Continuous Bodies' by permission of Maurizio Montalti (2010).

Figure 6: A rotting apple – testing human interaction with fungi. Image courtesy of Alexandra P Markova.

Figure 7: 'Mould Perception' Workshop, Kingston University, London. Image courtesy of Ezzidin Alwan, Web & Multimedia team Kingston University, London.

Figure 8: 'Mould Perceptions' Workshop, Sofia Design Week (Bulgaria). Image courtesy of Alexandra P Markova.

Figure 9: Students' designs from the 'Mould-Your-Tee' workshop.