18. Becoming-*with*: On Textile Companions and Fungi Friends

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Introduction

We wear material things every day. Garments act as a second skin that dresses the physical matter of our bodies. "The magic of cloth," Peter Stallybrass writes, "is that it receives us: receives our smells, our sweat and shapes even" (36). Woven into the fabric, wrinkles, and seams of our clothes are traces of past experiences (Gibson xiv–xv). We engage in intimate material relationships with clothes, which not only carry traces of our past experiences and become material memories (Munteán, Plate, and Smelik) but also traces of how matter becomes clothing. Planting seeds, growing and harvesting cotton or flax, for example, or spinning yarns, weaving textiles, making patterns, designing clothes, cutting and sewing—material pieces of cloth go through a multiplicity of material encounters in the process of coming into being. Clothing carries the material traces of processes of making, of the hands of the workers in the factories or the material traces of the animals and/or non-human living beings—their fur, leather, silk, etc.—that are still present in the garment.[1]

In industrialized processes of making (fast) fashion, human actions have led to the accelerated growth of (mass) production and consumption, which goes hand-in-hand with the systemic exploitation of human beings, non-human animals, and nature's matter. As we wear fashionable clothes that dress our bodies, communicate our identities, and express our cultures, these affective material companions become intricately interconnected with our sense of self. At the same time, the fashion system exemplifies how we as human beings have been mistreating the earth—exhausting and overexploiting natural resources, destroying ecosystems, and creating unhealthy imbalances in biodiversity.

In *Staying with the Trouble*, Donna Haraway reflects on the damaged planet and offers new ways to rethink our relations to the earth and all of its material inhabitants. She proposes to think in terms of "becoming-with," "making-with,"

1 See Femke de Vries's recent artistic research project "Which Animal is Present in your Garment?" (2022), https://practicingsolidarity.artez.nl/contributors/creative-practices/.

"living-with," and even "dying-with" others, including nonhuman "companion species" (2–5, 60) like dogs or monkeys, but also bacteria, fungi, spiders, synthetic hormones, or polymer fibers (Smelik 39). This concept of becoming refers to a process of change and transformation rather than a static "being," as Anneke Smelik explains (45). Becoming-*with*, then, entails the process of transformation evoked by the "intra-action" of (human and non-human) things (Barad 826). The notion of becoming-with offers a productive theoretical lens for thinking through how we could (and should?) live-*with* our fellow material beings, including our textile and nonhuman companions. In addition, this theoretical notion offers another perspective on some of the latest textile and garment design developments. It helps us see how innovative design practices, including textiles made from, or in collaboration with, living matter and technological materials are the concrete materialization of multispecies processes of becoming-with (Haraway 63)—which could potentially also become more sustainable alternatives to the current mass production of clothes and textiles.

Garments created from organisms such as fungi, algae, and bacteria; or from technologies such as solar cells, shape-memory material, and sensors can be understood as objects resulting from the mutually transformative encounter between human designers and nonhuman matter. Entangled in this encounter, the human and the nonhuman are together designing-, growing-, and making-with a whole new generation of garments. Such design practices also demonstrate how "animated" textiles cultivate the capacity for matter to respond (Buso et al.).

This chapter first focuses on new technological wearable companions that strengthen the embodied experiences of wearers and their intimate, physical, sensorial, and material relationship with garments. Here the case of designer Pauline van Dongen's smart jacket *Issho* demonstrates how technology can activate and animate the matter of fashion for therapeutic, emotional, or mnemonic purposes. Secondly, we discuss the recent development of biofabricating textiles and designing-with living organisms such as mycelium—which potentially opens up a radically new perspective on the agentic qualities of the (living) things we wear. Here the case of designer Aniela Hoitink, who works with liquid cultures of mycelium, is interesting because it invites the rethinking of how to make-with and give new life to fungi. In discussing these two cases, we aim to highlight the value of rethinking and affirming alternative ways of designing-, living-, and becoming-with the material things that we wear—our fellow material inhabitants of the earth.

Wearable Companions and the Caress of a Jacket

In *What Things Do*, Peter-Paul Verbeek states that the relation between subject and object is one of mutual constitution: "[n]ot only are they intertwined, but they

coshape one another" (112). The relations between humans and the things they wear are a powerful example of such a co-shaping. People and clothes are not separate entities but "hybrid agencies" (Ingold 69) "that constitute one another in the process of becoming" (Smelik 39). Innovative textile designs that integrate technologies radically redefine this process of becoming and what garments can do in contact with the human body. Acting like a wearable companion that actively engages with the wearer, the smart denim jacket *Issho* by Pauline van Dongen offers a thought-provoking case.

Fig. 1: Pauline van Dongen, Issho, 2017. Photograph by Sharon Jane D.

The jacket *Issho* (fig. 1) was designed to encourage a more mindful relationship between the wearer, garment, and environment. The conductive yarns woven into striped areas on the fabric's surface contain multiple sensors that register touch, such as an embrace, stroke, or a pat on the shoulder. After a programmed but slightly variable number of registered interactions, *Issho* responds by giving the wearer haptic feedback through four vibration sensors that simulate the sensation of a gentle caress on the wearer's upper back. Behaving like a close friend, the jacket becomes an active mediator in the social dynamic between wearers and their environment, yet at times also reminds wearers of taking a moment for themselves (Toussaint and Van Dongen). During a small user test with the jacket, wearers reported a heightened awareness of their actions and relation to their immediate surroundings. The jacket affected what wearers experienced (the object of experience itself) and stimulated a more attentive attitude toward their bodies and the world around them (Berentzen). This indicates the potential of designing garments for self-care and well-being. Wearers can *become* more aware of their body and environment *with* the help of a textile companion that actively responds to their embodied actions and interactions.

Issho is an example of how technology can activate and animate the matter of fashion on both a mnemonic and an affective level. First, responsive garments such as *Issho* extend the mnemonic power of clothes. In addition to how garments become imbued with the memories and traces of the places and people they encountered, a smart jacket like Issho also actively produces its own memory and history by sensing, storing, and materializing the sensation of touch. In other words, this jacket can be understood as a thing that records and re-enacts its own social life (Appadurai). In addition, *Issho* acts like a wearable companion that subtly yet actively reminds the wearer of their social interactions as well as of the fact that their body is a *clothed* body (Entwistle). The garment's haptic feedback is a material reminder and animation of "touches from the past." In addition to receiving us (the wearer's smells, shapes, and sweat), it "receives" and even records our intimate interactions with human *and* nonhuman others.

Second, *Issho* touches upon the affective relationship between humans and the things they wear by reminding wearers to *care* for themselves and be mindful of their bodies and the environment. In times of visual distraction and information overload, this technological garment fosters a non-human type of care for wearers and their bodies, demonstrating that care is not a human-only matter (Puig de la Bellacasa 2). When understanding people and the things they wear as mutually constitutive, it follows that a garment that actively cares for its wearer also creates a wearer that takes better care of the garment.

In sum, *Issho* exemplifies how "becoming-with the practices and artifacts of technoscience" (Haraway 104) can add a new sense of memory, touch, and care

to the relationship between nonhuman and other-than-human things, including garments and technologies.

Growing-*with* Fungi Friends

In addition to the new technological material intimacies between wearer and garment, more and more designers have started to grow materials from living organisms, such as fungi or algae, as innovative bio-based alternatives for textiles. This approach of "growing design" originates from advances in biotechnology and enables designers to collaborate with biological organisms (Karana et al. 119). Designing with fungi and fungal mycelium is increasingly popular in the fashion field, allowing for another perspective on new materialisms in fashion (Bruggeman 52).

Fungi live, become and grow underground. As fungal biologist Merlin Sheldrake states in *Entangled Life*, "fungi are everywhere … They are inside you and around you. … We all live and breathe fungi" (3–5). Continuously interacting and connecting with plants, trees, and other living beings and organisms—fungi are engaged in complex exchange systems. Exploring the lives of fungi, Sheldrake shows how they can be seen as "odes to other ways of being" —as they can assume dozens of different sexes, transform nonlife into life, and force us to question where one organism stops and another begins (Dunn 722). Mycelium is the vegetative lower part of fungi and consists of a network of interwoven hyphae, which are its long, tubular branching structures. Mycelium has been identified as the largest living organism on earth and grows due to its symbiotic relationship with the materials that feed it (Haneef et al.). Mycelium-based materials can be biofabricated into organic composites. However, pure mycelium materials can also be grown by harvesting a liquid culture of mycelium, which is the "liquid fermentation of fungal micro-organisms" (Karana et al. 121). Once it has dried, mycelium cultivation results in materials resembling leather, paper, or plastic.

Dutch fashion designer Aniela Hoitink experiments with growing mycelium-based materials, which she has called MycoTEX. In this design practice, materials are directly grown from a natural, living organism. This fundamentally changes the process of designing and making clothes and the relationship between the designer/maker and the living matter that is becoming a piece of clothing. Design here is transformed into biofabrication, activating and giving new life to organisms with new materialities. She developed a 3D manufacturing method that allows for seamless, on-demand produced and custom-made clothes grown from compostable mushroom roots – without the need to cut and sew. After using these materials or once these designs are worn out, the biodegradable garments can be buried in the ground to decompose. In this sense, Hoitink mimics the closed loops and wasteless regenerative life cycles that can be found in nature.

Since Hoitink uses 3D molds instead of flat pattern making, the mycelium could directly grow into any desired shape and wearable design to fit the human body. In doing so, this case of "growing design" explores the relationship between the biological matter of living organisms and the bodily matter of the wearer. Allowing the mycelium to act like a second skin on the human body brings human and fungi matter into dialogue—an innovative process of collaborating with the living matter of fungal companions. In starting from the potential of how living organisms grow and become, this design process embraces the "material agency" of the biological matter of fungi while creating new material(ist) intimacies and relations. Indeed, in this case, "matter is not just passive and inert stuff, but should be considered as an active and meaningful actor in the world" (Smelik 42). This requires the designer to open up to working with matter and materiality as "more than 'mere' matter: an excess, force, vitality, relationality, or difference that renders matter active, self-creative, productive, unpredictable" (Coole and Frost 9; see also Smelik 47). Even though the designer remains one of the main actants in the case of MycoTEX, creating the conditions for growing the mycelium, this design practice does express another way of designing-*with* biological matter. This opens up a path to reconsidering how people engage with the material things of this world and the "apparent capacity of things to act back" (Ingold 69)—a process of collaborating with living matter in the "nature-culture continuum" (Braidotti 31).

These new interspecies interactions in fashion and design practices help to think through the material capacities of the things and living matter that we wear and continuously become-*with*, which increases our understanding of how we live- and die-with non-human beings and other companion species.

A Matter of Care

In our times of exploitation and exhaustion of nature, it is a matter of care to stay with the trouble in order to learn to embody the daily practice of making kin with the more-than-human world, respecting planetary boundaries as well as all of earth's material inhabitants (Haraway 2–5). The destructive practices of the fashion industry have helped fashion theorists and practitioners to realize that it is ever more urgent to rethink the relationships between wearer and garment and between human and non-human matter in terms of the active matter that we are all living- and dying-with. From human beings, this requires an attitude of humbling, an awareness of the different temporalities of other human or non-human materialities, a politics of care for ourselves and others; an interspecies approach, creating space for all living beings, living matter, and other species to enact their agency—allowing all material inhabitants of the earth to grow, become, transform, and create new connections and relationships while nourishing each other. This also means approaching

fashion differently, starting from an affirmative ethics in order to move beyond its industry's destructive forces while opening up fashion's potential to connect, make, and become-*with* new materialities—embracing the possibilities of life. Let's try to see garments as companions to become (friends) with, to touch and be touched by, to make memories with, allowing us to grow and thrive with—in a way that those people that matter most in our lives do.

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