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Thinking with costume and material: a critical approach to (new) costume ecologies

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ABSTRACT

This article intends to shift current discourse on material thinking and agency from thinking *of* and *through* materials to thinking *with* materials; we therefore argue that re-locating the affects and agency of costume materiality in the changing material environment at this current moment is essential. Responding to the global environmental crisis and based on the emergent philosophical concepts of *extramaterialism* and *costume thinking*, examined through the prism of ecosomatics, we propose a critical approach to think and (co)create in contemporary costume praxis informed by ecological sensibility. Through acknowledging that the material, the natural and the cultural are not separate but co-constitutive, our aim is to provoke new insights into more-than-human material agency. This is explored by addressing the relationship between living and non-living things and the systems created through the inter- and intra-actions between these elements via the medium of costume. By analysing the use of biobased materials as costume matter in two case study productions, the article positions costume design as a critical tool for new performance narratives and cultural landscapes to be considered and created. It pushes the boundaries of wider philosophical understandings and innovations in costume with the potential to influence broader, environmentally aware cultural and societal contexts.

Introduction: proposing an ecologically informed costume practice

While the philosophy of material agency and the performing arts have a long history of productive connection, little is formally known about how the materiality of performance responds to external socio-cultural developments in relation to topical issues of environmental sustainability for human life and the world around us. Our approach seeks to expand the understanding of the material agency of costume in performative contexts, with the aim to deliver in turn philosophical insight beyond the remit of performance.

In order to mitigate the climate crisis, it is increasingly expected that designers consider the impact of their work on our social, environmental and cultural life (Gwilt 2015; Niinimäki 2018) by considering the well-being of our environment and its inhabitants at all stages of a lifecycle (Hes and du Plessis 2015; Lohmann 2020). Contemporary discourse

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on materiality (Ingold 2013; Malafouris 2013; Grosz 2017) suggests that the material processes not only have a profound impact in shaping human thought and understanding, but are also intrinsic to human consciousness. Through acknowledging that the material, the natural and the cultural are not separate but co-constitutive, our aim is to provoke new insights into the interrelationships between human thought and material agency in the context of performance design – our field of practice and research. We aim to do so by addressing the associations between living and non-living things and the systems created through the interactions and intra-actions between these elements through the medium of costume.

Due to its integral connection to the performing body, costume design is by definition highly delineated by ‘human-centredness’. Costume is ‘an area of dynamic social significance’ (Pantouvaki and McNeil 2021, 1) that reveals ‘the relationship between dress, body and human existence’, articulating ‘an infinitely complex human nature through material and form’ (Barbieri 2017, xxii). Costume is never free of meaning; it is sensitized towards meaning creation in relation to the human body – even in abstract representations of it, or even more when the body is not physically present but implied.¹ The material aspects of costume have traditionally been researched from a historical or cultural perspective or by considering costume as a material object that performs a signifier function in a system of human representation (Lynch 2016; Trencheva 2018; Järvinen 2020) operating through the actor’s body (Monks 2010). Because of this, other functions related to costume materiality, such as the possibilities to distribute creative ownership, to express interchange and intra-action between somatic reactions and ideas, and to investigate how costume praxis can be more responsible, some of which this article intends to address, have been largely overlooked. The centrality of the human body to costume design has contributed to an increase in ‘human-centredness’,² which has led to prioritizing the human body both through the materials used and in the processes of costume creation.³ This lack of consideration has caused ‘many unintended consequences impacting negatively on the ecosystems and non-human beings that sustain us’, as observed by one of the representatives of critical and sustainable design, Julia Lohmann (2021). According to scenographer Tanja Beer (2016, 163), ‘acknowledging that materiality and environments are mutually dependent in making beings, things and places, and recognising humans as part of nature’s system, rather than a separate entity’ is essential in orienting design for performance towards ‘ecomaterialism’ – the concrete application of theories of materialism expressing ecological concerns.⁴ In this article, we start from the idea that ‘[w]e cannot make the future [...] without also thinking it’ (Ingold 2013, 6). We thus claim that employing a more-than-human-centric approach to costume design that also takes into account ‘more-than-human needs’ will ‘help us reduce our human-centred blind-spot’ (Lohmann 2021).

Responding to the global environmental crisis, we propose a critical approach to think and (co)-create in contemporary costume praxis informed by ecological sensibility. Our approach employs *ecosomatics* (Enghauser 2007; Fraleigh and Bingham 2018), an ecological model that connects bodily ways of knowing (somatics) with ecological consciousness to reframe our thinking about somatic approaches to performance-making. With the intent to shift current discourse on material thinking and agency in the field of costume design from thinking *of* and *through* materials to thinking *with* materials, we argue that re-locating the affects, agency and essence of costume materiality in the changing material environment at this current moment is essential. Such an approach evokes

conceptualizing and materializing new, ecologically aware attitudes/strategies for costume creation and thus reconsidering the context of performance-making more broadly. The field of costume design can benefit from an ecosomatic approach to contribute to such a conceptual, ethical and creative relocation. By employing ecosomatics, we explore the possibilities offered by different interactions between living and non-living things in the context of costume design. To do so in concrete terms, we analyse two productions from the field of contemporary dance in relation to Elizabeth Grosz's (2017) articulation of *extramaterialism* that examines how socio-cultural meaning is constructed through the interdependence of ideality and materiality. Our analysis focuses on the use of selected biobased materials in these productions as a medium for subjective creative expression through contemporary costume design. Sofia Pantouvaki's (2015, 2020) *costume thinking* theoretical framing serves in a complementary way to debate the representation of the human body beyond costume as an artefact, by proposing costume designing as a conceptual process and as such a means to think critically. The two case studies serve to discuss how thinking *with* costume and material can become a critical tool for meaning-making, representation and expression in performance, and ultimately for the creation of alternative, ecologically informed collaborative performance processes. The engagement with biobased materials, analysed in this article, has the potential to become a new paradigm that directs *costume thinking* (Pantouvaki 2020) towards more sustainable and environmentally responsible material engagements. Our objectives are threefold: (1) to introduce a critical interrogation of costume materiality and its diverse ecological, cultural and philosophical dimensions; (2) to generate novel practical and conceptual material approaches to costume creation; and (3) to propose new methodological approaches to reflective and practice-led costume research that will continue to generate impact beyond the scope and timescale of this article.

A 'material turn': material thinking and ecomaterialism in costume design

While performance scholarship has acknowledged material knowledge as a fundamental part of a costume designer's practice (Barbieri and Crawley 2019), material agency remains a largely under-researched area in costume theory. Currently, there is an emergent interest in the role and significance of costume materiality and costume's material agency in contemporary costume research (Suurla 2017; Barbieri and Crawley 2019; Pantouvaki 2019; Fossheim 2019), as our work also attests. Costume provides 'a way to *think through*, as well as to *act* or *do*, and even to *be* as a researcher' (Barbieri and Pantouvaki 2020, 5). This multi-level agency of costume – a theoretical and practical system – offers diverse options to elaborate on new conceptions of power, knowledge and representation. The role of artist-researchers engaging with material explorations is central 'as a method for new costume design and for the making of new performance' in order to investigate 'the agency of materials as conceptual and expressive tools for costume creation' (Pantouvaki 2019, 150).

In recent years,

coinciding with the 'material', 'embodied' and other cultural 'turns' that have highlighted new ways of thinking through culture, costume has been re-connected in new and exciting ways to theories of the body and embodiment, wider design practices including process studies,

co-design and other forms of collaboration, renewed practical and theoretical studies of artistic creation [...]. (Pantouvaki and McNeil 2021, 4)

Costume research has turned to question how the human relationship with the world is formed and draws insight from diverse disciplines of art, performance, fashion, philosophy, anthropology, sociology and cognitive science, among others.⁵ Through its dimensions of negotiating identity, circumstances and environments, the performance of costume materiality 'can become the means for a theoretical discourse on the deep connections between body, costume and material' (Pantouvaki 2019, 150–151), as well as their interrelations with the world. In so doing, costume has the capacity to debate and navigate the world's becomings, thereby also instigating 'new performance narratives that are generated through costume' (ibid.).

Over the last decade, costume research has been preoccupied with the agential and enactive powers of costume rather than its signifier function as a semiotic device. Artistic research exploring costume materiality in recent years has focused on experimentation with 'non-conventional' costume materials such as ice in Leo Fressato's *The Girl and the Autumn*, 2007; smoke in Daphne Karsten's *Ping*, 2014; or porcelain in Dawn Summerlin's *Perceptive Fragility*, 2015 (Summerlin 2019) as wearable material that shapes physical and emotional responses. Other approaches concentrate on bodily interaction with materiality in relation to body position and movement, as well as in relation to other bodies, focusing on somatic perception: notably, Sally Dean's 'somatic costumes' (2011–present); and independent projects such as Madaleine Trigg's collaboration with Francisca Rios and Cristina Valls in *Sutre*, 2009; and Charlotte Østergaard's and Jeppe Worning's *Mask*, 2016 (Østergaard 2018). Such explorative projects investigate how costume and material co-create performance with the body and prove that costume practice offers a laboratory for experimentation (Barbieri 2012). These approaches have shifted the focus towards the agential actions of costume generated through materially discursive iterative processes (Barbieri and Crawley 2019).

Costume practice driven by an interest in sustainability currently centres on established processes of recycling, upcycling, and a growing use of natural and biodegradable materials. The global stage has increasingly adopted more conscious decisions in the use of eco-friendly costume materials for small- or large-scale productions,⁶ a movement increasingly employed also in costume design education.⁷ Costume-based artistic research is ever more concerned with employing bio-compatible materials and exploring the interrelationships between costume and nature, as indicated at the 'Critical Costume 2015' exhibition (Pantouvaki 2015). Experimental costumes such as Liisa Pesonen's edible *Organorgan* (2013) (Figure 1) and *Grow* (2015) from Aalto University challenge the boundaries between nature and culture, inviting a new materialist analysis. A nascent, yet rapidly evolving research landscape for the field of costume that interests us in this article is bio-based material development used as costume material. Mexican costume designer Jerildy Bosch has approached speculative materials such as growing bacteria; inspired by Suzanne Lee's biofabrication recipes, Bosch produced microbial cellulose – a material that has similar properties to leather – through a fermentation process and used it for costumes in the Mexican National Dance Company's *The Rite of Spring* (2018).⁸ Finland-based Ingvill Fossheim has worked with choreographer Jenni-Elina von Bagh on a series of contemporary dance productions for which she developed biobased colourants and



Figure 1. *Organorgan* (2013), Theatre Academy Helsinki. Costume design: Liisa Pesonen. © Photo: Aku Häyrynen.

microbial cellulose as costume material. The productions are *Posthuman* (2016); *a life – nomadic melodrama* (2017); *Posthuman days* (2018); and *A Prologue* (2020), two of which are further analysed as case studies in this article. These global design precedents indicate great potential in furthering the environmental agenda of the field.

Bringing our attention to material ecologies in the context of costume is important to move towards a change in how we join with the material non-human world. 'Thinking *with*' materials, understood as together with, alongside and through materials, entails a process where thinking follows the flows of materials and related sensory awareness (Ingold 2013, 98), as well as associative connotations that materials carry in and of themselves. There, meaning emerges not as 'a product of representation', but as 'a product of a process of conceptual integration between material and conceptual domains' (Malafouris 2013, 18). Drawing from this, we suggest that it is imperative that we connect the thinking with the making in costume to move towards new costume ecologies and acknowledge that *costume thinking* entails thinking *with* materials. For such an approach, costume is not merely a passive artefact, or a project created from idea to material, but an act of correspondence (Ingold 2013), 'something active with which you engage and interact' (Malafouris 2013, 149), an enactment between makers and materials.⁹

Central to the material turn towards new materialism is the argument ‘that phenomena reveal themselves from their relations’ (Dolphijn and van der Tuin 2012, 89). Current scholarship focuses less on what costume *is* and largely on what costume *does*: its effects and agency in relation to its performative and contextual impact.¹⁰ Costume has been defined as ‘charged’ performance-making material (Barbieri 2017) and ‘critical praxis’ (Pantouvaki 2020). However, while costume designers are increasingly aware of the agential significance of costume ‘matter’ in performance-making, recent questioning of such agency by performance scholars demands further articulation of its intricacies through practice (Barbieri 2020). Following new materialist theory, fundamentally monist in its insistence on the interrelating nature of all matter and life, works of art surface through co-existence and co-emergence (Barret, Bolt and Kontturi 2017, 2). Costume operates integrally with material and the body and engages the body in co-production of meaning; thus, it can be understood as ‘itself “doing”, a co-creative force and process in performance making, not just a representation’ (Barbieri and Crawley 2019, 146). Material alone does not have agency; rather, the agency of costume matter occurs through enactment between its human and non-human actants, through their shared ‘response-ability, [...] the possibilities of mutual response’ (Barad in Dolphijn and van der Tuin 2012, 55).¹¹ Therefore, costume’s material agency itself is relational, not sequential or independent. This approach relies on new materialist theories as it evokes intra-actions, interdependency, and challenges power imbalances. We therefore propose that thinking *with* costume and material, taking the material into consideration as co-actant and collaborator for the creation of meaning, leads to a costume practice where the thinking, the material (world) and the body (soma) are co-constitutive, intertwining ‘between intentionality and affordance’ (Malafouris 2013, 149).

The approach that we propose illuminates how material performativity ‘precedes, informs and performs processes of embodiment’ (Barbieri 2020). As we further analyse in the following section, our approach employs the hypothesis that the materiality of costume physically and theoretically responds to external social factors and environmental agendas, turning costume into an active and effective agent of change. We suggest that the costume designer’s critical enquiry into materials has agency that enacts the emergence of new critical practice in the form of new modes of artistic expression, new narratives, new representations, and new meaning-making processes that engage ecological patterns in the context of performance and beyond.

Thinking with costume and material: towards a critical approach to costume materiality

How does an ecological approach evoke new processes and materials for costume design? Has the material turn affected critical thinking? How does ecological awareness – and the ethical considerations it entails – impact our methods and understanding of costume materiality? Here, we turn to questions around ethics in relation to costume by employing a critical approach that aims to ‘empower both the material agency of costume and the artistic praxis of performance design more broadly’ (Barbieri and Pantouvaki 2020, 5). To respond to such enquiry, we propose an ecosomatic approach as a useful lens through which to examine ethical perspectives that emerge from ecologically sensible new materialist analyses of costume practice.¹² Although ecosomatics operates

through somatic practices, it is distinct from other frames of embodied understanding (such as kinaesthetic perception and somaesthetics) because it focuses on ecological principles and aims at 'mindful, collaborative participation in the relationships of human and nonhuman living beings' (Fraleigh and Bingham 2018, 10). In the performing arts, ecosomatics has been adopted by dance practitioners and scholars as 'a practice which encourages an equal alertness to both the inner reality of the participant and to their external environment' (Reeve 2006/2012, 6).¹³ Finnish ecosomatics pedagogue and practitioner Satu Palokangas (2021) notes that 'the shared aspects of ecology and somatics are awareness of relationships, patterns and change'; this conscious awareness that is based on focused observation, deep communication, and attention to the interrelationships between bodily sensations (soma) and the ecologies the body lives in (the environment, the natural world at large) is useful, we claim, and can be mindfully employed by costume designers to perceive things and design bodies anew. By adopting an ecosomatic approach, costume practitioners have a possibility to take an alternative direction, one that is informed by a wide ecological framework and offers a path towards a more ethical costume praxis. Such an approach brings the human relationship with the world into the equation: it allows departing from the sentient human body (the soma) – which constitutes the main site of costume practice and research – to develop a relational understanding of how the body is constantly intertwined with the environment as one whole system.

Existing in a double register of material and bodily actions (Pantouvaki and McNeil 2021), costume design is a practice whose materiality is marked by cultural connotations related to human life. We explore how these meanings come alive when we design costume with the intention to extend our perspective 'from human life to all life' (Palokangas 2021), thus employing ecosomatics as a more holistic lens for costume analysis. Our approach is framed theoretically by two critical key concepts: *costume thinking* (Pantouvaki 2015, 2020) and *extramaterialism* (Grosz 2017). We argue for the equity of the material and the conceptual: neither is subordinate to the other. By combining these theoretical concepts through an ecosomatic approach, we co-examine processes of embodiment and corporeality, intercultural meaning-making, material agency and ideation.

Costume thinking, conceptualized by scenographer and scholar Sofia Pantouvaki (2015, 2020),¹⁴ is a theoretical strategy for critical thinking through costume. At the core of *costume thinking* lies the realization that costume design practice extends beyond the context of performance into the sphere of critical thought, which entails questioning, analysis, experimentation, negotiation and communication. *Costume thinking* offers a frame not simply to study and analyse costume, but to think *with* costume and *through* costume, thus proposing costume as a lens for developing a critical theory deriving from its practice. Through *costume thinking*, the expression of ideas and behaviours moves costume into a position where it provokes, shapes and proposes to rethink humanity, its representation, expression and ontology. *Costume thinking* is therefore proposed as a strategy not only to design for the human body, but to critically understand human presence beyond an artefact-centred approach in the context of social, philosophical, political and ethical environments and ecosystems. As recent research and costume design practices and their applications (some of which we introduced in the previous section) evidence, there is a need for terminology that could take costume beyond *design* and *object*, into critical thought.

Extramaterialism, or the Incorporeal, introduced by philosopher and feminist theorist Elisabeth Grosz (2017), supports the shaping and definition of the inseparable bond between ideality and materiality and how the very possibility of a collective socio-cultural life arises through their interdependence. According to Grosz, Incorporeal or the Extramaterial is the ideal in material which ‘frames, directs, and makes meaning from materiality’ (2017, 12). Central to the ontology of *extramaterialism* is that, where ‘materialism addresses the material reality of things, objects, relations, events; idealism addresses the conceptual, signficatory, representational directionality, sense, or form by which matter materializes itself into things from its primary resources’ (2017, 249). Thus, materialism and idealism are cooperative; they are ‘not two substances but two ways in which the real is distributed’ (2017, 251). Exploring costume materiality through the ontology that Grosz proposes opens new perspectives for the practice itself and for exploring the philosophical connotations that emerge from *extramateriality* in the practice of costume. Deploying *costume thinking*, we interrogate this proposition and explore alternative approaches that expose and expand the agency of costume materiality.

How, then, can thinking *with* costume and material provide a critical approach? As costume exists between the body and the world, our understanding of it is sensitized in relation to associations. The ‘intimate entwinement of the orders of materiality and ideality’, in Grosz’s words (2017, 5), takes shape, structure and form in costume’s symbiosis with the performing body and their interdependence within the wider environment. Costume reveals the ideal within the material, becoming a lens through which to question established ideas and inviting those related to it (costume practitioners, scholars, performance makers and audiences) to think in open ways taking a critical stance (Pantouvaki 2020). The thinking that happens through the medium of costume and its materiality constitutes a type of *costume thinking* that allows the development of ‘an ontoethics, a way of thinking about not just how the world is but how it could be, how it is open to change, and, above all, the becomings it may undergo’ (Grosz 2017, 1).

Combining costume research with such critical debates around ethics through the lens of ecosomatics, taking into consideration the ‘one world in which we live and that we share with all forms of life’ (Grosz 2017, 2), enables ‘an analysis of how the capturing of meaning in specific manifestations and performances can also draw attention to ambiguities, reductive framings, appropriations, exploitation, under-investigated contexts and exclusion zones’ (Barbieri and Pantouvaki 2020, 3). The intra- and interrelationships that formulate dynamics between things are central in the theories of new materialism as well as in ecosomatics; costume is able to develop from such dynamics to propose a form of incorporeality that ‘subtends matter, that makes materiality locatable, changeable, meaningful, and capable of being spoken about’ (Grosz 2017, 251). This ability reveals the potential of costume materiality to provide new visions for a conceptual ecology through direct experience.

An ecological model for costume practice: biobased materials as costume matter

By analysing practical provocations emerging from an engagement with material agency and its multi-dimensional experience enacted in relation to these theories, specifically focusing on biobased materials in the frame of ecosomatics, we aim to propose

alternative and ecologically sensitized methods for costume design development for informed decision-making that benefits from critical costume praxis for a sustainable world.

This section examines costume (process and outcome) in two contemporary dance works designed by Ingvill Fossheim, *a life – nomadic melodrama* (2017) and *Posthuman days* (2018), as case studies for the purposes of analysing our ideas in the context of this article. The two productions were intrigued and initiated by the possibility to incorporate systems thinking and biobased materials – other-than-human living systems – into the costume creation process, offering an opportunity to explore what such an approach might bring to the process of performance-making.¹⁵ These examples aim to demonstrate how the proposed alternative take on costume design may suggest an empowerment of both the artistic praxis of the costume designer and of material agency in the context of contemporary dance. The costume design of *a life – nomadic melodrama* was focused on specific berries and selected microalgae as colourants for dyeing existing fabrics for costume. The subsequent *Posthuman days* further explored the intra-active potential of biobased material engagement through the cultivation of microbial cellulose, a material explored through an open-ended process of material development, which was anticipated and thus extended beyond the rehearsal period. The decision to incorporate these materials into the costume design was a tentative response to the new materialist discourse grounding the collective process, also rooted in the designer's personal values and interest to orient their design praxis towards a more responsible, resilient and regenerative material approach.¹⁶

What are the benefits and challenges of biobased materials as costume material? In what ways can these material choices be understood and have an impact on a practical, technical level, as well as a notional level in artistic practice? In what ways can such a biobased material approach through costume design be meaningful and what values does it afford to costume beyond the scope of the live performance event and representation? How do biobased materials operate with the performer's body from an ecosomatics viewpoint? These questions provoke the critical orientation of costume as 'an orientation to the future' where the 'pull of our material practices and production is precisely to the incorporeal world of sense and values' (Grosz 2017, 261). By broadening the concept of costume design as critical practice (Pantouvaki 2020) that directs the embodied self 'towards a communal and social practice [...] formed in relation to the environment, nature, place and rhythms' (Palokangas 2020), the work presented here employs an eco-sensitive biobased material approach in order to critically illuminate human interdependence with all life on Earth.

The performance-making processes of the two productions were informed by ecosomatic practice, here understood as the bringing together of improvisation, ecology and systems thinking by extending the perspective of performance-making 'from human movement to all that moves, breathes, lives' (Palokangas 2021). Within the two respective interdisciplinary working groups, ecosomatic exercises were elaborated as tools to sensitize the human bodies 'as cellular bodies [...] connected with their environment' (Palokangas 2021) and to establish a shared perspective for collaboration. There was a dynamic connection between the work processes of the groups and the processes of costume creation for both these works.

Case study 1: a life – nomadic melodrama (2017)

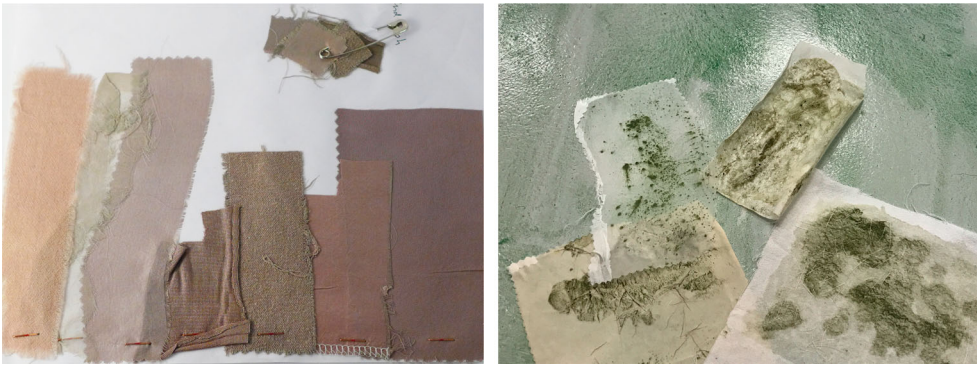
a life – nomadic melodrama introduced biobased colourants¹⁷ and experimental dyeing with a procedural approach. These colourants were explored as a medium *onto* and *with* other material, such as textiles and on human skin, and as elements of surface manipulation through pigmentation and texturing. The costume designer explored methods to increase the sharing of material engagement within the creative team, by inviting confrontation between the human and non-human bodies – the performers' bodies and the costumes-in-progress. This encountering at all phases of the process enabled expressions of interchange and intra-action between somatic reactions and ideas, through which the costume as conceptual and as relational material component could 'grow more complex, more multifaceted' (Grosz 2017, 253).

A formative theoretical source for *a life – nomadic melodrama* was new materialist/political theorist Jane Bennett's publication *Vibrant Matter* (2010). Bennett's articulations on *assemblages* (2010, 20–38) provided a frame to explore human/non-human materials as agentive forces and compositional 'ad hoc groupings of diverse elements, of vibrant material of all sorts' (23) throughout the performance-making process. The concept of *vibrant matter* resonates with Henri Bergson's concept of *Élan vital*, an essential 'vital force' elaborated further by philosopher Gilles Deleuze (1997) in his essay 'A Life' to which the title of the performance referred.

As an action towards a more eco-sensible protocol for dyeing and pigmentation of the costumes, the amount of chemical substances applied in the dyeing process was kept to a minimum. Rather than employing conventional mordants, time was explored as a method to bind the dye on the fabric (Figures 2a–2b);¹⁸ this enabled study of the ways in which these experimental colourants afforded colour expression with the costume. Such an explorative approach demanded careful observation and *being-with* the colourants, not only from the costume designer's viewpoint, but within the transdisciplinary working group, who followed the process. The open-endedness of these explorations further afforded dynamic distribution of creative ownership and contributions in-between the professional disciplines of the group members. For example, the microalgae colourants 'migrated' from costume to the stage environment as pigments painted onto the entire stage floor surface by initiative of the set designer (Figure 3a). As the costumed performers worked *on* and *with* the microalgae painted floor surface, algae and sweat rubbed off the floor in interactions with the performers' bodies, subtly changing the patterning and appearance of the microalgae surface, footprints emerging and dissolving again (Figure 3b).

Case study 2: Posthuman days (2018)

In *Posthuman days*, the material enquiry evolved from surface manipulation to biofabrication of the costume material itself. To elicit the performance-making process, the working group asked: 'What does it mean to let go of anthropocentrism?' This question triggered an enquiry into the 'co-resonance between philosophy and stage' (von Bagh 2019) through material engagement in Ingold's sense as 'a process of growth, where the maker joins "forces" with a world of active materials' (Suurla 2018, 386). This resulted in an exploitative making process which required a direct, hands-on relation of



Figures 2a and 2b. (Left) samples of colour results of 14 days' immersion in acai-berry dyebath; (right) samples in rehearsals: chlorella and spirulina as colourants on silk fabrics and reindeer hair, against spirulina-painted stage floor. *a life - nomadic melodrama* (2017), Kallio Stage Helsinki. Costume design: Ingvill Fossheim. © Photos: Ingvill Fossheim.



Figures 3a and 3b. (Left) performance documentation photograph; (right) post-performance documentation: the berry-dyed costume is stained and marked by the wearing body and interactions with the microalgae on the floor surface. *a life - nomadic melodrama* (2017), Kallio Stage Helsinki. Costume design: Ingvill Fossheim. © Photos: (a) Sanni Siira, (b) Ingvill Fossheim.



Figures 4a and 4b. Microbial cellulose and the costume designer's hand: (left) work-in-progress, creation of a membrane; (right) a thicker sheet of wet microbial cellulose, testing of weight and movement on the human body. *Posthuman days* (2018), Zodiak Stage Helsinki. Costume design: Ingvill Fossheim. © Photos: Ingvill Fossheim.

correspondence with a non-human living system exploring how this might contribute to the emergence of form and material expressivity as costume on stage.

Sensory encounters with samples of uncannily skin-like, soft and supple semi-dry microbial cellulose inspired a curiosity towards this material as costume matter with a potentially strong and diverse somatic input through its capacity to react and transform with the temperature and moisture of the human skin (Figures 4a–4b). The material's expressive qualities would shift and change, through levels of wetness/dryness, texture, weight, movement, temperature and smell. The direct engagement with microbial cellulose as costume brought these lifeforms into intra-action with the human embodied self, at all stages of costume development and expression. The microbial cellulose, with its inherent material capacity to affect/transform *onto* and *with* the performing bodies, was given space to inform the work in rehearsal (Figure 5a). In this way, the biobased material was embedded into the shared performance-making process resulting in distribution of the creative ownership of the microbial cellulose between the collaborating artists (Figure 5b).

Biobased materials as costume matter

Growing the costume matter with living organisms through naturally occurring processes¹⁹ and without the use of harmful chemicals offered a more sustainable and environment-friendly alternative, a counteraction to the widespread use of textiles that are derived from the industrial processing of plants, animals or oil. Choosing to engage in a corresponsive manner, with another living system as producer/generator of the costume material, aligned the materiality of the performance with an ecosomatic framework. Fossheim elaborates on this relation in her notes on *Posthuman days*: 'I fed and cared for symbiotic colonies of bacteria and yeast and in return these living microorganisms produced cellulose material that I harvested and explored as costume material' (Fossheim 2019, 66).

These material encounters, with the ability to subtly transform the appearance of the costumed bodies of the performers as well as the performance environment, became part of the performance aesthetic where the richly creative process of making corresponded with 'the conduct of thought' that 'goes along with, and



Figures 5a and 5b. (Top) rehearsal documentation photograph; material trials with microbial cellulose on 1:1 scale; (bottom) performance documentation photograph. *Posthuman days* (2018), Zodiak Stage Helsinki. Costume design: Ingvill Fossheim. © Photos: Ingvill Fossheim.

continually answers to, the fluxes and flows of the materials with which we work' (Ingold 2013, 6). As such, affective and performative material agency could be observed: the biobased colourants and the microbial cellulose material were afforded space and time as expressive agents 'being' and 'doing' together with the other bodies through their intra-activity (Barad 2007). The microalgae colourants and the microbial cellulose were, in a way, co-performing on the stage, *working with*, and *alongside*, the performers.

Working with the material through rehearsals facilitated observations on the inter-actions and intra-actions between the biobased materials as costume matter offering shape, form and expressive quality. The associative connotations that emerged through this process further complexified the material agency of the work by adding a layer of dynamic relations between the ideal and the material. This can be understood through Grosz as a manifestation of the 'ideal's capacity' to enable the material to be auto affective, 'in touch with itself' (2017, 251), which in turn leads to material transformation. This relational dynamic illuminates the material's capacity for meaning-making as a 'temporally emergent property of material engagement, the ongoing blending between the mental and the physical' (Malafouris 2013, 117–118).

A pre-rehearsal study with the respective biobased materials was applied by the costume designer, Ingvill Fossheim, to understand how these materials are developed (cultivation/post-cultivation processing) and how they come into agentive relations *with* and *through* costume. New materialism argues that 'we know nothing of the (social) body until we know what it can do' (Dolphijn and van der Tuin 2012, 113). As such, the embodied self of the costume designer also functioned as a key tool for sensitizing and anticipating formations of costume performativity, narrative and meanings. The entire process was informed and affected by subjectively perceived experiences – through sight, tacit handling and making, and olfactory engagements with the different scents released by the biobased colourants and the microbial cellulose during production and maintenance – wherefrom sensorial perception emerged as increasingly relevant. This material engagement affected costume's agency as 'transformational practice' (Enghauser 2007).

Engaging with biobased materials: critical considerations

What type of questions do biobased materials evoke? This membrane of non-human microbial cellulose tissue can act as a catalyst for ecosomatic awareness when brought into direct contact with the human skin. As introduced earlier, the ecosomatic practice sensitized the working group's perception towards a cellular level of the human body, focusing on membranes and the skin as inter(sur)face between the embodied self and the environment. The microbial cellulose is also a membrane; as such, the somatic exchange between the microbial cellulose tissue and the human skin brought about a double intensification of ecosomatic awareness. The membrane is a porous surface that acts as an interface between agentive bodies. The central function of membranes, whether in the form of human cells, skin or microbial cellulose tissue, is to protect the organism(s) that produced it. This brings to the fore critical considerations on the material agency of biobased materials (colourants or tissue, in the two productions) when they

become costume: what potentially harmful/toxic substances interact with the human body through the costume? Can costume become a protective membrane? Is the human body causing harm to the (living) costume material? Is costume, through its materiality, able to regenerate and nurture not only the human actant but also the non-human living co-actants?

A biobased material approach to costume facilitates a direct engagement with non-human living organisms and life-processes. Thus, it elicits the direct critical consideration of ethics involved in costume creation. The biobased material approach analysed here has a potential to direct *costume thinking* (Pantouvaki 2020) towards a new paradigm of more sustainable and environmentally responsible material engagements with 'human and non-human relationally evolving systems' (Barad 2003, 802). A responsible costume praxis thus demands 'listening for the response of the other and an obligation to be responsive to the other' (ibid.), an alert attunement towards the ideal and material dynamics (Grosz 2017) that influence and shape our decision-making.

The critical orientation of *costume thinking* (Pantouvaki 2020) impacted the artistic team on both productions. The exploration of collectively 'prising an opening and following where it leads' (Ingold 2013, 7) supported the emergence of a dynamic, intra-active relationship between the human and non-human bodies/actants as well as between them and the theory informing the work. This shared dedication to 'try things out and see what happens' (ibid.) can be positioned as a 'reflective yet intuitive immersion in the world that generates both understanding (or knowledge) and action at the same time' (Grosz 2017, 255). The shared grounding through ecosomatic practice eased the distribution of ownership and exchange within the team, aligning the critical inquiry 'in relation to [the collaborators'] own field of practice' (Fossheim 2019, 37). Through this dynamic, *costume thinking* and material orientation simultaneously affected and were affected by the collective material engagement during the performance-making process.

By engaging with living microorganisms and acknowledging these as collaborative relations throughout the process of performance-making, the praxis of costume became a catalyst for exploring the in-between dynamics of human/non-human agentive bodies and activating ecologically sensitized spaces of thought. Working simultaneously on material and immaterial levels – as a sensory, corporeal practice and as an ideal, conceptual orientation (Grosz 2017) – this exploration of matter offered pathways for observing what a costume 'does' as an agent of performance-making and as a reflection on contemporary collective socio-cultural life.

The success of such work materials and processes relies on material qualities and intra-agencies that unfold and perform through time. A deeper learning of the material and learning from the material constitutes a crucial part of such an approach. Implicated by this, it is necessary to reconsider 'conventional' performance-making structures, and specifically address the criticality of the costume designer's access to allocated resources – time, funding, and suitable infrastructure for the material research. A deep and rich comprehension of ideality and materiality emerged *with* and *through* costume thinking when the production frame facilitated 'experimentation and usage, through intuition and attunement, if not through a complete understanding' (Grosz 2017, 259). By employing *extra-materialism* and *costume thinking* as critical theories that support costume praxis in transdisciplinary performance-making, these two case studies demonstrate how a methodology for developing a costume praxis informed by ecosomatics enables 'creating

values that enhance oneself and one's milieu, not through pre-existing values but through acting, making, and doing that generate new values' (Grosz 2017, 255), thus leading towards a new critical costume ecology.

Discussion: a critical approach to (new) costume ecologies?

Costume's unique ability to act out and rethink matters related to human life with its material and bodily dimensions supports the promotion of ethical and inclusive representations within performance and in society at large. By approaching material phenomena and processes through the lens of costume as critical thinking, the insights gained enable practitioners and researchers to collectively explore alternative perspectives for an understanding of human and non-human life. We contribute to the timely debate on the nature of the relationship between material and culture and the need for sustainable ecosystems of performance-making. Our work positions costume as a powerful form of art in its own right with communicative agency that is relevant to a wide audience; it also lays the ground for novel and dynamic collaboration across diverse disciplines and fields of research.

Formalizing a critical and ecologically sensitized understanding of costume materiality has the potential to provide research-informed, sustainable and innovative creative responses to the contemporary world, which requires that 'the arts take its responsibility towards a better world' (Fossheim 2019, 9) to address 'the question of how to act in the present and, primarily, how to bring about a future different from the present' (Grosz 2017, 1). The most important task for costume designers today is perhaps to learn to think in a new way. This entails decision-making respectful of the carrying capacity of nature and responsible treatment of resources. Costume holds the potential to change how artist-researchers relate with materials conceptually and practically. The socio-cultural troubleshooting capacity of costume is then able to challenge unsustainable material traditions in established costume practice, as well as human-centric attitudes towards material engagement.

By developing the strategy of *costume thinking* as a methodology for future artistic research and practice, we propose that artistic interventions can communicate environmentally conscious ideas through the practice of costume. Our approach encourages biodiversity and contributes to building a resource-conscious community of practitioners, researchers and industry. It offers innovative ecological strategies to costume praxis and ways to think about humanity and materials by engaging with scientific research-in-progress in an artistic context. *Costume thinking*, then, emerges as a catalyst for insights on human and material agency by inviting other fields to assemble through a practice-led research focus, generating transdisciplinary collaboration(s). To paraphrase dance pedagogue Rebecca Enghauser (2007, 89), adopting an ecosomatic approach to costume design has the potential 'to yield a more sensitive, and thus a more capable and versatile' costume artist, who is 'prepared to contribute positively to the art form' of costume and, ultimately, 'to the world at large', uncovering 'new dimensions of expressing what it means to be human in the most global and essential way'. We, therefore, position costume design as a critical tool for new performance narratives and cultural landscapes to be thought of and created, pushing the boundaries of wider philosophical

understandings and innovations that carry the potential to influence the future making of performance as well as broader, environmentally aware cultural and societal contexts.

Sharing such an approach, we aim to contribute to the articulation of new theory emerging from the practice. Thus, this article also aspires to contribute to the epistemological discourse of artistic research by articulating an innovative approach to costume scholarship. We propose a new *extramaterial* ontology for costume informed by ecological consciousness that implements a change in how materiality and its agency are acknowledged and valued within and beyond costume design, including during its production and reception. This involves 'an ethics that addresses not just human life in its interhuman relations, but relations between the human and an entire world, both organic and inorganic' (Grosz 2017, 1). Ethics in this context is 'about mattering', as well as considering 'new configurations, new subjectivities, new possibilities' (Dolphijn and van der Tuin 2012, 69) that costume addresses. The reconsideration of material philosophy through costume-based practice-led interventions, as analysed in this article, is timely and potentially powerful in its impact in fields ranging from performance studies – and performance design in particular – to philosophy and bioarts. Through open-ended explorations and development of alternative material practices in costume design, the accessed knowledge can be disseminated and applied to other fields of performance, advancing towards the next material turn. The insights of such work in performance-making extend to broader societal contexts, opening new understandings of systems of living that expand the prevailing positions and limits of contemporary costume theory, and performance philosophy more broadly. Therefore, the approach undertaken in this article has implications not only for the role of costume materiality in performance in an ecological framework, but also for contemporary philosophy and critical theory across multiple disciplines, changing the way that material agency is discussed and treated within performance scholarship.

Parallel to a reconsideration of professional practice, such a critical approach would require a renewal of the pedagogical agenda of the field with activities that encourage and nurture emergent generations of costume practitioners and researchers to be conscious of the sustainable impact they have through their profession, while also being comfortable and competent to work in the unsettling space between disparate disciplines. This requires new interdisciplinary collaborations and approaches across artistic and material science communities and advocates for ecological equity in research and artistic practice in the performing arts, aspiring to help society imagine, experience and articulate needs for a more sustainable material future for generations to come.

Notes

1. Such as in the archive or an exhibition.
2. The concept of 'human-centredness', developed in design practice in the second half of the twentieth century, focuses on people's everyday needs, behaviours, emotions and wishes. Although originally considered a positive turn originating from empathy and placing the human end-user at the centre of the design process, this focus on human experience is critically reconsidered today (Norman 2005; Grubauer, Maurer and Newman 2021) as it did not take sufficiently into account other living entities in design-related decision-making. A more

holistic approach is anticipated today in the debate for a sustainable design future (see e.g. Kimmerer 2014; Lombardo 2019; Lohmann 2020).

3. For instance, in dance costumes, by preferring stretch fabrics that bring comfort and freedom of movement to the human body on stage; however, most types of fabric containing elastic synthetic fibres such as spandex are difficult to recycle (Yin et al. 2014). Eco-friendly stretch fabrics that can be reprocessed have only been in development recently and are not yet widely available to costume designers.
4. The concept of *ecoscenography* introduced by Tanja Beer (2015, 2016) has led to a growing interest in ecological thinking in scenographic practice and scholarship, informed by new materialist approaches that invite a consideration of more-than-human aspects in the design of performance.
5. For diverse inter- and trans-disciplinary perspectives on costume praxis, see research published in the scholarly journal *Studies in Costume and Performance* or at the Critical Costume conferences (e.g. Critical Costume 2020 conference presentations available online, <https://costumeagency.com/critical-costume-2020-conference/>); see also significant volumes, for example, Maclaurin and Monks (2015), Barbieri (2017) and Pantouvaki and McNeil (2021); the *Costume Methodologies* research project (2014–18) at Aalto University, Finland and the *Costume Agency* artistic research project (2018–21) at KHiO, Norway.
6. As an example, the Greek National Opera commissioned a stage production of Antonio Vivaldi's *Four Seasons* (2019, online in 2021) as an original 'green' music theatre performance for youth on 'major issues related to our attitude toward the environment and the dangers threatening it'. Costumes were made of disposable goods such as plastic bags, bottles, plastic straws and gloves, offered a second use. See: <https://www.nationalopera.gr/en/alternative-stage/es-children-s-performances/item/2750-tesseri-epoxes> (accessed 8 October 2021).
7. For example, Arts University Bournemouth launched the competition 'Costume for Change', for which students designed a costume that addresses climate change. See the online exhibition: <https://aub.ac.uk/latest/costume-for-change?fbclid=IwAR1ekKK-i75qOLdR3oaXEXdn2YcLxCtsG6l5x1XfN4a86QOIIAhjtFOX1sg> (accessed 8 October 2021).
8. This work was awarded a Best Performance Design prize for Costume at the Prague Quadrennial 2019.
9. 'Makers' here includes all the human and non-human actors that contribute to costume's 'becoming': designer, tailor/dressmaker, performer, lighting, performance context, etc. Equally, the word 'materials' here refers not only to the physical materials but also to conceptual materials such as ideas, referred to as 'ideality' in the following section.
10. There is currently an increasing interest in the notion of agency in costume practice and research, as demonstrated by the artistic research project 'Costume Agency', supported by the Norwegian Artistic Research Program and Oslo National Academy of the Arts (<https://costumeagency.khio.no/>), as well as in the significant international response to the 'Critical Costume 2020' conference and exhibition organized on the same topic.
11. Karen Barad argues that agency 'is an enactment, not something that someone or something has' (2003, 826–827).
12. According to Fraleigh and Bingham (2018, 7), the term 'ecosomatics' descends from Edmund Husserl, who 'articulated concerns for "the environing world" through various interrelated horizons or ways of knowing the world (Husserl [1932] 1995, 154–65), ones that we commonly call ecological, social and cultural. He called these horizons "lifeworlds" and wrote of their relationship to the somatic life of the body'.
13. Movement director and dance movement therapist Sandra Reeve has been one of the pioneers in ecosomatics, articulating it as an ecological approach to the living body in movement; her work applies ecological principles to movement training defined as a practice of 'ecological movement' informed by embodied environmental awareness (see also: <https://www.moveintolife.com/thesis-ecological-movement.html>, accessed 9 May 2021).
14. The term was first proposed in Pantouvaki's opening talk at 'Critical Costume 2015' in Helsinki, later briefly presented in the introduction to the first issue of the journal *Studies in Costume and Performance* (Pantouvaki 2016), and further articulated at the 'Critical

Costume 2020' conference (Pantouvaki 2020). The concept emerged during Pantouvaki's research undertaken in the frame of the 'Costume Methodologies' research project (2014–18), funded by the Academy of Finland.

15. The costume design process for the two works developed at the facilities of Aalto University (Aalto Studios, CHEMARTS/Bio2), UniARTS Helsinki (Theatre Academy), Zodiak – Centre for New Dance, and the designer's studio between March 2017 and October 2018. *a life – nomadic melodrama* premiered on 16 November 2017 at Kallio Stage and *Posthuman days* premiered on 18 October 2018 at Zodiak Stage, both in Helsinki.
16. The full lists of credits for the two productions are available at <https://www.ingvillfossheim.no/a-life-nomadic-melodrama> and <https://www.ingvillfossheim.no/posthuman-days>.
17. The colourants were green microalgae *Chlorella vulgaris*, cyanobacteria *Arthrospira platensis*, acai berries *Euterpe oleracea*, and blueberries *Vaccinium myrtillus*. Costume designer's notes: 'these organisms are ancient inhabitants of planet Earth, and fundamental to the development of life on this planet. I imagined my stage-creatures would rely on these microorganisms for food' (Fossheim 2019, 32).
18. The use of time alone as dye fix, replacing chemical mordants, extended the dyebath immersion by up to 14 days.
19. This phenomenon refers to the fermentation of sugar and tea by symbiotic cultures of bacteria and yeast.

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No potential conflict of interest was reported by the authors.

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Sofia Pantouvaki, Professor of Costume Design at Aalto University, has led important initiatives for the development of costume research, including the *Costume in Focus* research group; Chair of Critical Costume; Vice Chair (Research), OISTAT Costume Design Sub-commission; and a founding Editor of *Studies in Costume and Performance*. She is also an awarded practising designer with over 25 years' experience and 90 design credits in major European venues. She has curated many international projects including the Finnish Student exhibit (Gold Medal PQ2015), led the research project 'Costume Methodologies' (2014–18) and is lead editor of *Performance Costume: New Perspectives and Methods* (Bloomsbury Academic, 2021). Her research currently focuses on the critical enquiry of costume design theory and practice.

Ingvill Fossheim is a costume designer, scenographer and researcher. By exploring and embedding biobased materials and systems knowledge into the complex process of costume design, her work seeks to orient performance-making praxis towards responsible, resilient and regenerative material approaches. Fossheim is doctoral candidate at Aalto University, School of Arts, Design and Architecture.

Susanna Suurla is an artist-researcher, costume designer, doctoral candidate and part-time lecturer in Costume Design at Aalto University, with over 20 years of professional experience in costume for performance and screen art. Her artistic work and research explore the relationship between mind, matter and meaning-making, employing different mediums of material engagement, including costume design, installation and video art.

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