

On Microperformativity: Alternative Animated Agencies in Art

Jens Hauser (Karlsruhe Institute of Technology)

The neologism *microperformativity* has progressively emerged from years' long observation and epistemological scrutiny of how and why art since the 1990s has appropriated a large variety of increasingly available biotechnologies as performative media in order to literally, and materially, stage 'aliveness', including at microscopic scales *in vivo* and *in vitro*. 'Microperformativity' (Hauser 2014b & 2015, Hauser 2020) denotes a current trend both in performative art practices and theories of performativity to destabilize human scales – both spatial and temporal – as the dominant plane of reference and to emphasize biological and technological micro-agencies that, beyond the mesoscopic human body, relate the invisibility of the microscopic to the incomprehensibility of the macroscopic. Investigations into microperformativity redefine what art, philosophy, and the technosciences actually consider a 'body' today, in times when performance art shifts towards generalized and pervasive *performativity in art*. Cross-fertilizing aesthetics, media and performance theory, as well as science and technology studies, *microperformativity* has been coined as a concept to describe and contextualize the recent attention paid to these other-than-human agencies, biological and technical ones alike, which challenge and subvert the mesoscopic tradition within which human phenomenological considerations are, still, rooted. Now, non-human agencies are increasingly being staged in relation to performative techno-scientific or algorithmic systems, thus addressing contemporary dynamics linking the organic and the machinic.

Even before the current viral pandemic of the coronavirus started to monopolize the public discourse in 2020, microperformative artistic methods and positions had since a long time begun to enquire how art can critically engage with technologies that exploit life on a microscopic and molecular level to merge bio- and digital media, and how performative art and discourses can inform these processes to think biopolitics and necropolitics in relation to the dystopia of economy and the utopia of ecology alike. While it is for sure not without irony that our human-all-too-human travels, gatherings and the entire socially organized life we refer to as *bios* have been compromised by omnipresent viral agencies,

'partial life', 'extreme biologies' and 'alien life' – often haughtily branded *zoë* – microperformativity as a concept may not only provide a lesson in humility, but also links manifold disciplines such as ecology, synthetic or astrobiology, microbiome research, origins of life research, etc., in an attempt to foster interdisciplinary encounters between art, philosophy and the most diverse scope of the techno-sciences when re-defining allegedly self-understood, but increasingly destabilized notions such as 'body', 'matter' or 'aliveness'. The aim of this contribution is to propose a functional vocabulary in which performativity and agency are ascribed to systems of aliveness beyond anthropocentrically established criteria such as intelligence, consciousness or language. From the standpoint of media theory, art history and science and technologies studies, based on two decades of curatorial experimentation and experiences in this field, this chapter aims to

1. define the concept of microperformativity and discuss its relevance in the light of a panoply of related artistic examples;
2. describe and historically explain the current trends of how *performance art* shifts towards different forms of *performativity in art* ;
3. demonstrate how the concept of *microperformativity* is intertwined with the concept of *biomediality*, since it has emerged in relationship to art that increasingly uses biotechnologies as performative media in order to stage 'aliveness';
4. sketch out an outlook to further inquire whether *microperformativity* in art should, or should not be conceived for human audiences only.

Performing Co-corporeality

For more than two decades, contemporary art increasingly involves bio(techno)logical processes and entities. Genetics, tissue engineering, DNA chips, so-called *biobricks* in synthetic biology, neurophysiology, but also self-experimentation, etc. have entered the repertoire of resolutely experimental artistic strategies. Extremophile microorganisms, viruses and chemical systems from which rudimentary protocells can emerge are, however, not just tools, media, passive material or inert stuff but entities that play an active role in artistic displays as their inherent agencies unfold. Consequently, art in this field

displaces the focus from its mesoscopic *actions* to its microscopic *functions*, from *physical* gestures to *physiological* processes, and from staged *diegetic* time to *real performative* time, even of an experimental setting in a Petri dish. Often these displays contain performative elements and produce a particular perceptive disposition, which can be described as *co-corporeality* to denote a central characteristic for the perception of bio-media-based art – namely the crucial importance of an actual organic presence, including in the spatial Latin sense of *prae-esse*, ‘with which the viewer comes into contact and with which he can sensually or multi-sensorially accomplish an affective corporeal projection’ (Hauser, 2008, p.89). These ‘presence effects’ (as opposed to more distant ‘meaning effects’) produced by corporeal substantiality and the impact of the non-hermeneutic on senses and bodies in cultural phenomena (Gumbrecht, 2003) have frequently been emphasized, especially since often only a very restricted audience has the chance to experience such artistic displays directly in exhibits or performance situations.

While traditionally performance has been about the encounter between an artistic entity (mostly human), its presentation and its perceivers, the notion of *co-corporeality* today presupposes different types of ‘bodies’, which establish a uni- or multidirectional affective connection, between human and nonhuman bodily entities, biological and technical ones alike. This requires to redefine what a ‘body’ is. Anthropocentric representations – such as Leonardo Da Vinci’s *Vitruvian Man* appear to us today that way – in which the human body and its ideal proportions establish analogies for the logic of architecture or the universe at large, have come under critical and humorous scrutiny, subverting the *Vitruvian Man*, and more generally the human scale, as a reference point in the light of other metrics and logics, for example, molecular or microbial. Such deconstructions also continue the idea of the three alleged wounds to human’s narcissism – *die drei Kränkungen* earlier described by Sigmund Freud (1917): First, Copernicus’ discovery of heliocentrism as the first blow to humanity’s narcissism and a critique to the idea of ‘centralism’ as such; second, Darwin’s theory of evolution, which relegated the *anthropos* to a descent from the animal world; and third, Freud’s own psychological explanations that the human ego is not even master in his own house, meanwhile today the microbiome is said to be influencing cognition and humans fear Artificial Intelligence as a concurrence. Envisioning an aesthetic of *co-corporeality* that acknowledges microperformative agencies deserves some etymological and epistemological premises. The ‘co’ in

corporeality is reported to originate in Sanskrit *krp* and Proto-Indo-European *kreþ*, standing for ‘appearance’ and ‘form’, giving rise to the Latin *corpus*, ‘body’ but also ‘matter of any kind’. The term thus denotes organised physical substance but does not per se imply any scale or nature and is not anthropomorphic by definition. The other prefix ‘co’ comes from Latin, where it means ‘joint’, ‘shared’ or ‘auxiliary’, resulting in a kind of *togetherness*, something that different entities have or perform in common. Which bodies are then called to engage in *togetherness*?

In our recently edited volume *On Microperformativity* (Hauser & Strecker, 2020), forty-five authors and artists have interpreted the notion as a conceptualizing tool to analyse and frame their own practices. Topics cover subjects from microbial transplantation, micro-gestures, bacterial labour, protocells and non-terrestrial agency, up to ecological or bird flu-related traditional performance. But while *performativity* often appears to be a proxy of *agency* and *aliveness*, we argue, it is also technical, such as in the apparatuses of the natural sciences, as well as in economics in times of algorithmic finance, high-frequency trading and neuronal networks. Out of curiosity we flicked through all chapters and compiled a list of who or what actually micro-performs:

extra-terrestrial organic matter (ETOM); protocells – precursors of cells formed by innate, complex chemistry, created live on stage; ‘psilamine’, an artistically created psychotropic molecule; volatile organic compounds (VOC) and aerosols; DNA sequences, manipulated by processes such as electroporation, lipofection or biolistics via genetic guns; protective immunoglobulins; enzymes and pheromones; bio-solar cells, pluripotent stem cells; growth media, amino acids and signalling proteins to culture cells in incubators; spiking neurons grown on microelectrode arrays; yeast cells; aquatic cyanobacteria; chemolithoautotrophic bacteria (*Acidithiobacillus ferrooxidans*) and human skin bacteria (*Staphylococcus epidermidis*, *Corynebacterium xerosis* and *Propionibacterium avidum*); fungi (*Psilocybe cubensis*); bodily fluids such as mucus, breast milk, blood, sweat and tears; microbiomes sourced from breast milk or Pygmy populations; sweat glands; Begonia seeds; jellyfish, xenopus, zebra fish and mealworms; techno-scientific experimental devices such as Winogradsky columns, blunt-tip applicators, or microfluidic machinery with its associated giant unilamellar vesicles (GUVs) and water-in-oil droplets (W/Os); phoneme caption devices and voice spectrograms; machinic graphics processing units (GPUs); Artificial Intelligence based deep

learning networks and corporate surveillance systems; high frequency trading algorithms; weaving robots and looms... and also – viruses (Hauser & Strecker 2020, 2).

This eclectic list resonates with Chris Salter's bon mot summing up the pervasiveness of a 'performative turn' today: 'Bacteria perform processes. Scientists perform experiments. Algorithms perform actions. Humans perform gender and sex. The question is who or what nowadays doesn't perform?' (Salter, 2020, p.9). Notwithstanding the extraordinary range of possibilities that microperformativity offers for artistic research and research-based art, a main challenge remains: how are these displays, experimental set-ups, events and dramaturgies that convey co-corporeality with other than human agencies conceived to conceptually and materially engage indeed human observers and participants? And by which nonhuman biological or technical agencies is the impression of 'aliveness' being produced?

Staging Aliveness

Such art seems to update, at least at first sight, art historical tropes of 'aliveness' and 'creation' as a vanishing point of a persistent artistic quest that delineates a biotechnological desideratum – nostalgic and metaphoric, utopian and metabolic. From an art historical perspective, the creation of life-like appearances has always been a persistent feature, from early anthropomorphic statues and myths of artists' works 'coming to life', to notions of the artwork as an organism in itself, to robotic and software simulations of digital media art and, more recently, to artistic artefacts created in bio-scientific contexts. By means of *form*, *material*, or *process*, art has *imagined*, *represented*, *mimicked*, then *simulated* and quite recently, *manipulated* living beings and systems for real. Three primary typologies of 'alive' artworks exist today, the criteria of which sometimes overlap and create, technically speaking, hybrid forms:

1. representational and concept-based contemporary art, including organic matter;
2. process-based 'dry' media art using software and hardware such as informatics and robotics to simulate lifelike behaviours via media that are not biological;
3. process-based 'moist' media art with wetware that uses biotechnological methods to manipulate organic systems, organisms, or their constitutive

parts in an aestheticized technical framework.

The impression of 'aliveness' for the viewer can be triggered by very different criteria, between the *animation of the technological* (which means the construction and staging of life-like processes or entities in media other than biological ones) and the *technologization of the animate* (which implies the instrumentalization and manipulation of existing organic systems, beings, or their constitutive parts) (Reichle, 2005, p.3). To set the stage for this dialectic, an opposition can be made between two process-based, performative art projects that, at first sight, seem to be similar in their desire to stage 'aliveness', but with very different means. One example is the self-repairing *Robotic Chair* (1984–2006) by Max Dean, Raffaello D'Andrea, and Matt Donovan, using custom-made robotic systems, software and sensors. Artificial aliveness is suggested via 'intelligent' behaviour, since its parts are able to reassemble independently into the recognizable form of a chair, encouraging audiences to applaud, before it falls apart again. In a second example, Wim Delvoye's defecating digestion machines branded Cloacas (since 2000), functional metabolic processes – involving food, enzymes, and gut bacteria – are enacted to produce organic excrement; here, visitors also applaud as the machines' droppings fall.

These works indeed rely on very different characteristics. In the first case, the four-legged chair does not resemble any animal, but its *movement* suggests that it is animated in the etymological sense of the Latin *anima*, which is typical of a whole genre of (often inter-*active*) media art installations. The second can be perceived as alive via its metabolism, establishing a proprioceptive co-presence with the viewer – through a disposition to identify physi(ologi)cally with the observed 'living' entity. In that light, we need to scrutinize which characteristics of 'aliveness' artists – selectively – put their emphasis on. In a definition that is both biologically and philosophically grounded, such as that of Bernhard Rensch in his *Epistemology* based *Biophilosophy*, 'life' is manifested by a sum of characteristics, some of which one can also find in the inanimate world, and the aliveness of the living manifests itself as a specific combination in living organisms:

Living beings are *hierarchically organized, open systems* of predominantly organic compounds. They usually constitute *clearly delineated cellular individuals* showing a *temporary constancy*. Their cells

are morphologically characterized by specifically functioning *organelles* (cell membranes, nucleus, chromosomes, ribosomes, mitochondria or their prestages). With regards to their chemical constitution, they are characterized by *specific proteins and nucleic acids*. *Metabolism and exchange of energy* give rise to *activity* and maintain the organism in a state of *dynamic equilibrium*, determined by complex *structural and functional interrelationships* and controlled by particular *steering and feedback systems*. They show *specific reactions to external stimuli* [...]. All their structures and processes are mainly *purposive*, serving a rational functioning of the organs and the *maintenance* of the individual and the species, but *historically* conditioned by the *structure* of the organism's phylogenetic ancestors. *Reproduction* through totipotent cells is linked with *changes of form in the course* of the individual's life. Organisms undergo phylogenetic alteration through *mutation* of hereditary factors. They are links in the continuous chain of cells that constitute the *stream of life* to which probably every species of organism ultimately belongs. *Progressive development* in many lines of descent made the *emergence of complicated psychological processes* possible (Rensch, 1971, pp.65–66).

For artists, it can be sufficient to emphasize only a few of these characteristics to evoke or stage aliveness. Practitioners of 'dry' robotic art may focus on *activity, regulation, and irritability*, those with an interest in digital simulation of populations on *reproduction, evolution, and mutation*, and practitioners of 'wet' biotechnological art on *metabolism, dynamic stability, or protein-based* materiality. These preferences, in turn, translate into the chosen art media via which the microperformative agents of aliveness are made present.

In recent years, artists appear to want to bridge the dichotomy between the *animation of the technological* and the *technologization of the animate*. As an example, Mexican artist Gilberto Esparza's work is indicative of this tendency. His hybrid entities combine software, hardware, and wetware. He applies the concept of 'life' as 'a pattern transposable across media', as anthropologist Stefan Helmreich (2011, p.676) puts it, resulting in networks of distributed agencies. Two artworks condense these questions in particular. The 'bodies' both of his *Plantas Nómadas* (2008–2014) and his *Plantas Autofotosintécas* (2014) are conceived as decentralized ecosystems, containing bacteria in microbial fuel cells to produce energy for the robotic actions. The *Plantas Autofotosintécas* (auto-

photosynthetic plants) use energy extracted by DIY microbial fuel cells from wastewater to produce the light that the aquatic plants and cyanobacteria in the installation requirements to conduct photosynthesis. This not so 'individual' creature seems to have 'organs', but distributed ones, and functions as a hybrid of a gastro-bot and a bio-musical synthesizer. The Plantas Nómadas (nomadic plants) also combine hardware, software and wetware to purify polluted water, filter out chemicals, release oxygen and generate energy, becoming increasingly self-sufficient as they learn to navigate. And if they are said to express 'autonomous' and 'intelligent' behaviour, this might not result in the mimicking of human cognition, but rather the system's distributed intelligence to clean up human's mess in times of major ecological crises.

Agencies across Kingdoms

Beside such eco-systemic displays, microperformativity nevertheless often emerges through human bodies still, revealing hidden physiological processes, or establishing connections with other than human kingdoms. One particularly known and complex example is *Bleu Remix* (since 2007) by Yann Marussich, chosen on purpose as the cover image for the issue 'On microperformativity' with *Performance Research*. First, it subverts the tradition within which human phenomenological considerations are still rooted – precisely by displacing the focus from mesoscopic actions to microscopic functions, from physical gestures to physiological processes, and from staged diegetic time to real performative time. In this mesmerizing an hour-long physiological performance the former dancer Marussich stages a controlled biochemical choreography of methylene blue, which progressively seeps out of all the orifices in his body, from eyes, mouth and nose to eventually the pores in his skin, while internal bodily sounds are amplified and remixed, shifting the observer's attention from the physical to the physiological state. What is being choreographed here are both the internal and external milieus. Second, *Bleu Remix* relates to the frequent mode of microperformativity explored by artists that is vegetality, in the very polysemic sense of the term: not only meaning the quality or state of being vegetal, but also concerning those physiological phenomena that are commonly ascribed to plants, even in animal organisms. Here, Marussich deconstructs alleged passiveness, and alludes to the vegetative (autonomic) visceral nervous system, which regulates vital functions such as metabolic activity of internal organs, breathing and heartbeat, beyond categories such as intentionality and subjectivity traditionally held central in human agency.

In a similar vein, Špela Petrič's 20-hour-long performance *Skotopoiesis* (since 2015) can be conceived of as a microperformative physiological encounter between human life and vegetal otherness as co-performer, adjusting their respective rhythms and functions. Here, the artist and germinating cress stand vis-a-vis each other, illuminated by a strong artificial light. The title *Skotopoiesis* means 'shaped by darkness' and refers to the continuous shadow of the artist's body that signals the plants to respond by changing their shape and colour, so that their bodies, in turn, produce a living imprint of the artist's silhouette. By obstructing light, the artist's shadow causes a phenomenon called etiolation, resulting both in the paling and lengthening of the cress's stems, which is contrasted by her own shrinking height due to persistent stillness.

The deconstruction of apparent stillness and passiveness concerns also the mineral kingdom, e.g. in Julia Borovaya's *Crystal* (2018) where dendrites are growing in real time out of vaporized menthol on a performer's body. Growth is a phenomenon that human and crystal bodies share, a threshold between the inanimate and the animate. In an aquarium filled with vapours, polycrystals relentlessly grow in the mist phase of a chemical substance that passes through several states of aggregation, at an accelerated speed that is indeed beginning to be perceived by human observers as a movement. Human movement, in turn, is slowed down to the imperceptibly extreme in Tina Tarpgaard's *MASS - Bloom Explorations* (2018). A human performer, whose facial traits are hidden in a costume resembling the thousands of mealworm non-human performers she is interacting with, slows down audiences to get in touch with decay, decomposition and death. Under an organically shaped dome multiple cycles of life create constant changes to the landscape, while mealworms digest polystyrene, human waste, and create a unique soundscape. This embodied practice over many days involves scales of time beyond the mesoscopic bubble of human audiences. 'Given that the work of the mealworms continues outside of gallery opening-hours, away from the gaze of the human-audience, the long durational nature of the piece points to the impossibility of appreciating the work in its entirety' (Whalley & Miller, 2020, p.133).

Human-animal relationships, but even more the complexity of immune communication systems and their microscopic agencies, are staged in the performative biomedical self-experimentation *May the horse live in me* (2011) by

French duo Art Orienté Objet where artist Marion Laval-Jeantet was injected with compatibilized horse blood to experience immune otherness in an act of trans-species blood brother (or sister) hood. The artist turned herself into a proverbial 'guinea pig', injecting herself over the course of months with horse immunoglobulins to develop a tolerance to these foreign animal bodies, and to be injected without falling into anaphylactic shock so that the horse immunoglobulins would by-pass the defensive mechanisms of her own human immune system, enter her bloodstream to bond with proteins of her own body and, as a result, impact on her own body functions of the endocrine system. After the transfusion, Laval-Jeantet, on stilts, performed a 'mesoscopic' communication ritual with the present horse, before her hybrid blood was extracted and ultimately freeze-dried in order to be conserved. This risky undertaking alludes to the possibility of healing autoimmune diseases using foreign immunoglobulins as therapeutic 'boosters', meanwhile, on the metaphorical level, the performance was also conceived as a continuation of the centaur myth – that human-horse hybrid which, as 'animal in human,' symbolizes the antithesis of the rider, who as human dominates the animal. More recently, Art Orienté Objet has carried out microbiome-based art experiences *May the Rain Forest Live in Me* (Laval-Jeantet, 2020), consisting of grafting the rich microbiota of a Pygmy inhabitant of the African primordial forest onto the artist, to potentially learn to feel, as a real physiological experience, the forest environment thanks to the transplant of an internal ecosystem. This artistic self-experiment not only explodes the temporary and physical scales of an artwork, it also 'questions both the inner human ecosystem and the human umwelt, revealing the complexity of the globalized modern world, and, consequently, the indiscriminate destruction caused by the technological society in the name of development, with the complex consequences of globalization on our biological systems – still unknown consequences that could change our conception of the contemporary world at large' (Laval-Jeantet, 2020, p.162).

Performative Turns

All these artistic methodologies illustrate the incremental trend to shift *performance art* as a genre toward generalized forms of *performativity in art*, thanks to and including microperformative agencies. A good example in this regard is the posthuman sound piece *CellF* (2015) developed by artist Guy Ben-Ary and his interdisciplinary team (Nathan Thompson, Andrew Fitch, Darren Moore, Stuart Hodgetts, Mike Edel and Douglas Bakkum) featuring 'a cybernetic

musician, a rock star in a petri dish' (Ben-Ary, 2015) playing together with a human jazz musician. Here, lab-cultured spiking biological neurons are generating sounds, connected to electronic machinery, a kind of neural synthesizer. The neurons, synthesizers and human musicians perform live jam sessions that are only partially human. This piece is of particular interest because it combines, in a very explicit sense, the etymologically similar but epistemologically different notions of 'performance' and 'performativity': While the notion of *performance* puts an emphasis on presenting something to an audience, mostly via human presence, the notion of *performativity* highlights the execution of whichever action or process – here, for instance, the spiking nerve cells in the techno-scientific apparatuses, while the main purpose of the nonhuman performativity is *not* the encounter with an audience. Furthermore, *CellF* demonstrates that performativity needs to be itself understood as a technical-cultural hybrid, or, as Andrew Pickering states, as a 'dance of agencies' (1995, p.21) of human actors, techno-scientific apparatuses, experimental systems and nonhuman organic entities. Tracing its origins back to the early 20th century, Chris Salter has shown that performative forms and the fascination of the machinic had gone hand in hand, but that, despite the early avant-garde movements, 'the long history of technological entanglement with performance practice has been ignored or downplayed not only in theatre and dance histories ... but also in the recent surge of writing about the new media' (Salter, 2010, p.xxxv). Today's technical-cultural hybrid character of the notion of performativity can be seen as the result of at least four consecutive phases of development:

1. In linguistics and speech act theory, John Austin, in *How to Do Things with Words* (1962), popularized the idea that the performative expression or utterance does not just describe an action in language, but actually performs or activates something; non-descriptive language 'does not just *represent* statements but is an inherently material practice in the way it can change the course of an event' (Salter, 2010, p.xxv).
2. In the then-upcoming Gender Studies, the material-corporeal and social dimensions of the performative program get further established by cultural theorists such as Judith Butler who, in *Gender Trouble* (1990), studies the human body's gendering as not ontologically pre-given, but performatively produced in and over time.
3. In parallel, the performative turn in anthropology and sociology, under the influence of anthropologist Victor Turner and theatre director

Richard Schechner, transformed the concept of 'performance as the subject of research [into] *method* by which research would be conducted' (Salter, 2010, p.xxv), making performance 'into a category of analysis' (Velten, 2012, p.255). The performative now allowed, beyond strictly textual forms, for focusing on the tacit, non-verbal, embodied and immanent act of doing.

4. Finally, science and technology studies (STS) applies the performative program to the analysis of knowledge production in laboratories (Latour & Woolgar, 1979), postulating 'performative alternatives to representationalism' (Barad, 2003, p.802), taking into account the role of techno-cultural hybrids, experimental systems and the agency of non-human agencies (such as model organism) in what French sociologist Bruno Latour calls human and non-human collectives (1993, p.4). Thus, the long-held idea of 'humans as the sole producers of knowledge, the expressers of agency' (Salter, 2010, p.xxvii) is replaced by complex interacting networks, such as described in Actor–Network Theory (Latour, 2005) or as a 'parliament of things' (Latour, 1993, p.142–145).

The last point makes the entanglement between performativity – with *microperformativity* as its subsequent derivative – and bio media-based art particularly plausible, and it is here where the concepts of *microperformativity* and *biomediality* overlap.

When the (Bio)Medium is the Message

The trans-disciplinary career of the *performativity* trope shows parallels to the evolution of the notion of *mediality*, both spreading as so-called 'travelling concepts' (Bal, 2002) across a growing number of disciplines. The meaning of the concept of mediality itself mutates, and needs to be seen historically in its etymological and epistemological evolution. As historian Erik Porath reminds us, in the past the word medium was used more frequently in the context of the natural than of the human sciences, as an intermediary element, milieu, and only later as a means or tool. For this reason, today's mere focus on functions of communication causes us 'to lose sight of the natural scientific relevance of mediality,' so that 'cultural studies and traditional media studies generally lack consideration of the natural sciences and their history' (Porath 2008, 254–256). Here, the concept of *biomediality* comes into play. Isolated organic entities can be controlled, rearranged, combined and dynamically displayed, but they do not

necessarily ‘mirror’ the naturally inherent agencies of these entities – which artists indeed often intend to emphasize. Such entities can be instrumentalized to carry out processes despite and beyond their own vital potential, becoming capable of fulfilling traditional media functions such as to store, transmit and process, while adding potentially novel capacities such as to self-repair, adapt or evolve, expanding media definitions based on physical laws. By analysing contemporary art forms that employ biotechnologies, three main instances of biomediality can be distinguished (Hauser, 2014a, 2016):

- 1) life enabling *milieus*, *biological media*, understood as existential conditions, that enable a ‘body’ and its internal functions. Technically, this comprises experimental systems where milieus are simulated, biotic and abiotic ones, for example in tissue culture, with incubators and growth media, etc.
- 2) technical means, *biomedia* as transformative-generative *means*, whereby *biological systems do something* beyond their own organic purpose; ‘processing bodies’ – molecules, organisms, populations, cells as synthesis factories, viral promoters, programmed bacteria etc.
- 3) instances of *measurement*, *media of biology* employed to *measure*, *analyze* and *observe*; dispositives in which one organic system reveals something about another to produce knowledge, historically positioned in the tradition of microscopy or cell cinematography, such as biomarkers, biosensors, DNA chips, or electrophoresis.

While the second and third categories bear similarities to electronic or digital communication media’s functions such as storing, transmitting, processing and analysing, the first category relates to earlier understandings of media, and is therefore often overlooked. *Biological media* in the sense of *milieu* are however central, e.g. in many works by the Tissue Culture and Art project, which herald the artistic production of ‘victimless’ meat of leather. Here, the core concept lies less in the accompanying human *performances* than in the – albeit invisible – *performativity* of the bio(techno)logical agencies at stake. Three projects by the Tissue Culture & Art Project, which appear like in time-lapse mode from 2003 to 2015, are therefore well suited to both insist on overlooked ‘cocktails’ of multiple microperformative agencies, and to see how the progressive retreat of human performers can be compensated by aesthetic solutions to create encounters with, and experiences for perceivers.

In *Disembodied Cuisine* (2003) isolated frog muscle cells are grown into edible 'steaks' in bioreactors to artistically prototype meat production, allegedly without animal victims and as a pseudo-positivistic junk-food alternative to factory farming. But the biotechnological processes are still framed by human actions as 'performances', including a daily zoo-like feeding ritual, campaigns at the local farmers' market and a *nouvelle cuisine* cookout. The tissue-cultured artefacts are supported by a lavish lab scenography – 'we have to explain to the viewer that these semi-living constructs are alive and growing, and the viewer has to trust us (or be assured by the supporting technological apparatus)' (Zurr, 2016, p.191). But, in fact, the *nutrient medium* itself contains foetal calf serum as a growth stimulator, and as a consequence, cannot be 'victimless'. While the product ordered online just seems to be a standardized substrate, it indeed consists of multiple microperformative agencies. But since even researchers often ignore the exact composition of such media, it appears to be 'passive', while it contains signalling molecules that activate cell growth, and trigger intra-cellular changes.

Only a year later, in *Victimless Leather* (2004), the explicit title shifts the attention further to the (bio)medium, the *milieu* itself, which – literally – is the message! The utopic vision of leather clothing without animal victim is voluntarily contradicted. 'The naming of the work as victimless is deliberately ironic since tissue technologies as the seemingly victimless alternative to traditional forms of making leather is an illusion' (Senior, 2008, p.76). Deliberately disguised as technopositivism, the status of victim is merely shifted, veiled behind technology. However, in *Victimless Leather* human performances have disappeared, and the cells', the medium's and the machine's performativity is brought to the foreground: 'aliveness' is now suggested by an autotelic apparatus as surrogate body, which aesthetically translates, for the viewer, invisible processes of cell *growth* into visible *movement*. The feeding of the cells becomes automated, delegated to technical agency, in order to grow miniature jackets out of immortalized animal and human cell lines. The fleshy garments are being administrated the pinkish-bloodish nutrient media by a peristaltic pump, which simulates heart rhythms. Since growth cannot be grasped with the naked eye, aliveness inherent in the growth process is made plausible, however mechanically, by the rotating movement and the dripping onto these layers of 'skin', comparable to those of the viewer's body.

Finally, in *Futile Labor* (2015) 'the relationship between movement as an indicator for life and the notion of agency' (Zurr, 2016, p.188) is staged by the hardly perceivable micro-actuation of muscle fibres, and their aesthetic transposition. In a black box, this is achieved by slightly twitching tissue-engineered muscle cells whose miniaturized 'stage' is a custom designed observatory vessel, confronting the viewer with infinitesimal contractions. But in order to avoid 'purely microscopic visual representation of the myotubes' (Salter, 2015, p.90) their movement is translated into light and infrasound – sensations perceivable by humans, in order to 'create a visceral reaction in and through the bodies of the spectators.' (p.91–92). Obviously, staging microperformativity in technically stable and aesthetically convincing gallery displays remains a huge challenge for artists, especially when the retreat of human performers needs to be compensated.

Art with and for Microbes

Ultimately, the question of *for whom* performative modes of non-human agencies are actually staged, and whether human audiences should ultimately be the only receivers or targets, is also a matter of concern, e.g. for artists dealing with microbes. Artists may address bacteria's agency not only to be employed as mere workhorses for human aesthetics, but as partners or even co-creating audience, well expressed in Eduardo Kac's formula of an 'art that looks you in the eye' (2007a, p.18).

In his display cases of *Specimen of Secrecy about Marvelous Discoveries* (2006) microbial activity becomes the driving force of a series of canvas-like three-dimensional biotopes, technically conceived as self-sustaining Winogradsky columns, expressing different colours and shapes pre-arranged by the artist and then left to metabolic exchange over time. However, the work is conceived as a dialogical situation between human and microbial life: human caretakers provide light and nutrient-rich media *for* the perceiving microbial communities, as much as the constantly evolving living motifs produced *by* them become, in turn, a microperformative aesthetic process perceivable by humans. 'We shall not confuse our ability to describe a living entity in a given manner ... with the phenomenological consideration of what it is like to be that entity, for that entity' because the biotope manifests itself in 'its plural ontological condition that makes it unique' (Kac, 2007b, pp.92–96).

If one makes cell or microbe art for humans, why not make human art for microbes? The *E-feeder* (2020) by Derme, Mitterberger and Minovski hooks up biotechnological arrangements with algorithmic and artificial intelligence based agencies, as mediators or receivers. Here, a Zoom web interface tracks human facial expressions to be classified by an artificial intelligence face-recognition algorithm, and translates the results – neutrality, joy, sadness, surprise, anger – into physical-chemical inputs that impact on the behaviour of *E. Coli* bacterial colonies. ‘Positive facial expression’ translates into the administration of glucose and makes them ‘happy’ – ‘negative’ ones trigger destructive UV-C light. Beyond speech acts and symbolic language, human visitors communicate non-verbally with bacteria, while bad mood potentially has a lethal impact on their microbial audience.

Contemporary microperformativity may well connect historical roots in early Greek hylozoism, the point of view that matter is imbued with living forces and powers, or to vitalism, the doctrine that emergent principles in living systems cannot be fully described in terms of the properties of their constituents. Today, in times of questioning the reductionist sciences, performativity has become a way to address ‘phenomena [that] are entanglements of spacetime-mattering’ (Barad, 2012, pp.32), instead of objects or parts; microperformativity is a way to describe artists’ potential to network largely divergent agencies, anticipating or accompanying epistemological changes. For instance, in times of technologized biological life, the arts have reflected the shift in scientific focus areas from the Human Genome Project (1990–2003) to the Human Microbiome Project (2007–2016), via their selective emphasis on which biological agent, scale, function and agency to either foreground or background. We can predict that further research-based art will contribute to changes in the cultural perception of, for example, mineral and geological life (including plant-based or extra-terrestrial materials) or viral agency that is shaping the world on a yet unpredictable scale.

Jens Hauser / イェンス・ハウザー

Jens Hauser (DE/FR/DK) is a Paris and Copenhagen based media studies scholar and art curator focusing on the interactions between art and technology. He is currently a professor in art history at the Karlsruhe Institute of Technology (KIT). He is also a researcher at the Medical University Vienna, University of Copenhagen's Medical Museion, and at École Polytechnique Paris-Saclay, as well as a distinguished faculty member of the Department of Art, Art History and Design at Michigan State University, where he co-directs the BRIDGE artist in residency program. He is also a guest lecturer at the University of Applied Arts Vienna, the University of Innsbruck, and at the Department of Arts and Sciences of Art at Université Paris I Panthéon-Sorbonne. At the intersection of media studies, art history and epistemology, he has developed a theory of biomediality as part of his PhD at Ruhr University Bochum, and has curated about thirty international exhibitions and festivals internationally.