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This paper asks what kind of percepts constitute of abilities, vitalities and forces are built upon different ecological territories in media arts. Brief, preliminary analysis of percept in two experimental Finnish artworks, Paradise Family (2020) and Nimiia Cétii (2017), encodes vibrations of both human paradigm and varying machinic agencements. Two ecological decodings emerge from the analysis, one of homestead and one of a compost. In terms of perception, artificial intelligence in Paradise Family determine an anthropomorphized landscape after man. In Nimiia Cétii, an enhanced, pre-personal terrain of oddkins is established. Consequently, ecosophy of Paradise Family juxtapose to bios, mirroring the human condition, while the ecosophy of Nimiia Cétii parallels with zoe, proposing an equality between species.

Keywords: Artificial intelligence, Percept, Ecosophy, Media Art

Within the framework of media art, AI – artificial intelligence – has been one key factor at the intersection of art and science. Moreover, AI's capacity to incorporate non-human agencies to artworld is compelling and of particular interest. What is intriguing here is that at present it is taking stances on its own behalf to approach new technologies and their potentials and limits. (Stocher, Jandl & Hirsch 2021, 8; for a more profound history of intersubjectivity between art and science, see Wilson 2010; Sommerer & Mignonneau eds. 1998).

Today both the category and paradigm of AI are broad and ethico-aesthetically in a state of becoming. As a means to designate these awakening guidelines, art has a significant role. For example, art is seen as one essential force focusing the primary question of AI: to mirror the

human condition, to confront not only us within ourselves, but also with any form of “the other”, and finally, the purpose of the thing itself (Hirsch 2021, 23; 35). Secondly, as Maziej Ozóg puts it (2012, 50-51), these encounters perform a double perception system in which we perceive the possible variations in the evolution of a system, as well as recognize our position within it and our reactions to unpredictable circumstances arising from the varying experiments with perception.

To elaborate relatedness between AI and art a little bit further, one propositional role of AI might be the mobilization of new artistic insights to engagement of unexpected and unprivileged cohabitation in this astonishing world “under construction”. What is constructed, with these “new creation techniques” (Goodman 2010, 126), might then be a creative switchboard diagram for re-evaluating our relationship to the politics of unfamiliar and unrecognizable in thinking, sensing, and acting.

It goes without saying that this aspiration descends from an array of time-honored methods of artistic explorations with technology; for one, ambition to otherness stems from Avant-Garde’s cultural agenda in which “experimentation was both an important strategy and a form of expression” (Gere 2010, 4). Avant-Garde’s mindset has established a grand narrative of inhabiting modernist utopia to envision, imagine, and implement new practices of perception, thought, and presence in a modern world. Despite the technological modifications in time, this motivation has remained persistent historical formula in media arts. At present, one arising framework for reading the relevance of such issues, alongside the political and the cultural, is the ecosophies of AI.

For example, according to Zoe Beloff the concept of ecology encompasses a perception of our current historical situation, emphasizing the complexity of actions, interactions, processes, conditions, dependencies, connections, and relations within a heterogenous community of organisms and their environment. She says that we are today in a transition towards a hybrid ecology, referring to a situation in which ecology is formed by a diverse community of synthetic, biological, and technological organisms interacting with each other and components of their living habitat. Furthermore, she points out that with the use of biotechnological methods, the recognition of human impact on organisms is more challenging as the modifications are often invisible for our biological perception. (Beloff 2020, 97-99.)

This short paper scans this horizon with the key concept of percept as the landscape before man and in the absence of man, independent of a state of those who experience them. To replenish this thought, we might assume that agencies of sense datum are not supervised only by human alignment. In order to initiate ecosophies of such ambience, this interpretation of percept by Gilles Deleuze and Félix Guattari in their book “What is Philosophy?” (1994) is a starting point to make visible the invisible forces of a world in flux and in movement. On the basis of these conditions, it is worth thinking what vibrates, what resonates in AI. Notion of absence carries important value to judgments of AI’s capacity in perception. For instance, following N. Katherine Hayles (2012, 17), it is possible to ask what kind of role, cognitive position, it occupies in acting, perceiving, and drawing conclusions based on perceptions of its own “umwelt”.

Percept, a perception in movement, is both critical and clinical. Critical in discerning certain forces and energies, and clinical in evaluating the abilities to fold or unfold itself – clinical to diagnose the vitality of such formulations, critical in the evaluation of power grids of such wrappings where a form is still intermingled with the unformed. (Zourabichvili 1996, 192.) Such a becoming-state of impressions enables the interpretation and appraising of such energies, here, in terms of ecosophy. To study perception, is to study percepts (powers and energies) and affects (possibilities and becomings). Clinically scrutinized, how strong, how powerful the resonances of these energies are? Critically identified, how are they conditioned in AI?

This sounding burst out from within the vitality of AI. The becoming-with of any “I” and “AI” in analyzes of two major Finnish artworks *Paratiisiperhe* (*Paradise Family*, 2020), and *Nimiä Cétii* (2017) will be interpreted as two strands of mind-ecology of AI in art, namely, as *oikos*, rooting the term “eco” as homestead, and *compost*, defined by Donna Haraway (2016) as “worlding-with”. Ecological tokens of these familiar and unfamiliar mindsets in AI are, in turn, considered as two possible future paradigms of media ecosophies. To specify these paradigms labeled in this article, a mutual discourse between ecology, digital humanities and new materialisms is essential.

Digest idea of Guattari’s ecology is to resist homogenization in order to achieve resingularization of existence and to study the everyday refrains of life that are determining the limits within which we think, feel and live. These practices, ideas and ways of being are characterized as ecologies to attain consistency, becoming heterogenous, affirming our legitimate difference from each other and from a notional “self”. Main target of this ecosophy is to re-evaluate singularity not only in

terms of human, but in all existence, including the pre-personal and pre-individual levels of beings. It sympathizes liberation from repression and dominance as a goal to invent new ways of life to rediscover heterogeneity and to resist the normalization of our lives. (Pindar & Sutton 2000, passim; cf. Murphie & Potts 2003, 199.)

By and large, ecological entities are contextualized around questions of identities, materialities, and communication. Also Guattari settles upon a similar conception. His register of ecologies are material and social relationships, and as a media ecology, the prehension of mediation. From this standpoint, technology's grip on AI is tight: I agree with Andrew Murphie and John Potts, who argue that one key point in Guattari's ecosophy is that everything is a machine and everything is involved in assemblages that form and unform within this complexity. His ecosophy says as technologies open out to seemingly non-technological objects and processes, they'll lead us to what he calls machinic agencements, phyla possessing new kinds of collective agency. (Murphie & Potts 2003, 196-197; cf. Goodman 2010, 124.)

Umwelt after Man: Homestead of the Paradise Family

As an experimental radio play from Finnish Broadcasting Company YLE, aired 4/13/2020, *Paradise Family* is structured around dialogues between unknown family members in contemporary Finland. Dialogue, written by dramaturg.i.o. 1.4. program, outlines the family ties and relationships, the internal personification of the oikos, home and the everyday life. As ecology, it defines the subjective array of the family: who belongs into the oikos, how the stances between family members are set (love, hate, anger), and what are the responsibilities and the sense of duty within the economy of this household.

As ancient Greek word, "oikos" refers, as material economy, also to family property – in *Paradise Family*, home and the cottage outside the city. The concept of oikos carries in itself the possibility to diagnose the maintenance of this agricultural unit, such as lawn mowing at the cottage.

Dialogue let us also diagnose the economical and relational social groups of the family, homing culture in all of its proportions and magnitude. As a rulebook, we can define the force field of the family underlining the ecology of AI as an attempt to territorialize and control the encoded world in regular decoded patterns.

Anthropomorphized externality of AI verifies, amplifies and confirms the family constitution. It's making sense of the nucleus of the family through repetitive patterns of family rituals and concerns in endless "ritornello" of motifs. These schemes are known from the history of procedural, experimental writing – and to some extent, even cybernetic methodological forms and assemblages of culturally constructed articulations of humankind. They are mapped by different repertoires of human formula.

This refrain opens the existential, social, and economical ratios of family assemblage as an ecology of human-centered life. Emphasis on the humankind lets us assume that mediations of the family life are prehend by anthropocentric energies and forces. By a human, kindred pulse. The ecology of AI is thereby a territory determined by domesticated energy. Confined vitality indicates prosthetic writing, a process in which human is still attached to a writing machine (McHale 2000, 24). This machine envelopes human perspective to nominations of the outside, as is done in David Rokeby's installation *The Giver of Names* (1990–). Equal to *Paradise Family*, this artwork in progress perceives the phenomenal world of things with a comprehension of human intelligence in the right of naming such paragraphs. Ecological context of the given discussion – the actual associative database of both works – is based on homebound intension. It allegorizes "its own prosthetic character" (Ibid., 24) as ghostwriting, invisible labour, unfolded by hauntology that replaces the priority of being and presence with the figure of the ghost as that which is neither present or absent, neither dead nor alive (Davis 2005, 373).

Through a poetic allegorizing mode the resonance of human paradigm in AI might even be contextualized. It enacts echoes of about-a-human voice, an entropy that vibrates weakened energy, disclosing traces of us in a generic and speculative landscape, atlases of an "umwelt" (Hayles) after man. Concept of entropy describes aptly the becoming of energy as deteriorating and diminishing ecosystem (cf. Rowntree 2019, 177;179;184). Uncomfortable lifeworld echoes painfully also a human project that, as Britt Salvesen dissuades, ought not to be concerned as a drive toward wholeness or transcendence but rather as a coming to terms with plurality, exile, and diaspora (Salvesen, 2021, 6). Different readings of AI pinpoint towards a weakened human voice. Erosion of the hegemonic idea of man reveals how near us and our everyday life unknown energies are.

Entwined Compost of Nimiia Cétii

Jenna Sutela's *Nimiia Cétii* is a multi-programmed experiment in interspecies communication. Encoded is the movements of extremophilic bacteria, and decoded – through machine learning abilities, with French medium Hélène Smith's "martian speech" – as a choir of pre-personal voices both human and non-human. This dialogue creates a symbiotic relationship between living organisms and technology, apparently free from the artist's control and rules and restraints of grammar and syntax conventions. Clinically, material ecology of the set constitutes a playground for subjective and mediated ecologies to happen, to become-with in this environmental governance. In consideration of our reactions, we become sensitized to biological nuances, as well as to Martian sounds.

The procedure of the work is "making oddkin": we require each other in unexpected collaborations and combinations in "hot compost piles", as Haraway elaborates this interaction in her book "Staying with Trouble. Making Kin in the Chthubulucene" (2016, 4). She uses the concept of compost to describe the relationship between humans and other species in constant state of becoming-with, all being part of the same compost heap. This approach does not only challenge anthropocentrism, but also privileged status of the individual. As Satu Oksanen summarizes it (2019, 85), Haraway's theory expands the relationship between humans and the environment and their respective places in the world; humans are inseparably entwined not only with other organisms and life forms, but also with technologies (Haraway 2016, 51-57).

In *Nimiia Cétii* this impelling assemblage takes place, "becomes", in ecological terms of Deleuze and Guattari, to question the alleged separation of technology from the organic. Clinically assessed, entities coalesce within interchange of co-inhabitants of this milieu. Critically evaluated, mediality is used to "infect" AI with the other, "fertilize" it, making the language of the work blossom, contrary to a more monodic outcome of *Paradise Family*. The beautiful grammar and syntax of the work is both poetic and incomprehensible deterritorialization of the human-centered power grid of AI. Consequently, our perceptual fields, the horizon of a familiar place, is enhanced with the mind-ecology of the Unheimlich, or the unfamiliar within the familiar.

Nimiia Cétii's human and non-human agencies have significant ties to the decades old herbarium – to the corpus of interactive artworks – by Christa Sommerer and Laurent Mignonneau at points where, as Ozóg describes their work (2012, 47), "unusual contact with a living organism problematizes ideas about the natural environment – about a place where living organisms share a

common ecosystem, calling into question what forms of contact and communication are possible between human and non-human life forms”.

Generalizations in case studies are tenuous to justify, but would it be possible to comprise this agency regarding extensively to principles of collective intelligence and behavior? One contextualization might be “zoographical writing” (Parikka 2013, 537) as expressions of inhuman energies and resources. In this context of abilities, ecosophy of *Nimiia Céti* maintains the integrity of machinic agencements. The machinistic choice before entity is based on processual thinking of a territory within – with possible operational agencies of a phylum: phylum has the property of playing the role of a whole in and of itself, and a part of that whole at the same time. In this manner, a material ambivalence catalyzes “widening circuits of relations” (cf. Marks 2015, 24) as a coming to terms with diversity.

Representing emergent complexity of voices, *Nimiia Céti* appears also as one “application of biological patterns of information” (Goodman 2010, 125). Drawn into a discussion of becoming-with in media arts, concept of machinic agencement or a phylum posits thus a bio-technical allegory of a host: interpreted as a compost pile, AI in *Nimiia Céti* addresses both self-assertive and integrative pre-personal procedures of different organisms. Multiplying energies constitute for percept, the ecology of compost evolves also wide-ranging shifts in perspectives of perception and thought (cf. Hayles 2012, 5). In my mind, through this inviting manoeuvre an entry-point to a cohesive ecosystem is established.

Future Soundings of AI?

Guattari (2000, *passim*.) sees ecosophy as constantly moving components of subjectification. Components, or ecological territories, are material condition, social system and transversal subjectivity build upon the material and immaterial. He understands subjectivity as multiple, polyphonic, and the ecosophical attitude of this subjectivity in constant condition of productivity. Even matter becomes a creative force, of which the motivation is not solely human. From the standpoint of productivity, both artworks are in a state of becoming, their collective agency is procedural and processual as much they are relational and mediatory.

In this context, *Nimiia Céti* is more object-oriented than *Paradise Family*, paying attention to absence of man and to the rejection of privileging human existence over non-human objects. This

is the resonance of equity of the oddkin: machine vision is one example of the modern technological apparatus accomplishing oddkin to vibrate in the landscapes in the absence of man. In *Nimiia Cétii*, it's an integral part of a technical system to rewrite and reroute the boundaries of perception.

As much as *Paradise Family* could be understood in terms of the “autopoietic”, or self-organizing and -referential, the ecosophy of *Nimiia Cétii* compress the idea of “sympoiesis”, used by Haraway (2016, 58) to describe “making-with” as complex, dynamic and responsive process. Sympoiesis is to make sense of “worlding-with” within the ecology of company, extending the idea of “autopoiesis” of autopoietic machines described by Guattari as auto-reproductive, repetitive and unilateral (Guattari 2000, 100-102). But as the energy of the ghost territorializes the transitory, the new, as both O'Sullivan and Zepke ponder (2008, 2), is still an outside that exists within this world. In terms of entropy, energy languishes in a techno-cultural diaspora.

This makes comprehensible the fact that the discourse of interaction between man, nature, and technology is hard to obtain with the use of autopoietic machines. As a farside of recursive autopoiesis, bacterium language, machine vision and -learning all frame pre-personal ecosophy into AI. We have to keep in mind, that in Deleuzian-Guattarian philosophical framework also biological processes are thought as machines. To some degree, technological convergence – such as concatenation of semi-autonomous units, for example, to talking machines (Deleuze & Guattari 1983, 2) – assimilates even AI into a bioelectric circuit that accompanies odd kins together into kinship.

Presumably this flourishing kinship is an indication of a hybrid d ecology, in which we humans are existing in a complex ecological system with other organisms, artifacts, technologies and different modes of understanding (Beloff 2020, 97). But what, if not entropy, is the sounding of these modes? How do they probe, what are they emitting?

Sympoietic refers to polyphonic organization of voices with the use of, in Guattari's terms, transversal tools that make subjectivity able to install itself simultaneously in the realms of the environment and symmetrically in the landscapes and fantasies of the most intimate spheres of the individual (Guattari 2000, 69). Subjectivity of AI applies also to perception; unfolded other, the multitude of lifeforms, extends and dislocates the folded as a certain ethico-aesthetic paradigm (Guattari 1995; cf. Deleuze & Guattari 1994, 171). Co-existence of producing-machines (Deleuze &

Guattari 1983, 2) discharge vital outbreaks. This resonance contributes a testbed for different, symbiotic existential conditions, and might even charge language within language as a collective syntax (Deleuze 1998, 131-132).

This syntax with organic and inorganic connotations might stay anomalous:

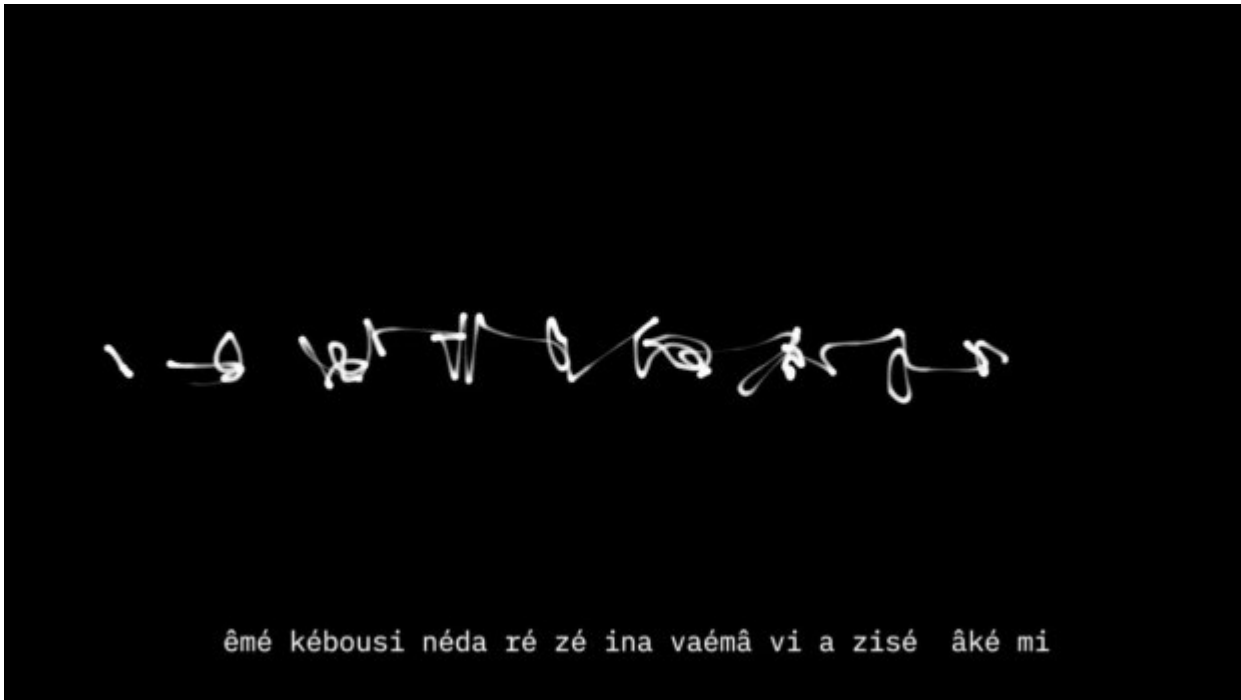


Fig. 1. Bacterium language “worlding-with” Martian speech in a landscape before man. Screenshot from Nimiia Cétii. Hosted by the program, a colloquium of oddkin is assembled by dissolving the boundaries between the organic and inorganic.

Different ecologies resonate and possibly repurpose different forces. How are they conditioned in AI? In the end, as we come back to terms with Hayles, what kind of cognitive positions are created? First of all, AI positions itself in creative decision making, and secondly, paraphrasing Beloff and Parikka, these positions manifest imperceptible forces and powers, even lifeforms, to our eyes. Ultimately, different manifestations of this invisible labour enable – vibrate – something we might think as “zoographical writing”.

As energy, family and the homestead juxtapose to *bios*, life. *Nimiia Cétii*, then, parallels with *zoe*, as described by Rosi Braidotti. She assumes that all species originate from nature and are hence equal. Humans are part of the material world, as also Guattari proposes, just like nonhumans. Braidotti uses (2019, 34-35) the term *zoe* to define the vitality and energy that flows through all matter – as in *Nimiia Cétii* – distincting from *bios*, which represents more anthropocentric

viewpoint on life. While sustaining this standpoint, AI keeps mirroring the human condition, a perspective arranged in the home territory of *Paradise Family*. In this respect, AI in *Nimiia Céti* studies the equality of species and organisms, as well as influences of the other in material and immaterial relationships.

In a Latourian sense, we're not to make art of any alien species, but merely, with it. As the colloquium in figure 1 implies, gesture of hostwriting of and in AI, hospitality in writing might promote some historical interest too (for sentiments of "ghost" and "host" in writing, see Miller 2004). A de-colonizing project addressing receptivity to the other becomes inherent, essential part of a long-term aspiration of European experimental culture to embrace cognitive, even mental exercises with the most advanced and sophisticated technology of the time. As far as I can see, it supplies a heritage of the study and critique of modern ecology of the mind, in a way that privileged domains of thought are questioned via transformations in our understanding of the world and our place within it (cf. Gere 2010, 3-4). A tangible thought is within reach: artificial intelligence relies not only on a nominal self. Equally, an ecosophy of transversal subjectivity is unfolding, which, in turn, requires a more profound study in the ecology of mind.

References

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Beloff, Zoe. "Hybrid Ecology – To See The Forest For The Trees". In *Art as We Don't Know It*, edited by Erich Berger, Kasper Mäki-Reinikka and Helena Sederholm, 86-102. Espoo: Bioart Society & Aalto University School of Arts, 2020.

Braidotti, Rosi. "A Theoretical Framework for the Critical Posthumanities". *Theory, Culture & Society* (2019). 36 (6). (2019): 31-61. Accessed May 5, 2020. DOI: 10.1177/0263276418771486.

Davis, Colin. "État Présent. Hauntology, Spectres and Phantoms". *French Studies*, (2005) 59 (3): 373–379. Accessed April 20, 2022. DOI: 10.1093/fs/kni143

Deleuze, Gilles. *Foucault*. 7th edition. Translated by Sean Hand. Minneapolis & London: University of Minnesota Press, 1988.

- Deleuze, Gilles & Félix Guattari. *Anti-Oedipus. Capitalism and Schizophrenia*. 10th edition. Translated by Robert Hurley, Mark Seem & Helen R. Lane. Minneapolis: University of Minnesota Press, 1983.
- Deleuze, Gilles & Félix Guattari. *What is Philosophy?* 1st edition. Translated by Hugh Tomlinson & Graham Burchell III. New York: Columbia University Press, 1994.
- Gere, Charlie. "Research as Art". In *Art Practice in a Digital Culture*, edited by Hazel Gardiner and Charlie Gere, 1-7. Farnham & Burlington: Ashgate, 2010.
- Goodman, Steve. *Sonic Warfare: Sound, Affect, and the Ecology of Fear*. Cambridge & London: The MIT Press, 2010.
- Guattari, Félix. *Chaosmosis: an Ethico-Aesthetic Paradigm*. 1st edition. Translated by Paul Bains & Julian Pefanis. Sydney: Power Publications, 1995.
- Guattari, Félix. *The Three Ecologies*. 1st edition. Translated by Ian Pindar & Paul Sutton London & New Brunswick, NJ: The Athlone Press 2000.
- Haraway, Donna. *Staying with Trouble. Making Kin in the Chthulucene.*, 1st edition. Durham & London: Duke University Press, 2016.
- Hayles, N. Katherine. *How We Think. Digital Media and Contemporary Technogenesis*. 1st edition. Chicago & London: The University of Chicago Press, 2012.
- Hirsch, Andreas J. "Five Preliminary Notes on the Practice of AI and Art". In *The Practice of Art and AI*, edited by Gerfried Stocker, Markus Jandl and Andreas J. Hirsch, 11-43. Berlin: Ars Electronica/Hatje Cantz Verlag GmbH, 2021.
- Marks, Laura U. *Hanan al-Cinema: Affections for the Moving Image*. 1st edition. Cambridge & London: The MIT Press 2015.
- McHale, Brian. "Poetry as Prosthesis". *Poetics Today* 21 (1). (2000): 1–32. Accessed April 3, 2022. DOI: 10.1215/03335372-21-1-1
- Miller, J. Hillis. "The Critic as Host". In *Deconstruction and Criticism*, edited by Harold Bloom, Paul de Man, Jacques Derrida, Geoffrey H. Hartman and J. Hillis Miller, 177-208. London & New York: Continuum, 2004.

Murphie, Andrew & John Potts. *Culture & Technology*. New York: Palgrave MacMillan, 2003.

Oksanen, Satu. "Museum-as-compost-Matter, rhythms, and the nonhuman". In *Coexistence – Human, Animal and Nature in Kiasma's Collection*, edited by Sara Hacklin and Satu Oksanen, 71-95. Helsinki: Kiasma, 2019.

O'Sullivan, Simon & Stephen Zepke. "Introduction: The Production of the New". In *Deleuze, Guattari and the Production of the New*, edited by Simon O'Sullivan, and Stephen Zepke, 1-10. London & New York: Continuum, 2008.

Ozóg, Maciej. "Life in a Post-biological World. The Methodology and Praxis of Artificial Life in the Works of Christa Sommerer and Laurent Mignonneau". In *Wonderful Life: Laurent Mignonneau & Christa Sommerer*, edited by, Ryszard W. Kluszczynski and Jadwiga Charzynska, 11-22. Laznia: Laznia Center for Contemporary Art, 2012.

Parikka, Jussi: Media zoology and waste management – Animal energies and medianatures. In: *NECSUS. European Journal of Media Studies*, Jg. 2 (2013), Nr. 2, S. 527–544. Accessed February 12, 2021. DOI: <https://doi.org/10.25969/mediarep/15104>.

Pindar, Ian & Paul Sutton. "Translators' Introduction". In Guattari, Félix. *The Three Ecologies*. 1st edition. London & New Brunswick, NJ: The Athlone Press 2000.

Rowntree, Miriam. *Material Intimacy: Bearing Witness, Listening, and Wandering the Ruins*. Arlington: The University of Texas at Arlington, 2019. Accessed February 16, 2021. <http://hdl.handle.net/10106/28610>.

Salvesen, Britt. "Confirm You Are a Human: Perspectives on the Uncanny Valley". *International Journal for Digital Art History*, no. 6 (August). (2021): 2.2-2.15. Accessed April 5, 2022. <https://doi.org/10.11588/dah.2021.6.81164>.

Sommerer, Christa & Laurent Mignonneau, eds. *Art@Science*. Wien & New York: Springer Verlag, 1998.

Stocker, Gerfried, Markus Jandl & Andreas J. Hirsch. "Promises and Challenges in the Practice of Art and AI". In *The Practice of Art and AI*, edited by Gerfried Stocker, Markus Jandl and Andreas J. Hirsch, 8-9. Berlin: Ars Electronica/Hatje Cantz Verlag GmbH, 2021.

Wilson; Stephen. *Art+Science Now*. London: Thames & Hudson, 2010.

Zourabichvili, Francois. "Six Notes on the Percept (on the Relation between the Critical and the Clinical)". In *Deleuze: A Critical Reader*, edited by Paul Patton, 188-216. Bodmin: Blackwell Publishers Ltd., 1996.