

# The Worlds of Entanglements: Reflection on Posthumanist Ontologies in Art&Science Projects

---

Masha Zolotova

Linz, Austria  
zolotovamsh@gmail.com

## Abstract

A posthuman turn can be observed in many contemporary discourses. It is characterized by an endeavour to overcome the anthropocentric picture of the world, excluding from it the 'gap' between the world and human, a belief in human exclusivity, as well as the practice of organizing dichotomic systems.

The article relates the theories developed by Braidotti, Haraway and Ferrando and the notion of posthuman subject to the artistic exploration of the work with nonhuman others, trees, and fungi in particular. By talking on the posthuman subject and its ontological state, but more precisely by following the way we are interacting with nonhumans within the practice of selected artists, Olga Kisseleva and Saša Spačal, what their connections to humans are, the movement towards rethinking the role of humans and acknowledging those by whom we are surrounded can be traced. Thus, artists do not formulate their notion of posthuman subject, but rather they demonstrate another approach and attitude towards nonhumans: to consider the latter, trees or fungi in our case, as partners, not to build hierarchies because the equality of the partners and to acknowledge their 'knowledge' we can learn from.

## Keywords

Art&science, bioart, nonhumans, more-than-human worlding, ontology, posthumanism, technology.

## DOI

10.69564/ISEA2023-96-full-Zolotova-The-Worlds-of-Entanglements

## Introduction

---

“Who that ‘we’ is, and how to keep that collectivity open, multiple and nonhierarchical.”—Rosi Braidotti.<sup>3</sup>

The discussion on ecological crisis, the Sixth mass extinction, capitalistic overproduction and further problems connected to them, as well as a growing interest in postcolonial and feminist perspectives can be observed in many contemporary fields of thoughts, from scientists and academics to artists and activists. What unites these intellectual pursuits is an attempt to overcome the Cartesian understanding of a man and to go beyond anthropocentrism. But while humans, it would seem, are at the pinnacle of their domination over nature, the interconnectedness and equality of human and nonhuman life forms are becoming more generally recognized and being associated with a posthuman turn.

By working with living beings, plants or animals, artists gain an opportunity to reflect on the subject-object continuum from different perspectives. While some artists still consider living entities as an object for their investigation, others are moving forward and distinguish them as their partners or collaborators. Within this paper the focus is made on the analysis of pieces by two artists, Olga Kisseleva and Saša Spačal. They both work collaboratively with scientist and their long-term research is dedicated respectively to trees and their communicative networks within the multi-faceted project *EDEN (Ethics–Durability–Ecology–Nature)*, and to fungi, their embeddedness in the human environment at the installation *Myconnect* and further the *MycoMythologies*.

Taking art&science field, the one that by its definition is based on the dialogue and interaction between different actors, as a prominent ground for discussion, the following question is raised in this paper: how does new understanding of the world, informed by posthumanist and new ontological perspectives, the interconnectedness between human and nonhuman agents, inform the field of art&science collaborations and reveal itself in the artworks?

### Posthuman turn: more-than-human forms of existence

---

A posthuman turn can be observed in many contemporary discourses. It is characterized by an endeavour to overcome the anthropocentric picture of the world, excluding from it the ‘gap’ between the world and human, a belief in human exclusivity, as well as the

practice of organizing dichotomic systems (such as subject and object, nature and culture, man and woman, and etc.). This term is, rather, a peripheral cultural-discursive theory in modern philosophy, that combines several social, ethical and natural science concepts, as well as developed ontological and epistemological perspectives. Following Francesca Ferrando, posthumanism is defined by three aspects: post-humanism, post-dualism and post-anthropocentrism. Post-humanism implies a rejection of classical humanism, that is, a universal and generalized understanding of man in favour of a plurality of connotations of nature and human capabilities. Post-anthropocentrism seeks to deconstruct a centrality of human figure, and post-dualism seeks to reject the rigid way of identity, represented in the symbolic dualistic categories. At the same time, the prefix ‘post-’ in the word posthumanism does not necessarily indicate the end of human as a species. ‘Post-’ refers to all the historical and non-historical experiences of the existence of nonhuman others, both in the era before and after humanism. Thus, ‘post-’ in posthumanism moves our attention to what for centuries was excluded from the humanistic picture of the world or was subjected to repression<sup>17</sup>. We could notice the emphasis on the analysis and critique of the notion of ‘man’ formed in the framework of the Enlightenment. Man as an autonomous being, his consciousness and the predominance of his reason, as well as his superiority over other human, animals and plants, nature in general, becomes a subject for the re-evaluation and negation.

Olga Kisseleva focuses her attention on trees: starting from the Elm of Biscarosse then Japanese cedars or Kauri trees in New Zealand. The artist was interested in establishing the missing connection among trees of the related species and facilitating their communication over the continents through specifically developed technological network, so to help them survive. Devices that measure, among others, VOC (volatile organic compounds) or barrel thickness, the basic characteristics to be captured for studying plants, have been connected through internet and thus, could pass over the signals on the distance what is not possible on a biological level without such technological mediation. So, the first iterations of the project were focused not on building contact in between human and trees, but to connect nonhuman beings with each other. The shift of the focus from tree—human to tree—tree communication, at my point of view, is a sign of putting away pre-described hierarchies and focusing on the sentience of trees at the same level of importance as the human one, an approach to provide an alternative vision. Saša Spačal, on her side, postulates that her

focus placed primarily on the posthuman condition that supposes humans are not masters of the world, but rather their existence and actions are elements of a much wider and complicated ecosystem. Since the beginning of the 2010s, she has been working with different biological matters as fungi in *Myconnect* (2013), plants, red clover in particular, in the *Symbiome* installation (2016), bacteria, as *Mycobacterium vaccae* in *Inspiration* (2018) and others. By addressing the above-mentioned nonhumans and by building the artistic statement using biotechnological methods in tight connections to and with them, Spačal reveals interactions appearing between different living beings and the way they are framing up our environment <sup>11</sup>.

The definition of the subject is a first one out of the ontological assumptions for criticism and reorientation. Current re-evaluation leads to further exploration of the boundaries, with the implicit notion that living can be attributed equally to human and nonhuman beings, or in a broad spectrum of more-than-human forms of existence. As noticed by Karen Barad, this is an opportunity to overcome the centrality of human taking into account the “differential constitution and differential positioning of the human among other creatures (both living and non-living)” <sup>1</sup>.

## Embedded and embodied aspect of the posthuman subject

---

Ontology offers a critical shorthand for exploring the characteristics of being, human or nonhuman. If previously, objects were distributed over different ontological regions and logical classes, now these heterogeneous entities find themselves on the same ontological plane. They are all actors, equal in their ability to act and interact, in which it is determined what they are and what they will be. <sup>10</sup>

The relational dimension became the crucial point in defining the posthumanist ontology. Rosi Braidotti defines a posthuman subject as “a relational subject constituted in and by multiplicity, that is to say a subject that works across differences and is also internally differentiated, but still grounded and accountable”. <sup>2</sup> Building the analysis on the relationality, she emphasized the embedded and embodied aspect of the posthuman subject. At the same time, to describe the relations between human and animal, Donna Haraway uses the notion of knot, “a knot of species co-shaping one another in layers of reciprocating complexity”. <sup>8</sup> As a result, further characteristics of a new ontological state have been formulated on the basis of the theoretical

convergence of the directions mentioned above: we are not existing in the dialectical world based on the opposition of external and internal, so humans are not the dualistic entities, they are rather “materially embedded subject-in-process” that are disseminated within the networks of relations with “forces, entities and encounters”. <sup>5</sup> Thus, the world is built on the interconnectedness and multispecies entanglements. We are not alone and separated, we are connected, embedded, and entangled.

Taking this point as a basis, Spačal is willing to reveal interweavings with the help of mycelium and fungi, trying to reflect on the ways fungal underground networks could inform humans and how this learning process can be mediated and shaped by technologies. The artist investigates “how fungal ontologies could help humans practice multispecies survival through practice of inclusion and caring” <sup>14</sup>. Within *MycoMythologies* series the artist tries to make these connections perceptible to viewers with the help of visual and aural tools. The entanglement presented is intended to let us think about what kind of networks we are. The entanglement presented is intended to let us think about what kind of networks we are. As it was summarized by the artist, “By making new connections with other biological species and environment one might step out of anthropocentric perspective even if for just one moment to experience fresh air of other possibilities”. <sup>13</sup>

The installation *MycoMythologies: Rupture* serves as a proof of the biotechnological connections in planetary life: the screens are linked with each other and any change in the system, the way nutrients are distributed and taken out of it, causes changes in video and audio representation, while in *MycoMythologies: Patterning* fungal structure becomes a great metaphor for the interconnected world: here the microbiome reveals the influence one actor could have on another. Within its framework, a tree reveals itself as a posthuman subject: embodied, and embedded, connected to other entities and being a part of a broader network that manifests itself by the relations that appear within and constitute it. The ways the project was presented in different locations around the world were chosen to show a tree as an ecologically interlinked being with multiple connections, as an equal partner that has its own perception of time and world around, holds a particular knowledge that could be shared for the good of both actors, a human and a tree. Art, this way, generates new knowledge and expresses more reasons to understand relations we are entangled in, to take more agency into shaping the world. Olga Kisseleva takes a scientific

discovery, works with it within different contexts, and then presents to the wider audience by revealing internal issues we have with nature, culture, or history.

Posthuman subjects are a work-in-progress: they emerge as both a critical and a creative project within the posthuman convergence along posthumanist and postanthropocentric axes of interrogation. In its critique of the dichotomy between human and nonhuman, posthumanism offers not to prioritize one category above the other, but “embrac[e] both relationally, as intraconnected actants in an open and respondent context, which is also constantly shifting”<sup>6</sup>. As it could be understood, we are not talking about separating the nonhuman into a hermetic category, but, on the contrary, about its complication, amplification; not about drawing the strict line and making a strict distinction between human and nonhuman, but about multiplying boundaries and dividing lines from within the nonhuman. Thus, the nonhuman is always already implicitly present in human: the border has already been broken, and the threshold has been crossed.

## Nonhuman knowledge

---

Acknowledging nonhuman beings and assigning them the same ontological status, including admitting the value of their experience as well, can open up the horizons for further scientific and artistic research. Thus, the investigation on plant intelligence as a scientific track could be considered as a point in science to promote a new attitude towards a subject of investigation previously considered as a non-sentient being due to the absence of brain and neural system in comparison to animals. With the development of Critical Plant Studies further changes could be followed: plants are not considered anymore as passive objects, they are sentient beings that could respond to the changes in the environment, and they have adaptive behaviour, communication possibilities, intelligence, memory<sup>7</sup>.

Sasa Spačal started to work with fungi and investigate with scientists their ability to capture and pass signals back in 2012 as a participant of a bio-hack workshop. In *MycoMythologies* series, a speculative artistic research project, fungi are already considered as full participants of the storytelling creation, as well as the narrative transmission to the viewers at the exhibition space. They are not the objects to be observed, but rather subjects with their own perspectives, the holders of their own knowledge to be learned from. And this collaboration with nonhumans is fuelled by technological

mediation. Not only advanced software, but even the simple microscope facilitates such interactions while just making visible something that is hidden from our eyes.

The *EDEN* project gives voice to trees, creates the digital representation of what cannot be grasped by our senses – to be seen and smelled, to capture the flux of information. The system studies the links between digital and biological networks in real time, creating a poetic and artistic vision of the original communication, it leaves the first place to nature, “not exploited or oppressed, but listened and heard”<sup>9</sup>. At the same time, it is crucial that such an exposure talking into the account the specificity of its subject. The application presented at WRO Biennale in 2019 was supposed to change colours appearing on the screen and let visitors follow how image is changing. So, they can shift their attention to the temporal aspect of the tree beings, the fact their communication is much slower than human one, how different the speed of response is. There is no clear answer or transcription of this ‘tree speech’, but it rather lets visitors experience its temporality. Trees are considered within the *EDEN* project not only as silent witnesses but also as the actors who can transmit this knowledge further and at some point - learn from it.

So, the knowledge we can receive from plants, animals, and natural phenomena can be valuable not only for humans, but also for the technologies we are working on. Thus, it became clear for the artist that we can learn from trees or fungi something that is not accessible to learn in any other way, so they are our partners. This way of thinking is a crucial part of posthuman convergence, as it is addressed by Rosi Braidotti, because zoe let us to acknowledge that

“thinking and the capacity to produce knowledge is not the exclusive prerogative of humans alone but is distributed across all living matter and throughout self-organizing technological networks”<sup>4</sup>.

## Networks of entanglements

---

Living organisms are highly entangled cannot be grasped without their networks of entanglements, without putting attention on the connections they have with other living beings and their environment. The most obvious example to illustrate this point is the human, in fact, not an independent living entity, but that coexists with other organisms even within itself, as Anna Tsing writes, “[h]uman nature is an interspecies relationship”<sup>15</sup>. Moreover, the posthumanism and non-anthropocentric model are associated not only with the decentring of the

human, but also with the decentring of a subject's position as such. It shifts the focus to the production of subjectivity, again not a fixed notion, but embedded and processual characteristic.

The first case of addressing to fungi in Saša Spačal's artistic practice was the installation *MyConnect* that she defines as "a symbiotic interspecies connector that questions anthropocentric division of nature-human-technology".<sup>12</sup> Within the stand-capsule developed, the signals and impulses create a feedback loop by the means of biological and technological mediation that lets visitors experience the symbiotic interdependence between their bodies and fungal mycelium in a very tangible manner. The signal coming from the viewer's heartbeat moves along the mycelium in petri dishes: Spačal is using either Oyster mushrooms (genus *Pleurotus*), or Shiitake (*Lentinula edodes*), and is processed by it in real time. The processed signal is transmitted back to the human body in the form of sound, light, and tactile impulses. Their impact on the nervous system causes a change in the heart rate in the viewer and starts a new cycle; the process can be repeated endlessly; thus the human nervous system and the mycelium of the fungus are closed on each other in a feedback loop. This lets the symbiosis of signals begin.

The electrical feedback in fungi that could be measured and traced in real time and allow the viewers to have a proper interactive experience is one of the major points to choose this species. Fungi, being one of the most prevailing life forms, and mycelium, creating the symbiotic relationships with plants by forming mycorrhiza and facilitating the nutrients flow among them, demonstrate their great potential to be a basis for the reflection on symbiotic relations and interconnections that are inscribed in our nature. Thus, fungi, mostly invisible to the human, as soon as they are started to be investigated, reveal themselves in every leaf, every piece of soil, they are everywhere. No matter that they are part of human life, they are embedded in our lives, even though they are unseen, covered by soil and having a small scale in comparison to the human environment.

As mentioned already, Olga Kisseleva focused her attention on the communication, chemical interaction between trees and new systems that can evolve with the directed technological mediation. Another element of the *EDEN* project as "an organic network based on vegetal medium" is a datascape. It is an interactive program that indicates and unites the actors in the network, more precisely, trees connected to the system through sensors and captures, gathers the information and later serves as a source for all visual displays. By

creating this network connection, the artist and the scientists were interested in allowing the trees to communicate despite the distance. Highlighting that it is possible to understand and receive the communication of a tree is one thing, to consider within the interdisciplinary group of the specialists that it can be transmitted and appreciated by one of its congeners living on a different continent is another.

As it can be seen, it is crucial to work collaboratively in the intersection of art, science and technology, this approach can reach beyond and let us think more on the way our world is constructed and how everything is linked within it. How can we live together? How can we acknowledge our mutual existence, the connections existing in our networked society and world?

## Conclusion

---

Overall, it can be stated that posthumanism, by itself, has become an umbrella term that includes different perspectives, in an era where the symbolic boundaries of the 'human' have been ultimately challenged. Along with that, posthumanism is interested in how one should think in order to coexist with nonhuman life forms and offers an ethical and political program (Haraway 2003, Braidotti 2019).

The ontological effort lies in acknowledging that the human may not be human after all, which calls to re-think existence and being in the world. The consequence is epistemic because if we assume that our being and becoming is different from what we previously thought (given that we are likely to be implicated in a posthuman life), we can no longer explain how we experience and think in conventional epistemological terms. The enquiry into a posthuman condition is to revisit the constitution and function of the world and life.

By talking on the posthuman subject and its ontological state, but more precisely by following the way we are interacting with nonhumans within the practice of selected artists, what their connections to humans are, we can trace the movement towards rethinking the role of humans and acknowledging those by whom we are surrounded. Thus, artists do not formulate their notion of posthuman subject, but rather they demonstrate another approach and attitude towards nonhumans: to consider the latter, trees or fungi in our case, as partners, not to build hierarchies because the equality of the partners and to acknowledge their 'knowledge' we can learn from.

This emphasis on the relations appearing among subjects and in the system as a whole, the tendency to make these interconnections explicit are the major posthumanist categories the artists refer to. As it was noticed by Anna Tsing, artistic projects let people learn “to accept that we are all part of the same interconnected system”<sup>16</sup>. Thus, I suggest considering approaches proposed by Olga Kisseleva and Saša Spačal as an indicator of change that could lead us to the refusal of a purely anthropocentric perspective. By not prioritizing one category over another, human over nonhuman or vice versa, by opening up such an approach to the scientific community during the collaborative work and to wider audience in the framework of exhibitions and art festivals, we are going towards a new posthuman subject.

## References

- 1 Karen Barad, *Meeting the Universe Halfway*, Durham, London, Duke University Press, 2007, p.136.
- 2 Rosi Braidotti, *The Posthuman*, Cambridge, Polity Press, 2013, p.49.
- 3 Rosi Braidotti, *The Posthuman Knowledge*, Cambridge, Polity Press, 2019, p.3.
- 4 Rosi Braidotti, *The Posthuman Knowledge*, Cambridge: Polity Press, 2019, p.94.
- 5 Rosi Braidotti, Maria Hlavajova, eds. *Posthuman Glossary*. London, New York, Bloomsbury Academic, 2018.
- 6 Francesca Ferrando, *Philosophical Posthumanism*, New York, Bloomsbury Publishing, 2019, p.165.
- 7 Matthew Hall, *Plants as Persons: A Philosophical Botany*, New York, State University of New York Press, 2011.
- 8 Donna Haraway, *When Species Meet*, Minneapolis, University of Minnesota Press, 2008, p.42.
- 9 Olga Kisseleva, *Du travail collectif a l'oeuvre*, Paris, Nouvelle Edition Place, 2017, p.97.
- 10 Bruno Latour, *Science in action: how to follow scientists and engineers through society*, Cambridge, Massachusetts, Harvard University Press, 1987.
- 11 Saša Spačal, “Connection continuum: a life”, in *Experiencing Unconventional: Science In Art*, ed. Theresa Schubert and Adam Adamatzky, 2015, p.175-206.
- 12 Saša Spačal, “Myconnect”, accessed December 1, 2022, <https://www.agapea.si/en/projects/myconnect>
- 13 Saša Spačal, “MycoMythologies: Patterning”, accessed on December 1, 2022, <https://www.agapea.si/en/projects/mycomythologies-patterning>
- 14 Saša Spačal, “MycoMythologies”, S+T+Arts Prize website, accessed December 1, 2022, <https://startsprize.aec.at/en/mycomythologies/>

15 Anna Tsing, “Unruly Edges: Mushrooms as Companion Species”, *Environmental Humanities* 1, 2012, p.144.

16 Anna Tsing, “When Things We Study Respond to Each Other: Tools for Unpacking ‘The Material’”, in *More-than-Human*, ed. Andr.s Jaque, Marina Otero Verzier, and Lucia Pietrouisti, Rotterdam: Het Nieuwe Instituut, 2020, p.83.

17 Cary Wolfe, *What is posthumanism?* Minneapolis: University of Minnesota Press, 2010.

## Bibliography

Karen Barad, “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter”, in *Signs: Journal of Women in Culture and Society*, vol. 28, No 3, Spring 2003, 801-831.

Laura Beloff, “Hybrid Ecology – To See The Forest For The Trees”, in *Art As We Don't Know It*, ed. Erich Berger, Kasper Mäki-Reinikka, Kira O'Reilly and Helena Sederholm, Aalto, Aalto ARTS Books, 2020.

Ryszard W. Kluszczyński, “Looking at the World through the Eyes of Other? Art as Non-Anthropocentric Ecology”, in Victoria Vesna. *Towards a Non-Anthropocentric Ecology and Art in the World of Anthropocene*, ed. Ryszard W. Kluszczyński, Gdańsk – Łódź: Laznia Center for Contemporary Art, Łódź University Press, 2020, 6-27.

“Olga Kisseleva, EDEN, 2012-2021”, ed. Maria-Laure Dejardins, Paris, ARTSHEBDOM.DIAS, 2021

Regine Rapp, On mycohuman performances: fungi in current artistic research, *Fungal Biol Biotechnol* 6:22, December 2019, doi: 10.1186/s40694-019-0085-6

Jakob von Uexküll, *A Foray into the Worlds of Animal and Humans, with A Theory of Meaning*, Translated by Joseph D.O'Neil, Minneapolis, University of Minnesota Press, 2010.

Rosi Braidotti, “Posthuman, All Too Human: Towards a New Process Ontology”, in *Theory, Culture and Society*, 23, 7-8, p.197- 208.

Richard Grusin, ed. *Nonhuman Turn*, Minneapolis, University of Minnesota Press, 2015.

Donna Haraway, “Symbiogenesis, Symptoiesis, and Art Science Activisms for Staying with the Trouble”, in *Arts of Living on a Damaged Planet. Ghosts and Monsters of the Anthropocene*, ed. Anna Tsing, Heather Swanson, Elaine Gan and Nils Bubandt, Minneapolis: University of Minnesota Press, 2017, 25-50.

N. Katherine Hayles, *How we became posthuman, Virtual bodies in cybernetics, literature, and informatics*, Chicago, The University of Chicago Press, 1999.

Erich Hörl, James Burton, ed. *General Ecology: the New Ecological Paradigm*, London, Bloomsbury Academic, 2017.