Lay talk PhD graduation Adam Lukawski, 21 November 2025

Many things can be considered a musical work: scores, manuscripts, performances, recordings... but even if we focus only on sound, the imaginary space of all possible music would still constitute an enormous space of possibilities.

A quick thought experiment shows the scale.

Let's take a compositional task of writing twelve chords for an instrument with a range of only two octaves. We could imagine this as a musical material for a very short miniature to be performed on a toy piano. The number of all possible solutions is about five million times larger than the estimated number of protons in the observable universe. Such a space is so large that not even the most powerful supercomputer could check all options one by one within any reasonable timeframe.

Despite the difficulty of the described problem, musicians do not explore this space blindly. In fact, musicians effectively handle enormous musical spaces every day. Improvisers craft new progressions on stage in real time, and composers sketch ideas long before they test every possible alternative.

This is possible, because the brain is built for good-enough answers when time and data are scarce. As neuroscientist Samuel Gershman writes, "the brain is evolution's solution to the twin problems of limited data and limited computation".

Artificial Intelligence copies these strategies. A large part of the inspiration for Artificial Intelligence is the human brain and the tasks best solved with AI are not the ones that machines have already been better at, but the opposite—AI helps automate typically human tasks that we don't know how to automate otherwise.

It is very often nowadays to hear that Artificial Intelligence replaces artists in various creative tasks. However, automation of art-making by AI is not as simple as it might seem. Researcher Sofian Audry warns that artistic practice differs fundamentally from engineering or other problem-solving paradigms in that it does not begin with a predefined problem to be solved. Instead, art generates fields of problematisation—open-ended contexts that provoke questioning, uncertainty, and reflection. Put simply: to make art is not to solve problems, but to critique, pose new challenges, and generate new problems in a specific time and context.

AI models trained on music from the past are increasingly becoming undistinguishably good at reproducing the style of such learned material in new configurations, which makes these models great for making more of the music that we already know. At the same time, these models struggle to generate true novelty in experimental contemporary music contexts.

This, however, has been challenged in my research through the creative use of increasingly popular Large Language Models. What everyone knows from tools such as

ChatGPT can now be used not only for generating text, but also as reasoning agents with the ability to control various tools, including thouse used for music-making.

The posthuman take in the arts and in philosophy is that the creative agent no longer has to be human; art can also be made by non-human agents.

The capability of AI to imitate human reasoning matters here, because it means that creative decisions no longer come only from humans. AI agents become decision-making actants: they can set aims, choose methods, change the artwork, and give reasons for each step. Thus, agency is now distributed across human and non-human actors.

In response to these initial observations, in its first phase, my doctoral research project focussed on exploring how the established creative roles of artists can be re-envisioned in a posthuman context. For that exploratory purpose I engaged in activities such as teaching an experimental course, organising a conference and publishing a co-edited book, to properly map the field before developing the core ideas of my thesis.

The first artistic role re-envisioned by the project is the role of an artist as an operator of agential tools: an artist who uses pre-existing tools for automating various creative process. Iannis Xenakis summarised this role in *Formalized Music*, describing the composer working with the aid of computers as "a sort of pilot: who presses the buttons, introduces coordinates, and supervises the controls of a cosmic vessel sailing in the space of sound, across sonic constellations and galaxies that they could formerly glimpse only as a distant dream. Now the artists can explore them at their ease, seated in an armchair". The key difference in the posthuman context is that these tools can now also exhibit intelligent behaviour.

This leads to the second re-envisioned role: the artist as a curator of agential assemblages. An assemblage is a concept describing dynamic grouping of elements—human and non-human, material and expressive—that form a functional whole without losing their individual properties. What matters is not a fixed structure, but the shifting network of relations between elements. An artist who composes using intelligent processes performed by human and non-human agents can then be seen as a curator of agencies rather than the sole originator of the musical material—a curator of relations between actants, in other words, a curator of agential assemblages.

But to automate various aspects of the creative process, artists have always not only been using tools but also participated in their creation, which in the posthuman context leads to the third re-envisioned role: artists as builders of intelligent systems. The focus shifts from composing outputs and stand-alone works to composing systems capable of producing artworks. Importantly, the identity of such an artwork no longer lies in any single output of a generative system, but in the system that generates artistic outputs. In other words, sometimes the intelligent system itself can be considered an artwork.

The fourth role is the artist as a builder of creative ecosystems in which humans and AI agents can co-create on top of each other's contributions. This is what I call worlding.

Philosopher Martin Heidegger used the term “worlding” to mean that a world reveals itself through how we live and act in it, rather than as something we build. Then, philosopher Donna Haraway took it further: worlding is about people and non-humans—like animals, tools, or AI—shaping one another as they live and create together. In practice, worlding can mean composing art ecosystems that others can enter, use, and transform thought their interactions.

My research then asked a simply-framed but hard question: how can we technically enable an artistic practice of worlding such ecosystems?

I proposed a new kind of technical solution: the Decentralised Creative Network. Its goal is to let many agents—people and AI—build on one another’s work with trust, and by keeping the provenance clear. To make this possible, I used another emerging technology: blockchain. Here is a plain explanation of why.

Typically, on the Internet, many computers each run their own software and then exchange information. There are many sources of truth, which are hard to align. By contrast, on a blockchain, many computers together simulate one shared computer. When software is installed on this shared computer, it is installed everywhere at once, and there is only one shared source of truth. And because execution occurs on a single shared machine, multiple actants can treat computer programs installed on such a machine as performative operations in artistic contexts, and transparently build on each other’s contributions.

This is where the key invention of my thesis comes in: Performative Transactions.
Performative Transactions are programs on the blockchain’s shared computer designed for composing. As presented in my doctoral concert, this system already works in practice. AI agents can plan steps, select materials, and explain choices; Performative Transactions register creative contributions and generate new versions of artworks; and, importantly: others can transparently build further works from these building blocks.

The project then, proposes a workable model for art in the posthuman era. It treats every human and every intelligent system as a potential collaborator. It invites any reasoning agent into the same ecosystem, where creative work can be reused, credited, and grown over time.

Worlding, in this sense, becomes a practical and technical term, allowing for a concrete artistic practice: building the ecosystems in which new art can happen—together.