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Performative transactions: worlding compositional ecosystems

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Conclusions

Artistic research is most compelling when it folds theory back into practice and allows practice to remake theory in return. This dissertation set out to test that recursive promise by asking how composers might create—not only new pieces—but the very infrastructures through which future pieces, collaborations, and even compositional worlds can emerge. Across six chapters the inquiry moved from close readings of present-day tool use to the speculative design and prototyping of a fully functioning blockchain-based compositional ecosystem. What follows gathers the main insights of that journey, clarifies their wider significance, and sketches the paths that now open beyond the confines of this doctoral dissertation.

Chapters 1–4 traced a gradient of artistic agency. Beginning with artists as operators who deftly steer complex AI models, the discussion shifted to artists as curators of agential assemblages, system-builders who encode generative logics, and finally artists worlding ecosystems—architects of conditions under which musical ecosystem can emerge rather than of isolated works. Read together, these roles chart a deliberate expansion: from interacting with single tools, to configuring relations among many human and non-human agents, to composing the ontogenetic field in which all later relations will take place. The arc suggests that the most urgent creative task today is neither to celebrate nor to resist technology, but to decide how and for whom techno-artistic systems should be built.

To name the expanded task of *composing the capacity to transform* the thesis introduced the concept of allagmatic composition—a mode in which the composed system is capable of autonomously transforming itself. Where generative music varies outputs within fixed procedures, an allagmatic work can re-write its own procedures as it runs, producing what Simondon called transductive events that continually redraw the horizon of future possibility. In practical terms this concept reframes composition as the design of epistemically complex artefacts whose value lies not in finished sounds but in sustained capacities for learning, adaptation, and knowledge production.

The practice of *worlding compositional ecosystems* was proposed as consisting of two steps: 1) iterative envisioning of an abstract machine with its operations and relations of various actants, objects, processes, and their interrelations with the (abstract) system, and 2) operationalising such an abstract machine in an actual technical system,

a functioning machine with precisely defined set of executable operations. Chapters 5-6 exemplified such *worlding of a new compositional ecosystem* in practice to first conceptualise and then operationalise a new blockchain-based system for music composition in which human and non-human actants can transparently build on top of each other's compositional processes.

Following the first step of how the proposed process of worlding a compositional ecosystem proceeds, Chapter 5 condensed the conceptual and theoretical findings of the previous four chapters into an abstract diagram of relations and conditions. The resulting Autopoietic Rhizomatic Metamodelling Machine (ARMM): an abstract machine (in Guattarian sense) envisioned the operationalisation of a system that treats every compositional act as a modular virtual machine. Rhizomatic in structure and autopoietic in behaviour, the ARMM is an infrastructural diagram—one that serves as a set of interrelated conditions and principles for operationalising a technical system in which generative, interactive, and allagmatic practices can co-exist. By elevating the process of metamodelling—modelling how models themselves can be built—the ARMM helped envisioning a technical system that offers composers a vantage point from which to shape not just musical forms, but the very grammars of formation.

Chapter 6 built on the conceptual diagram of the ARMM conceptualise and describe a concrete technical system. It introduced a concept of Decentralised Creative Networks (DCNs)—an Application Programming Interface that enables storing compositional processes as smart contract on the blockchain that human and non-human agents can reuse within the operational logics of their own compositional machines. Within this network, the atomic act is the Performative Transaction (PT): an executable compositional process that calls features, applies transformations, checks conditions, and—crucially—retains full provenance of every element it mobilises. Traceability, modularity, and interoperability are enforced at the level of the ontology of the system itself.

Methodologically, the project combined compositional experimentation, speculative design, and collaborative software engineering. A year-long collaboration with programmer Michał Skarżyński converted conceptual developments of this thesis and code prototypes into a public API, test server, and Solidity contracts, demonstrating that aesthetic claims can (and should) be validated in running code as well as in text. The resulting infrastructure is itself an artefact of research, capable of hosting future

studies that will in turn modify the system that enabled them—a live demonstration of recursive world-building.

A list of contributions could be categorised as follows:

1. Conceptual.

- A four-tier model of technological artistry, culminating in the ecosystemic worlding (Chapters 1-4).
- The definition of allagmatic composition as a mode of music-making.
- The Autopoietic Rhizomatic Metamodelling Machine (ARMM), a diagram of principles for crafting future creative systems.

2. Technical.

- The concepts of Decentralised Creative Networks with Performative Transactions that encode, execute, and document compositional processes on the blockchain.
- Three experimental prototypes of generative music NFTs: *Canons*, *Tone Row*, and *Subtraction*, as described in Chapter 3.

3. Methodological and Pedagogical

- A new educational course titled “Posthuman Creativity Labs: Artificial Intelligence and Blockchain in Music”, described in Chapter 1.
- Methods for composing with Artificial Intelligence resulting from the course, as described in Chapter 1.
- A template for practice-led infrastructural artistic research that marries artistic intuition with rigorous software development.

4. Cultural-ethical

- A proposal for transparent, shareable authorship that accommodates human and non-human contributors without collapsing into either Romantic singularity or corporate platform logic.
- New music compositions using the described system of Performative Transactions in practice, presented in a concert accompanying the defence of this doctoral trajectory.

Several constraints accompany these advances. First, the complexity of smart-contract ecosystems, despite them being designed for lowering the technical bar of entry might nevertheless still require further development of more intuitive user interfaces. Pedagogical materials and documentations are also an urgent next step. Second, blockchain's energy footprint and evolving legal status pose environmental and regulatory hurdles that must be monitored as the system scales. Third, while Performative Transactions guarantee traceability, they do not in themselves resolve questions of economic value, remuneration, or cultural legitimacy. Finally, the aesthetic assumptions baked into any initial library of features may inadvertently bias what kinds of music flourish on the network—a reminder that openness is a continuous labour, not a one-time design choice.

Future directions thus might be predicted to: 1) developing further musical works within the established framework, not only for aesthetic and artistic exploration, but also for further experimentation on posthuman creativity, human-AI collaboration, and interrogation of the possible future Intellectual Property regimes, 2) focus on the user-layer design, by developing visual editors and no-code interfaces to lower adoption barriers, 3) adapting the logic of Performative Transactions to various types of musical and non-musical artistic practices testing ARMM's discipline-agnostic promise, 4) experimentation with on-chain voting or reputation systems so that the network itself evolves under collective stewardship, not under a single maintainer (for instance as a Decentralised Autonomous Organisation), 5) exploring Layer-2 or alternative consensus protocols to mitigate ecological costs, 6) integrating Decentralised Creative Networks tooling into the *Posthuman Creativity Labs* curriculum, letting students experience compositional world-building firsthand.

By turning composition into a publicly-queryable API the project positions artistic research as infrastructural invention—a stance that resonates with recent calls to treat the art world as a medium in its own right. For musicology, the work invites fresh analytic categories focused on processual provenance rather than score or recording. For cultural policy, it offers a blueprint for decentralised authorship frameworks at a moment when AI blurs traditional Intellectual Property boundaries. And for computer science, it provides a use-case in which blockchain is neither a speculative asset nor a supply-chain ledger, but a generative artistic commons.

If, as the thesis argues, we are no longer composing only sounds or scores, but the systems through which composition itself can unfold, then every composer is,

implicitly, a legislator of future musical ecology. The artistic-technological stack proposed here is one possible constitution: provisional, hackable, oriented toward collective flourishing. Its value will be measured not by the permanence of any single artefact but by the diversity of practices it can host and the unforeseen transformations it can survive.

The subtitle of this dissertation—Worlding Compositional Ecosystems—was never a metaphor. Worlding names an active, unfinished verb; ecosystem names a milieu whose health depends on heterogeneity. The research has offered an initial seed-bed, encoded in prose, code, and working prototypes. Whether that seed germinates now depends on the communities willing to cultivate, critique, and mutate it. In the spirit of allagmatic thought, the final gesture is therefore not to seal conclusions but to invite performative transactions yet to come—transactions that will rewrite both the network's logic and the author's own thinking. May the system continue to compose itself through the many minds, human and machinic, that choose to enter its field.