

Orrery Arcana: Esoteric and Ecological Correspondences

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Fig. 1. Orrery Arcana, Side View, Debut Performance at Queensland Conservatorium, Griffith University (QCGU), April 30, 2018. Still image from performance video documentation, author's own.

1 Program Notes

Orrery Arcana is a bespoke performance system that integrates custom sensing hardware, planetary gear mechanisms, Tarot-driven chance operations, and real-time ephemeris data into a ritualised improvisational framework. The instrument foregrounds embodied interaction and symbolic gesture, positioning improvisation as a semi-automated process within a deliberately indeterminate system. The system and performance concept are designed to evoke a process akin to divination through automatic writing.

The hardware comprises a hand-built controller with a planetary gear train whose manual rotation governs timing and event sequencing. Each gear incorporates light, magnetic, and capacitive-touch sensors, activated through modular acrylic rings embedded with magnets that encode Tarot correspondences. These sensor streams drive custom processes via Max/MSP and Python, controlling synthesis engines, sample playback, and audio processing derived from the performer's field recordings. Mappings blend deterministic (astronomical data) and stochastic (real-time Tarot draws) processes to generate an evolving, chance-based score.

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First presented in 2018, *Orrery Arcana* has evolved through ongoing redesign and re-voicing. For NIME 2026, its sound world centres on field recordings made in the Ecuadorian rainforest in collaboration with members of the Cofán community and acoustic ecologists—materials originally captured as documentation of endangered soundscapes. Recontextualised here, they extend the work's themes of cosmology, collaboration, and ecological connection.

2 Project Description

Orrery Arcana is a bespoke system for real-time improvisational solo performance that integrates light, magnetic, and capacitive-touch sensing; planetary gear trains; real-time ephemeris data; chance operations via Tarot cards; and custom software, within an explicitly ritualised performance context. The intention of ritual is articulated through the physical design of the instrument, its staging, the overt use of divinatory tools, and the performer's gestural interaction with the system. Together, these elements are designed to facilitate a process analogous to automatic writing, situating improvisation within a structured yet indeterminate framework. This framing situates chance and determinism as analogues for ecological and social systems shaped by forces both imposed and unpredictable. In later iterations, these dynamics extend to the source materials themselves, whose sonic contingencies reflect environments and communities subject to external extraction and planetary-scale processes.

The system comprises custom software for real-time signal processing, developed in Max/MSP and Python, and a self-built hardware controller incorporating a planetary gear train. Manual rotation of the gears affords control over timing and sequenced events. Each gear is fitted with a sensor plate containing light, magnetic, and capacitive-touch sensors, which are primarily engaged through tactile, modular control objects. These objects take the form of concentric coloured acrylic rings with embedded magnets corresponding symbolically and numerically to Tarot cards. Sound sources include synthesis engines that emulate the author's DIY hardware instruments based on the CD4040 binary counter/divider CMOS IC, and curated samples drawn from the author's field recordings. Synthesis parameters and effect processing are governed by automated mappings utilising ephemeris data via NASA's Horizons Ephemeris System, and Tarot correspondences based on Alejandro Jodorowsky's [1] Tarot numerology and symbolism. Live sensor input enables improvisation within a chance-based score generated through real-time Tarot card draws. A detailed account of the system's concept, technical architecture, mapping strategies, and design approach is developed in the author's doctoral dissertation, *Orrery Arcana: Musical Materiality through Esoteric Devices* [2].

The project investigates how integrating technology, aesthetics, and phenomenological engagement with non-musical source materials can produce an evocative performance experience when framed as ritual. Within this frame, the system's oscillation between deterministic control (astronomical data, mechanical gearing) and indeterminate intervention (Tarot draws, light sensor input) mirrors ecological conditions in which local agency operates under larger, often non-negotiable structures. By foregrounding physical form and symbolic gesture, the system deliberately obscures conventional music-making processes, redirecting audience attention away from technical architecture and toward a shared experiential space between performer and listeners.

First debuted in 2018, *Orrery Arcana* has undergone continual development, countering the tendency for NIME instruments to remain at the prototype or demonstrative stage. Ongoing software evolution and shifts in sonic materials have enabled sustained artistic exploration. In response to the NIME 2026 theme *Communities*, the core sample banks have been reconfigured to include field recordings from the Ecuadorian rainforest in 2023, recorded in collaboration with members of the Cofán

community and a small team of acoustic ecologists. Originally intended as archival documentation of endangered soundscapes threatened by mining development, these recordings are recontextualised within *Orrery Arcana* as performative material and contingent agents within the system. Their inclusion into a chance-based score foregrounds the tension between planetary-scale forces and localised ecological vulnerability. In this iteration, sounds commonly associated with the rainforest are juxtaposed with sounds of tools and machinery required to navigate the rugged terrain. These sounds are layered with processed versions that render the source recordings increasingly uncanny, often transforming them beyond recognition. This compositional approach reflects the presence of external intervention upon ecological systems, framing sonic transformation as an analogue for the gradual erosion and destabilisation of pristine soundscapes. Sonically and conceptually, the environmental recordings align with the system's cosmological and elemental symbolism, extending the instrument's engagement with place, collaboration, and ecological connection, and reimagining the work's compositional logic in light of the precarity of endangered environments and communities.



Fig. 1. Orrery Arcana, Top View, Performance at Brown University, October 3, 2019. Photo: author's own.

3 Technical Notes

Performance context:

- Solo performance with bespoke instrument and live projections of instrument.
- All of performer's gear is on-stage. Ideally computer and interface should sit hidden under the performer's table.

- Ideal placement: Performer offset from direct overhead light source—sidelight is preferable due to light-sensitive instrument.

Performer will supply:

- Bespoke instrument (does not require mains power)
- Laptop running Max/MSP
- Audio interface with ¼" or XLR outputs: 2, 4, or 8-channel depending on house system (please advise on number of channels available before performance, as performance system will be adjusted to suit venue)
- Camera with mini-HDMI output for live projection
- Table covering
- AU/local power adapter
- AU multiway power board

Requirements from house venue:

- Small-medium table, approx. 24x32" or 61x81cm. Ideally standing height.
 - 1 power outlet
 - Adjustable lighting (instrument is light-controlled)
 - Projection screen
- Tripod to situate camera above table/instrument (please advise if not available, performer will provide if necessary)

4 Media Link

- Video: <https://vimeo.com/1164546187?share=copy&fl=sv&fe=ci>

Acknowledgments

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Ethical Standards

This artistic research was undertaken as part of the author's respective roles as an academic working in university contexts. The author is not aware of any conflicts of interest, and no human or animal participants were harmed in the making of this work.

References

- [1] Alejandro Jodorowsky and Marianne Costa. 2009. *The Way of Tarot: The Spiritual Teacher in the Cards*. Jon E. Graham (Trans.), Destiny Books, Rochester, VT.
- [2] Nicole L. Carroll. 2019. *Orrery Arcana: Musical Materiality through Esoteric Devices*. Ph.D. Dissertation. Brown University, Providence, RI.
<https://repository.library.brown.edu/studio/item/bdr:1129460/>