

# Distributed Synthesis

## The Ethics, Technics, and Aesthetics of Co-Located Network Music Performance

### Milestone 2: Research Summary

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#### Abstract

Browser-based distributed synthesis is a novel, lithe technique for co-located networked music performance that leverages the ubiquity, connectivity, and computational capacity of our personal devices to achieve multi-channel sonic works. It continues a lineage of historical networked and participatory music performance practices that make use of contemporaneous technology to agitate hegemonic, commodified forms of music performance ritual. The paradigm repurposes the substrate of the internet as its artistic materials, aligning the practice with the educational project of creative coding, and entangling it in the messy problematics of surveillance and platform capitalism. This research employs a critical posthumanist frame to clarify an ethical position from which creative work can be produced in this arena, with particular focus on the themes of texture, ritual, and emergence.

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# 1 Rationale

The rationale is tripartite, with the three categories being *creative*, *pedagogical*, and *sociological*.

## 1.1 Creative Rationale

To fashion a coalition of cultural and technical scaffolding such that the connective, computational, and transductive affordances of audiences' devices may be leveraged to increase the accessibility of networked music performance and multi-channel sonic works.

## 1.2 Pedagogical Rationale

The pedagogical rationale pivots on the project's ability to scaffold cultural practices which foreground the creative control of information vectors through the infrastructure of the internet. The logic is that by making these practices more vivid in students' cultural life-worlds, the project operates at the level of sense of belonging and identity psychology to increase students' intrinsic motivations to learn the specific digital literacies required by this repertoire.

## 1.3 Sociological Rationale

- To pry open a space for play in the tightly woven normative strictures that characterises our relation to our phones.
- To help, via its *pedagogical effects*, a) cultivate a more digitally literate citizenry capable of holding public discourse to a higher level of technical sophistication; and b) increase the technology-generating capacity of diverse communities.

## 2 Research Situation

### 2.1 Genealogy of Practice

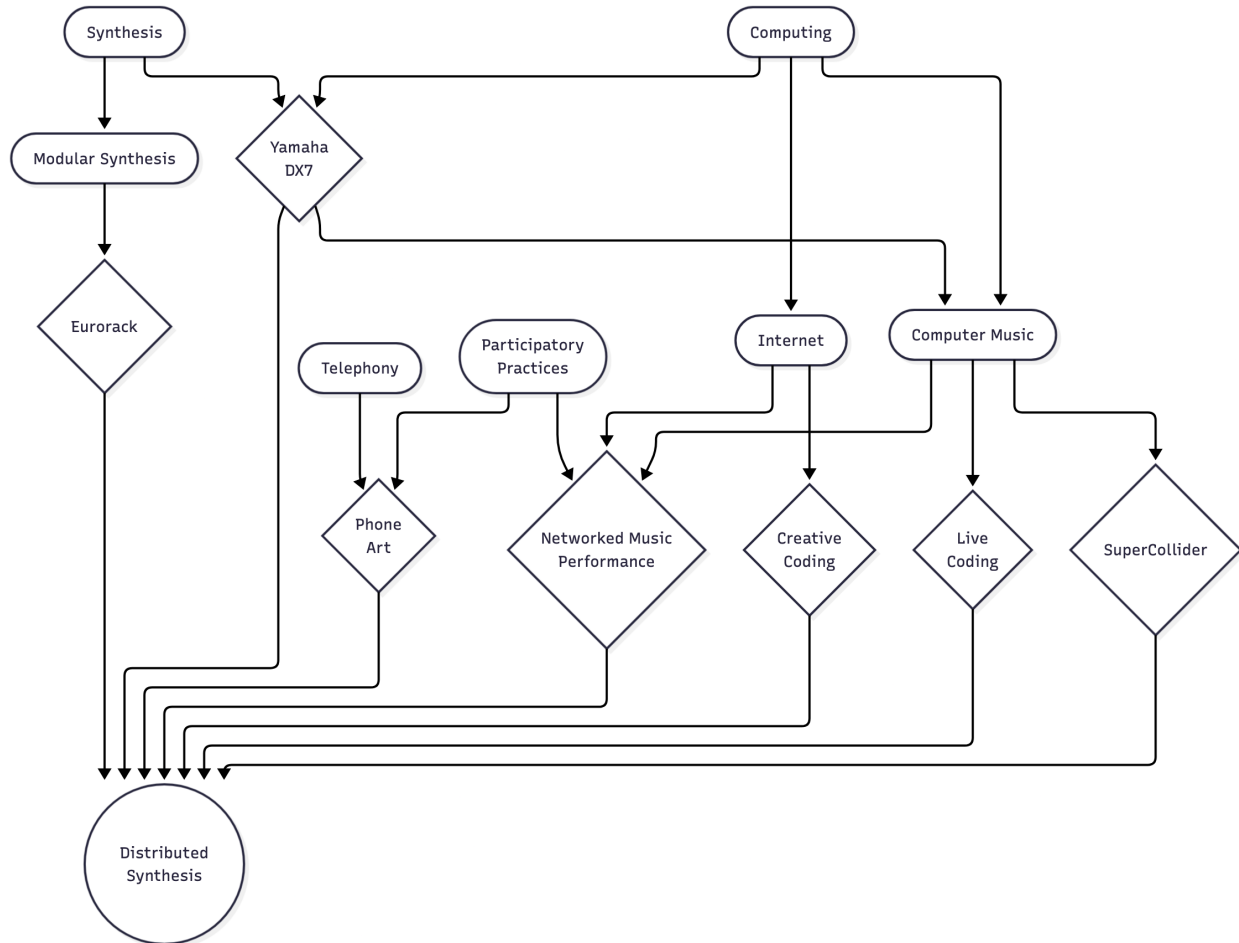


Figure 1: Distributed Synthesis Genealogy Chart

My sonic practice of distributed synthesis inherits from a variety of cultural lineages – see *figure 1*. Particular importance is placed on:

- the pioneering work of Chowning in developing frequency modulation synthesis, and which led to the production of the highly impactful Yamaha DX7. (1977)
- SuperCollider – an open source programming language and environment for digital signal processing and algorithmic composition, founded by McCartney. (2002)
- TidalCycles, and the efforts of McLean (2018), Cox (2013), Blackwell (2014; 2022), Collins (2003), et al. in establishing a world-wide community of practice for live coding.

- the establishment of the Eurorack standard for modular synthesis in the mid 90s, and the community of practice which has grown around it since then (Bjørn, 2018; Jenkins, 2020)
- the efforts of Maeda (1999, 2004), Reas & Fry (2007, 2018), Shiffman (2015, 2024), McCarthy (2018; 2015; 2019, 2020a, 2020b), Tarakajian (2020b), et al. in establishing a world-wide community of practice for creative coding
- the array of thinkers and practitioners who have, over the years, attempted to investigate, understand, and agitate our entangled relation to the telephone (Dolar, 2006; F. Kittler, 1990; McLuhan, 1994; Ronell, 1989)
- the lineage of composers, artists, and musicians who have contributed to the set of participatory and networked music performance repertoire.

## 2.2 Stakeholder Impact

The sets of stakeholders potentially impacted by this research (see *Figure 2*) can be categorised in the same manner as its tripartite rationale (see *Rationale*) – *creative* (purple), *pedagogical* (green), and *sociological* (yellow). By brokering repertoire pertaining to cultural forms (co-located music performance rituals) from the sonic arts community of practice (CoP) to the creative coding CoP, and brokering repertoire pertaining to material forms (the browser, javascript, connectivity architectures, etc.) in the other direction, I hope primarily to expand the repertoire available to practitioner members of either CoPs.

This expansion should, secondarily, expand the curricular resources for teachers and curriculum setters in primary, secondary, and tertiary education systems, which, along with increased cultural visibility of javascript use, may increase students’ intrinsic motivations to learn those forms of digital literacy.

The effect of this expanded repertoire in the citizens’ cultural life-worlds, should be a more ambitious, expanded creative horizon – we should be able to imagine the feasibility of some things previously understood to be impossible. This along with improved digital literacy should bolster the technology generating capacities of diverse communities, and increase the technical sophistication of public discourse, politicians, and ultimately, legislation.

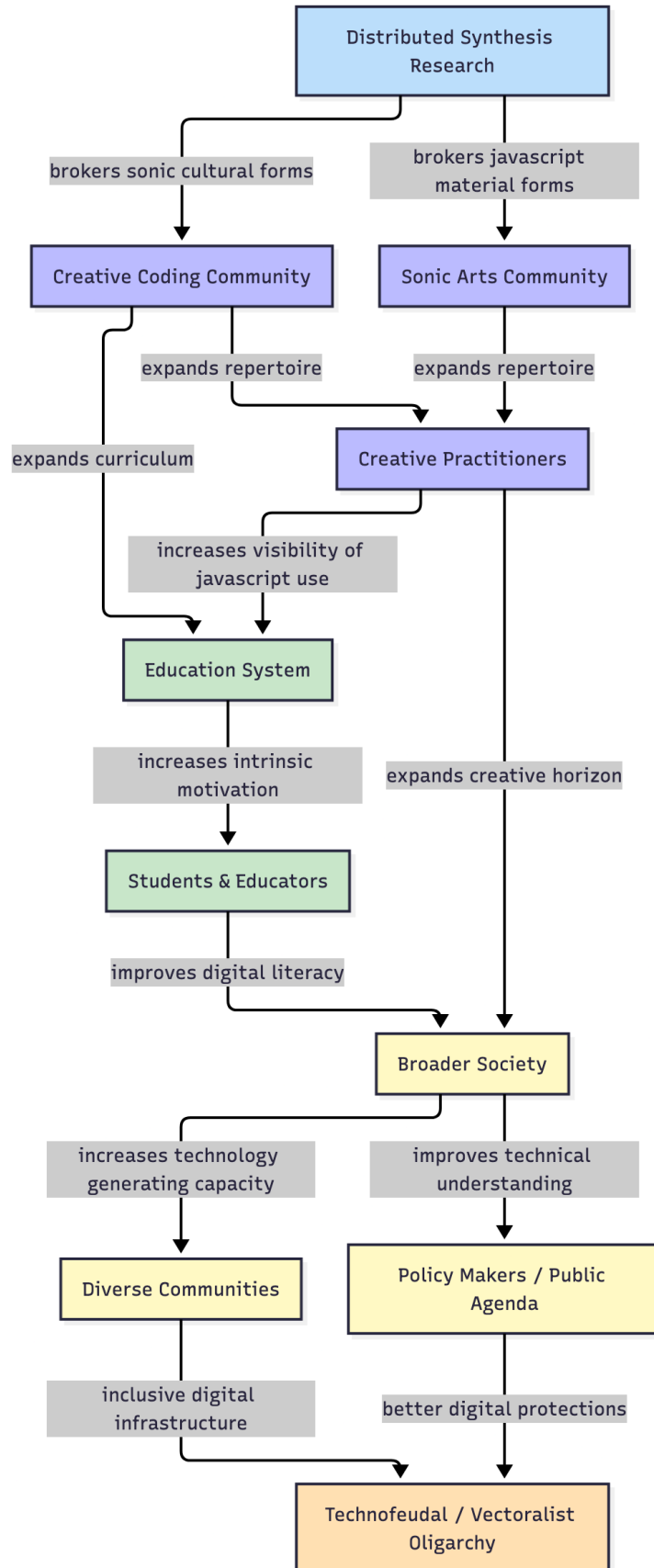


Figure 2: Distributed Synthesis Stakeholder Impact Chart

## 3 Methodology

### 3.1 Diffractive Reading

This research proceeds from a monist disposition, and acknowledges the musical substrate in which discursive participation is predicated, always simultaneously *constructing* the subjective apparatus of intelligibility, and *deploying* it to parse meaning. (Serres, 2017) This intractable, liquid exchange, between content and context, does not permit a retreat into the invisible view of everything from nowhere, but rather necessitates an ironic, strategic cutting together-apart of theory, concepts, relations, and identities, in the construction of a contingent, fallible, opinionated theoretical position *with an argument*. (Barad, 2014; Haraway, 1988)

The approach finds odd bedfellows with Rorty’s *Ironism*, in which he elucidates the absurdity of the concept of a final vocabulary. (1989) Truth, for Rorty, can only ever be an attribute of sentences, and as such is therefore relegated to appear and disappear within the confines of our deliberative rituals. (Brandom, 2000) The role of reading then, is to fit semantic candidates with pragmatic affordances, within a pre-existing network of normative conceptual relations – in other words, to navigate those commitments that this project must become responsible for (potestas), in order to understand what these responsibilities entitle the project to become (potencia). (Braidotti, 2019; Brandom, 2009)

### 3.2 Mycelial Creativity

Central to the functioning of this research is the possibility of a mycelial creativity, that is, a way of understanding what creativity *is*, and how it *works*, that draws on the figure of fungal mycelium. (Clarke, 2018; Ingold, 2004)

In this way we can understand creativity to occur as the practitioner accumulates many thousands of individual, specific, transactional relationships with the pragmatic affordances of their cultural, technological, physical, social, digital, institutional, economic, domestic, etc. environments, in an omnidirectional and indiscriminate manner, such that both the practitioner, and their environments, undergo gradual transformation. (Sheldrake, 2020;

Tsing, 2017) Where the mycelium becomes dense enough, and given the right environmental conditions, a fruiting body grows and releases *spores* – cultural forms, containing *DNA* – visible traces of the commitments and processes that constitute the apparatus of their production.

This shifts the locus of creativity from within the encapsulated bounds of human ingenuity, to the distributed, ecological effects of mycelial relations, refocusing the task for creative practitioners, from the heroic scouring or internal resources to find a sublime spark of inspiration, to the much more mundane processes of simply feeling the texture their environs. (Ostendorf-Rodríguez, 2023; Sedgwick, 2003)

A comparison can be made with design processes that build backwards from deliberately calculated, strategically imagined end result – mycelial creativity should be understood as a *process* methodology, capable of hosting iterative design cycles, but not requiring them. Instead, over time, as the mycelium runs and accumulates, should the conditions become favourable, a fruiting body can form almost as from its own accord – as if from an ecological fugue – half awake, half dreaming.

As an extreme example, we might spontaneously imagine a *Camponotini* ant infected with *ophiocordyceps unilateralis*, whose nervous system, now possessed by the fungus, climbs as high into the canopy of the rainforest as possible, before becoming host to the fungus' fruiting body, maximising the area of spore dispersal. (Araújo et al., 2018) The point here being, not so much that a practitioner should sacrifice their body in service of their creative project, but rather that mycelial creativity works best at a resting state, allowing the practitioner's gut feelings to do the work of processing large quantities of data unconsciously, imprecisely, but massively in parallel, rather than deliberately processing a reduced, potentially incomplete set of data, yes – more precisely, but much more slowly, via serial, explicit, conscious processes. We might recall Freud's image of the dream-wish, rising like a mushroom from the navel of the dream, exactly where the web of unconscious conceptual relations has reached critical density. (2019)



### 3.3 Iterative Design

At the micro-level, much of my day to day creative methods are governed by the logic of iterative design – I am defining goals by pairing my understanding of audiences and opportunities in my cultural environment (as per mycelial creativity), with concepts drawn and fashioned from my diffractive reading. I brainstorm various approaches and technical affordances, and prototype with those conceptual resources at hand, in a manner that is roughly equivalent with the double diamond design cycle. (Design Council, n.d.)

## 4 Key Readings

### 4.1 Critical Sonic Theory

- Noise: The Political Economy of Music (Attali, 1985)
  - in which Attali frames music as a prophetic industry that foretells economic and political reorganisations.
- The Soundscape: Our Sonic Environment and the Tuning of the World (Schafer, 1993)
  - in which Schafer chronicles the modern soundscape to advocate for ecological listening and acoustic responsibility.
- Pink Noises (Rodgers, 2010)
  - in which Rodgers assembles interviews foregrounding women’s agency in electronic sound cultures.
- One Square Inch of Silence: One Man’s Search for Natural Silence in a Noisy World (Hempton, 2010)
  - in which Hempton narrates a quest for natural quiet as a call to protect fragile acoustic ecologies.
- Sound Unseen: Acousmatic Sound in Theory and Practice (Kane, 2014)
  - in which Kane theorises acousmatic sound to reveal the politics of disembodied listening.

- A Million Years of Music: The Emergence of Human Modernity (Tomlinson, 2015)
  - in which Tomlinson traces co-evolutionary paths of music and human modernity through deep history.
- After Sound: Toward a Critical Music (Barrett, 2016)
  - in which Barrett proposes critical music as a practice that entwines sound with social critique.
- Ocean of Sound: Ambient sound and radical listening in the age of communication (Toop, 2018)
  - in which Toop drifts through ambient histories to map radical possibilities for listening.
- Hearing the Cloud (Frankel, 2019)
  - in which Frankel reflects on online culture to imagine communal futures for post-internet music.
- Sex Sounds: Vectors of Difference in Electronic Music (Sofer, 2022)
  - in which Sofer excavates electrosexual aesthetics to expose gendered assumptions in electronic music.
- Nothing but Noise: Timbre and Musical Meaning at the Edge (Wallmark, 2022)
  - in which Wallmark analyses timbre controversies to show how noise encodes cultural conflict.
- Hungry Listening: Resonant Theory for Indigenous Sound Studies (Robinson, 2020)
  - in which Robinson articulates decolonial listening obligations that challenge settler ears.
- Experimenting the Human: Art, Music, and the Contemporary Posthuman (Barrett, 2023)

- in which Barrett reconsiders experimental music as a lens on posthuman technoculture.
- The Science-Music Borderlands: Reckoning with the Past and Imagining the Future (Margulis, 2023)
  - in which Margulis et al convenes perspectives which agitate common assumptions regarding humans’ relationship to music.
- Sounding the Virtual: Gilles Deleuze and the Theory and Philosophy of Music (Nesbitt, 2010)
  - in which Nesbitt convenes Deleuzian perspectives to rethink music’s philosophical stakes.

## 4.2 Participatory Practices

- Participation in Art and Architecture: Spaces of Interaction and Occupation (Stierli, 2016)
  - in which Stierli surveys participatory spatial design as a negotiation of power and use.
- A history of the Audience as a Speaker Array (Taylor, 2017)
  - in which Taylor traces audience-as-instrument experiments across the history of NIME.
- Understanding Media Multiplicities (Bown & Ferguson, 2018)
  - in which Bown theorises on the general properties of media multiplicities.
- Interactive Contemporary Art: Participation in Practice (Brown, 2019)
  - in which Brown curates cases showing participation as an evolving institutionally situated practice.
- The Art of Assembly (Malzacher, 2023)
  - in which Malzacher reflects on assembly-based dramaturgies for collective public action.

### 4.3 Composition & Texture

- Fundamentals of Musical Acoustics (Benade, 1990)
  - in which Benade explains the acoustical physics underpinning instrument design for musicians and builders.
- Silence: Lectures and Writings (Cage & Gann, 2013)
  - in which Cage collects lectures and chance writings that reposition silence as an active compositional material.
- The Ashgate Research Companion to Minimalist and Postminimalist Music (Potter & Gann, 2013)
  - in which Potter and Gann compile scholarship mapping minimalist and postminimalist practice across scenes.
- Krautrock: German Music in the Seventies (Adelt, 2016)
  - in which Adelt situates Krautrock's textures within the transnational cultural politics of the 1970s.
- The Oxford Handbook of Algorithmic Music (McLean & Dean, 2018)
  - in which McLean and Dean assemble perspectives on algorithmic music spanning theory, history, and craft.
- Structure and Synthesis: The Anatomy of Practice (Fell, 2021)
  - in which Fell diagrams procedural strategies that loosen habit within electronic studio practice.
- Social Dissonance (Mattin, 2022)
  - in which Mattin amplifies alienation as a method for redirecting attention from sound to social relations.
- The Mechanism of Human Speech (Kempelen, 2022)

- in which Kempelen details mechanical speech experiments that prefigure synthetic vocality.
- Sonic Faction: Audio Essay as Medium and Method (Goodman et al., 2024)
  - in which Goodman, Barton, and Kronic champion the audio essay as a speculative research medium.

## 4.4 Telephony

- The Telephone Book: Technology, Schizophrenia, Electric Speech (Ronell, 1989)
  - in which Ronell deconstructs the telephone as a psycho-technical apparatus entwining voice and power.
- A Voice and Nothing More (Dolar, 2006)
  - in which Dolar philosophises the acousmatic voice as the resistant remainder between body and language.
- The Truth of the Technological World: Essays on the Genealogy of Presence (F. A. Kittler, 2013)
  - in which Kittler surveys media technologies to show how technical inscription governs cultural presence.

## 4.5 Creative Coding & Cybernetics

- Zeros + Ones (Plant, 1998)
  - in which Plant links cyberfeminism to digital materiality through speculative media histories.
- How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics (Hayles, 1999)
  - in which Hayles traces posthuman subjectivities emerging from cybernetics, informatics, and embodiment.

- The Question Concerning Technology (Heidegger, 2008)
  - in which Heidegger questions technological enframing to recover more mindful modes of revealing.
- The Glitch Moment(um) (Menkman, 2011)
  - in which Menkman theorises glitch aesthetics as critical breaks in networked perception.
- The Interface Effect (Galloway, 2012)
  - in which Galloway interprets interfaces as allegories of control within network culture.
- Speaking Code: Coding as Aesthetic and Political Expression (Cox, 2013)
  - in which Cox and McLean argue for code as an expressive, politically situated practice.
- Mobile Media Making in an Age of Smartphones (Berry & Schleser, 2014)
  - in which Berry and Schleser collect smartphone media-making case studies as situated pedagogy.
- The Question Concerning Technology in China: An Essay in Cosmotechnics (Hui, 2016)
  - in which Hui advances cosmotechnics as a plural philosophical response to modern technology.
- Information and Thinking (Serres, 2017)
  - in which Serres meditates on information flow as a metabolic process of thought.
- In The Swarm: Digital Prospects 3 (Han, 2017)
  - in which Han critiques digital swarms to diagnose subjectivity in hyperconnected societies.
- Art and Cosmotechnics (Hui, 2021)

- in which Hui connects aesthetic practice to cosmotechnical genealogies beyond the West.
- LIVE CODING \_a user’s manual (A. F. Blackwell et al., 2022)
  - in which Blackwell, Cocker, Cox, McLean, and Magnusson document live coding as a collaborative method.
- Cybernetics for the 21st Century, Vol. 1: Epistemological Reconstruction (Pickering & Hayles, 2024)
  - in which Pickering and Hayles revisit cybernetics to propose epistemologies for contemporary technics.

## 4.6 Methodology

- Diffracting Diffraction: Cutting Together-Apart (Barad, 2014)
  - in which Barad stages diffraction as a method for thinking entangled difference.
- The Mushroom at the End of the World (Tsing, 2017)
  - in which Tsing follows matsutake lifeworlds to model collaborative survival on ruined landscapes.
- How to Make Art at the End of the World (Loveless, 2019)
  - in which Loveless offers activist art pedagogy for precarity inside neoliberal institutions.
- A Theoretical Framework for the Critical Posthumanities (Braidotti, 2019)
  - in which Braidotti lays out critical posthuman tools for affirmative, situated scholarship.
- Touching Feeling: Affect, Pedagogy, Performativity (Sedgwick, 2003)
  - in which Sedgwick explores affective pedagogy to expand queer performativity and repair.

- Creative Theories of (Just About) Everything: A Journey into Origins and Imaginations (Lutters, 2020)
  - in which Lutters advocates creativity education grounded in philosophical storytelling.
- Let's Become Fungal!: Mycelium Teachings and the Arts (Ostendorf-Rodríguez, 2023)
  - in which Ostendorf-Rodriguez invites fungal metaphors to reorient artistic collaboration.
- Becoming an Artwork (Groys, 2023)
  - in which Groys argues for life as an aesthetic project amid digital economies.
- Reading Spinoza in the Anthropocene (Lloyd, 2024)
  - in which Lloyd rereads Spinoza to situate monist ethics within the climate crisis.

## 4.7 Contemporary Situation

- Good Entertainment: A Deconstruction of the Western Passion (Han, 2019)
  - in which Han diagnoses entertainment as a biopolitical regime of self-optimisation.
- Postcapitalist Desire (Fisher, 2020)
  - in which Fisher charts collective education projects to reclaim desire from neoliberal realism.
- Construction Site For Possible Worlds (Beech et al., 2020)
  - in which Beech and Mackay collate essays attempting to rejuvenate an emancipatory project under surveillance capitalism.
- Capital is Dead: Is this Something Worse? (Wark, 2021)
  - in which Wark argues that information logistics have supplanted industrial capital with something worse.
- The Internet Con: How to Seize the Means of Computation (Doctorow, 2023)



- in which Doctorow outlines policy tactics for seizing digital infrastructure from platform monopolies.

## 5 Progress

### 5.1 cicada.assembly.fm

### 5.2 string.assembly.fm

### 5.3 voice.assembly.fm

### 5.4 Glossa Derma

Glossa Derma is a piece inspired by

Please find video documentation here → [click](#).

## 6 Changes

- more orientated towards original work

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