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Sheila Pinkel
LABS Editor-in-Chief
Leonardo International Co-Editor
HIGHEST-RATED ABSTRACT

DESIGNING FOR THE MINDBODY IN TECHNOLOGY-MEDIATED MUSIC-MAKING

Aura Pon

Together as combined attributes of one entity, the mind and body determine how we experience, understand and make music. Our bodily experiences in the world shape how we comprehend music. In turn, our music cognition and expressive intentions are shaped by and mediated through the body when we make music. This inseparable mind-body interaction is essential to our sense of meaning, connection and embodiment in our musical experiences, yet this dynamic is not always intact in today’s technology-mediated music-making. Digital technology offers endless possibilities for new musical sounds and the mechanisms to control them, but the relationship between musical intentions, human action and sound in such technology must be deliberately designed. Some current approaches to designing computer-based musical experiences dichotomize these mental and physical aspects of music-making, causing disembodiment and disengagement. Employing a practice-based research methodology, this thesis explores the potential of considering the “mindbody” in the design of interactive computer systems for music-making. Five interactive systems for music-making were designed and used to create and perform four original compositions. This exploratory creative and design process also yielded a set of design heuristics for holistically considering the mindbody in technology design, pertaining to (1) valuing and awareness of process; (2) integrating intention, action, and sound; and (3) whole-body engagement.

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GAZE RELATIONS
A Critical Analysis of Human Gaze and Computer Vision

Anthony Assi

Gaze Relations is an art installation that visualizes how human gaze and computer vision see bodies in visual media, to compare how they operate perceptually and culturally. Gaze, in visual media, refers to the way the filmmaker and audience look at bodies and how the filmmaker behind the camera influences the way the photographic subject is represented to an audience. Gaze-tracking software tracks how a person looks at an image, and custom-built software then reconstructs the image through their gaze, demonstrating how they visually engage with the photographic body. Body detection, on the other hand, is a computer vision technique employed by surveillance institutions to automate the process of detecting bodies in surveillance footage. Critical software was developed to visually analyze the processes of how a popular body detection algorithm models a human body. In addition to video, costume designs represent how the algorithm sees the body projecting the machine vision back into the world it is looking at. The piece highlights the differences between the complexities and nuances of human gaze and the algorithmic processes of computer vision that reduce the human form to simple features. Gaze and computer vision will be discussed in this thesis as powerful social and cultural forces capable of influencing the external world, not just the phenomena of taking in light and processing it.


SHAPESHIFTING THE COLONIAL OBJECT
Sarah Rosalena Brady

The idea of shapeshifting is present in the oldest forms of totemism and shamanism and in extant literature and represents our desire to create new forms. Drawing on Southwest Native American philosophy, indigenous design and postcolonial theory, this thesis examines the signifier of the shapeshifter as symbolic metaphor to create techno-hybrid forms. Shapeshifting reformation aims to understand and develop new visual languages through the lenses of artificial life, postcolonialism and otherness. Analysis of emergent forms is employed through sculpture and automata, system aesthetics and real-time systems, leading to an imaginative paradigm shift in relation to forms enforced by colonial conversion. Thus, this paper will further examine the construction of social and scientific discourses about power that initially authorized colonial violence and continue to support repressive policies against indigenous species. It argues that as the previously stable ordering divisions of Life and Nonlife shake, new figures, tactics and discourses of power can emerge through hybrids. These concepts will be discussed in selected works from 2016–2018—The Desert, The Animist, and The Virus; Reformation of 50,000 Letters; Material Reiteration; and Data Weaving as Activism—using indigenous processes combined with computation to refigure and reimagine colonized objects.

**THE RETURN OF HEPHAISTOS**

*Reconstructing the Fragmented Mythos of the Maker*

Cheryl De Ciantis

Hephaistos the blacksmith is the Greek god of art and technology. Homer says he is the only Olympian god to suffer “mortal pain.” Born to walk crookedly, Hephaistos is rejected by his mother, Hera, who throws the infant from Mount Olympus into the sea. There he is fostered by sea-nymphs, daughters of the primordial Ocean. Returned by order of Zeus, who has need of his skills, Hephaistos is said to be the only Olympian who works.

Hephaistos is paradigmatically representative of the mythic Maker archetype. Two themes emerge when tracking this archetype's manifestations through history. “Wounded Artist” pathologizes Hephaistos as emblematic of the mother-wounded and thus psychically impaired creative masculine. “Monstrous Technology” conflates the Hephaistean archetype with technological hubris, culminating in the military-industrial complex.

Contemporary norms image the artist and technologist as having divergent aims and values. Greek and other mythic texts/images and key etymologies show they were anciently revered as aspects of the same archetype. By Plato's time, *technē*, the Greek root of “technology,” was conceptualized such that the Maker’s mythically/metaphorically “skewed” gait situates the archetype in opposition to the “straight” gait of legitimate power in the Greek polis. This metaphorically crooked gait is associated with *mētis* (roughly, “cunning intelligence”) and connected with the primordial Oceanic powers of shapeshifting and ambiguity. This work recenters the Hephaistean archetype in a poetics of Making, reclaiming its ancient roots.

**ART ON THE INTERNET AND THE DIGITAL PUBLIC SPHERE, 1994–2003**

Megan Driscoll

This dissertation narrates the development of Internet art, a diverse set of practices united by their exploration of the technological, social and/or political bases of computer networks. Covering the period from 1994, when Internet art coalesced around the rise of the World Wide Web, to 2003, when both Internet art and Internet culture writ large began to respond to the rise of social media and Web 2.0 technologies, the dissertation homes in on specific net art projects that variously engaged or challenged this period’s most persistent claim: that the Internet is a new, digital public sphere.

Reviewing significant theorizations and critiques of the classical public sphere, the concept on which such claims were based, the dissertation reveals three major models through which net art defined the publicness of computer networks—as an interpersonal network that connects or unites strangers into groups; as a virtual space akin to physical spaces of public gathering, discourse and visibility; and as a unique platform for public speech, a new mass media potentially accessible to all.

In so doing, the dissertation provides a historical account and critical analysis of Internet art that encompasses not only its technological evolution but also its confrontation with the claims of publicness upon which our understanding of computer networks, and the art made on and about them, are founded.


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**BAY AREA EXPERIMENTALISM**

Music and Technology in the Long 1960s

Theodore Gordon

The San Francisco Tape Music Center (SFTMC) was an independent nonprofit corporation that fostered a unique community of experimental musicians and artists in the Bay Area in the years 1962–1966. It has been celebrated as both a direct influence on the counterculture that peaked during 1967’s “summer of love” and as a decentering foil to more-established histories of experimental music centered in New York and Europe. In the memories of many who were there, the SFTMC opened windows onto many possible worlds through novel technologies, compositional and collaborative logics, flows of instrumental agency and ways of organizing the very sociality and materiality of creative work. This dissertation follows four people—Donald Buchla, Morton Subotnick, Pauline Oliveros and Ramon Sender—and shows how their experimental practices diffracted, producing moments of irreducible difference. It argues that these people sustained a constitutive ambivalence: Even as they cultivated and relied on the institution, they also threatened the very nature of institutionalization. In a truly experimental spirit, one could say, they produced more than they bargained for. Studying moments of experimental difference and excess has consequences not only for understanding compositional and creative logics but also for the inherently political project of organizing—of practices, processes and bodies—in the 1960s Bay Area and well beyond.

**CHOREOGRAPHING TIME**

*Developing a System of Screen-Less Animation*

**Carol MacGillivray**

The Diasynchronoscope is an experimental medium that draws on tropes from animation, film and Gestalt grouping to create the perception of screenless apparent motion. This research interrogates the Diasynchronoscope as an emergent new medium. Formalisms are developed through studio practice and tested in exhibited artworks (exhibited collaboratively with Bruno Mathez). Results of evolving interactions are observed and contextualized by the author using existing frameworks from film studies and psychology.

Inside the Diasynchronoscope, static objects are grouped according to Gestalt laws and animation principles to create sequential visual cues that, when lit with projected light, demand selective attention, thus creating the illusion of movement. The animation is immersive and environmental, so that observers perceive a continuous flow of movement that resembles, at a physiological level, interaction with a real-life moving object. The technique is named “diasynchronic” and the system the Diasynchronoscope. The name combines *diachronic* (the study of a phenomenon as it changes through time) with *synchronous* and *scope* (view). Being so named, it evokes early animation simulators such as the phenakistoscope and the zoetrope, regarded as direct ancestors of the project as they, too, function as both art objects and experimental media.

The thesis documents the creation of this new experimental medium in choreographed time and explores its potential both as art and as a prototypical tool for empirical spatiotemporal experiments in Gestalt perception.


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**IS THERE A PLACE IN HUMAN CONSCIOUSNESS WHERE SURVEILLANCE CANNOT GO?**

**Noor: A Brain Opera**

*Ellen Pearlman*

The world’s first EEG brainwave-enabled opera is based on research into increasing network surveillance and global governmental funding to map every neuron in the human brain. The rise of the posthuman, or biologically based human animal, is incrementally merging with computerized machines and biological interfaces. It emerges from the same forces that created ubiquitous network surveillance to ultimately surveil consciousness and the brain. Drawing upon the origins of discipline and surveillance as expressed by the writings of Michel Foucault and control societies enabled by the rise of the digital to enhance ubiquitous surveillance as theorized by Gilles Deleuze, surveillance and the posthuman intersect with consciousness and the potential to be policed and controlled.

Using a consumer-grade brain computer interface (BCI) headset, I produced the opera using methodologies based upon Donald Schon’s *The Reflective Practitioner* and Bruno Latour’s actor-network theory (ANT). Noor employed an Emotiv EEG brainwave headset measuring a performer’s brainwaves using preset emotional thresholds of interest, excitement, meditation and frustration, proving these emotions could launch databanks of videos, a sonic environment and a libretto. The performer’s brainwaves were displayed in real time while interacting with an audience inside a 360-degree immersive theater. This thesis expands the known ability of brain computer interfaces (BCIs) as a tool for creative arts practices.

Ellen Pearlman: ellenluminescence@gmail.com. PhD thesis, School of Creative Media, Hong Kong City University, Hong Kong, 2017.
ST. GEORGE AND THE DRAGON

Design and Production of a Cultural Heritage Museum Installation Using Media Archaeology

Mercedes Said

Media archaeology is a field of research investigating new media cultures through material manifestations. Although often recognized as an approach to art, its use as an approach to design has not been fully explored. Media archaeology can be valuable because it offers alternative qualities of mediation, as a design palette, to that of prescriptive common media devices.

This thesis describes a media archaeological approach toward the design of a cultural heritage media installation for an exhibition at Häme Castle in 2017—a collaboration between the National Museum of Finland and Aalto University. The installation displayed a multiview stereoscopic (3D) digital reconstruction of a medieval sculptural scene of St. George and the Dragon, based on preserved, fragmented medieval sculptures from the museum’s archives. Four stereoscopic video viewers were synchronized to a rotating central sculpture, affording an effect of augmented reality, without the need for a mainstream augmented reality implementation.

The design approach achieved a well-integrated installation that was sensitive to the aims of an exhibition of sculpture within a cultural heritage museum: artistry, materiality, interpretation. This thesis therefore argues that media archaeological approaches to design can identify historical ideas that can be remediated into relevancy for new contexts and, in spite of their historical connotations, foster engaging technological experiences for the contemporary audience.

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ROMANTIC OBJECTIVISM

Diagrammatic Thought in Contemporary Art

Michael Whittle

This thesis examines notions of diagramming within modern and contemporary art and proposes an entirely new field of “Diagrammatic Art” in an attempt to reconnect science and art on deep philosophical, semiotic and aesthetic foundations.

The study incorporates selected highlights from historical and prehistorical diagram creation to position the diagram as a fundamental mode of human knowledge production and communication, yet one that has been overlooked in its importance to art, where there is a distinct lack of critical discourse concerning its role.

Over the last 100 years, artists have employed a variety of strategies that take advantage of the unique visual and conceptual properties of the diagram to create some of the most challenging artworks of the modern, postmodern and contemporary periods. Applying the semiotic code of science and mathematics to the aesthetic code of art allows artists to create work that mediates between subjective, metaphoric self-expression and the detached, intellectual rigor of objective scientific investigation in a style I refer to as “Romantic-Objectivism.”

Through art’s incorporation of diagramming as part of its tools and techniques of conception and production, we can see the transformation of not only artistic practice via diagramming but also our notion of what the diagram is itself.

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PhD thesis, Kyoto City University of Arts, 2015.