

N o l a n   L e m



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[www.nolanlem.com](http://www.nolanlem.com)

I create dynamic acoustic systems that render sound and movement through kinetic gesture, synchronization, and physical materiality. My work explores the interplay between process, function, and the cultural materials embedded into 21st century life where I oftentimes employ multiplicities of everyday objects to repurpose, activate, and populate a sound environment.

I'm interested in the seemingly invisible forces at work within the composition of sound through the use of repetitive movement and visual phenomena. As a researcher in psychoacoustics and machine learning, my work is often inspired by experimental studies related to human auditory processing. I hope my work promotes alternative ecologies of sound and environment, one that is at once investigative, transformative, and playful in its evocation of mechanical and emotional process.

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Nolan Lem is an artist and researcher whose work reflects a broad range of influences and mediums. His work examines issues related to emergent dynamics, machine learning, and the synchronization of auditory phenomena.

He has premiered his work and research at a number of diverse spaces both in the US and abroad including the Hayden Planetarium at the Natural History Museum (NYC), Pioneer Works (NYC), L'HOSTE Art Contemporain (Arles), and the NIME (New Interfaces for Musical Expression) Conference among others. He has held residencies at GRAME, IRCAM, MassMoCA, Cité Internationale des Arts, and Pioneer Works. He holds degrees in saxophone performance, Electrical Engineering, and received his MFA at Columbia University where he studied at the Computer Music Center.

Nolan is currently a PhD candidate at Stanford University where he studies at the Center for Computer Research in Music and Acoustics (CCRMA).

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**tout ce qu'on a construit / everything we constructed (2019)**

ratchets, metal, motors, electronics, computer

In this piece, the ratchet is used as a functional sound object where it stands as a symbol of time, work, and physical labor. Time itself is (de)constructed across each ticking tool, interweaving sonic pulses that self-organize, align, and devolve. Recalling the mechanics of a clock, the ratchet can only move in one direction. Arranged in a physical space, the ratchets' rhythms are emergent, each one synchronizing to one another to suggest a physical coupling between disparate senses of temporal duration,.

<https://vimeo.com/332528445>



## Tentacle (2018)

velcro, plastic, wood, metal, motor, electronics, speakers

Tentacle is a site-specific sound sculpture that examines the sonic materiality of Velcro as it is situated within the ASMR (autonomous sensory meridian response) and BDSM (bondage, dominance, slave, master) communities. This machine houses 10 speakers that are mechanically driven by Velcro extrications that occur on top of the speakers' paper cones. The kinetic dynamics of the velcro becoming hooked and unfastened is transmitted through large plastic tubes that resonate and transfer the acoustic energy into different parts of the space.

This "BDSMR" object complicates our awareness of sound and sensuality by casting materiality as an erotic fetish, one that derives from our darker, more lurid impulses. The imposing cephalopodic presence of the black machine suggests a cyborgian instrument somewhere in between an organ, a music box, and a Luigi Russolo noise machine.

<https://vimeo.com/261293688>



### **Rocks in Roll (2017)**

large river rocks, wood, steel, motors, electronics  
platforms—4'x 6' each, 16' x 16' total

This piece explores the outcomes of animate motion posed by large rocks, objects typically considered to be symbols of stasis, non-sentience, and mass. Rocks in Roll sets in motion an assortment of large river rocks that roll around surfaces upheld by reciprocating wooden platforms. Because each rock bears a unique deformative shape, they contain a range of unique rolling frequencies. As the reciprocating motion of the platforms change over time, various rocks begin to oscillate with more velocity thereby resonating the sounding wooden platforms. Taken as an ensemble of rolling masses, each rock's kinetic vacillations contributes to the dense buildup of sonic mass over time. This piece was inspired by the notion of 'learnable weights' in machine learning contexts and the chaotic motion exhibited by elementary particles that comprise the biological makeup of the rocks themselves.

<https://vimeo.com/242010661>



### **activations (2017)**

lightswitches, plastic, 3d printed gears, wood, steel, motors, computer-processing  
16'x16'

In 'activations', hundreds of light switches are activated en masse in a cryptic communicative interplay. By subverting the conventional function of the switch as a compliant toggle under human control, this piece posits a future where the strange language of intelligent machines has become normalized and quotidian. The switches themselves are represented as neural network weights (aka activations) that are tuned throughout the course of the computer's learning process.

<https://vimeo.com/245809496>



**long live the new flesh (2017)**

shoes, wood, steel, motors, electronics, lights  
24'x2'

The disembodied shoes lining the gallery wall evoke the neurotic polyrhythms that accompany the demands of an increasingly globalized labor production. The frenetic energy expended in this piece is depicted as a pathological byproduct accompanying contemporary life in this 'Age of Anxiety' and shows how different modes of production – both material and technological– keep apace despite shoes not being filled.

<https://vimeo.com/245809965/>



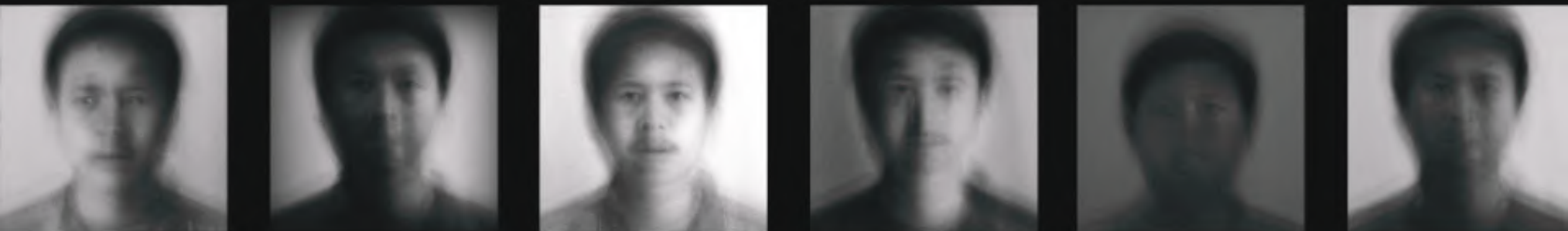
**'fingers' (2017)**

digital renderings

22 x 17 each, 216' x 51" total

Arranged in chronological sequence, 'fingers' is a photo documentation of my onychophagia and dermatophagia (skin and nail biting) over the course of approximately one month. These sequences of images call attention to the pathological processes of body-focused repetitive behaviors by focusing on the way in which a particular compulsion operates on the skin as a material of the living body and source of self-gratification.





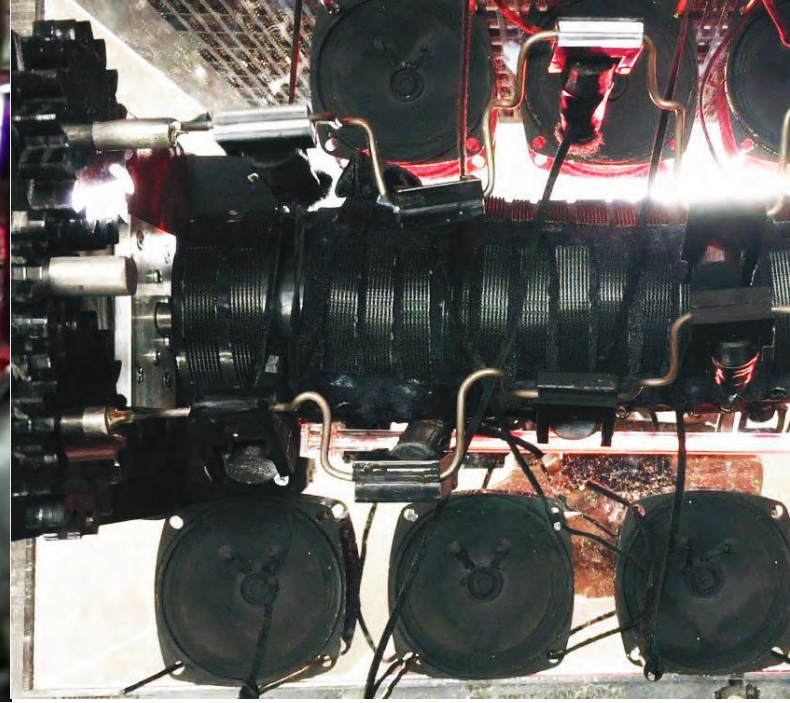
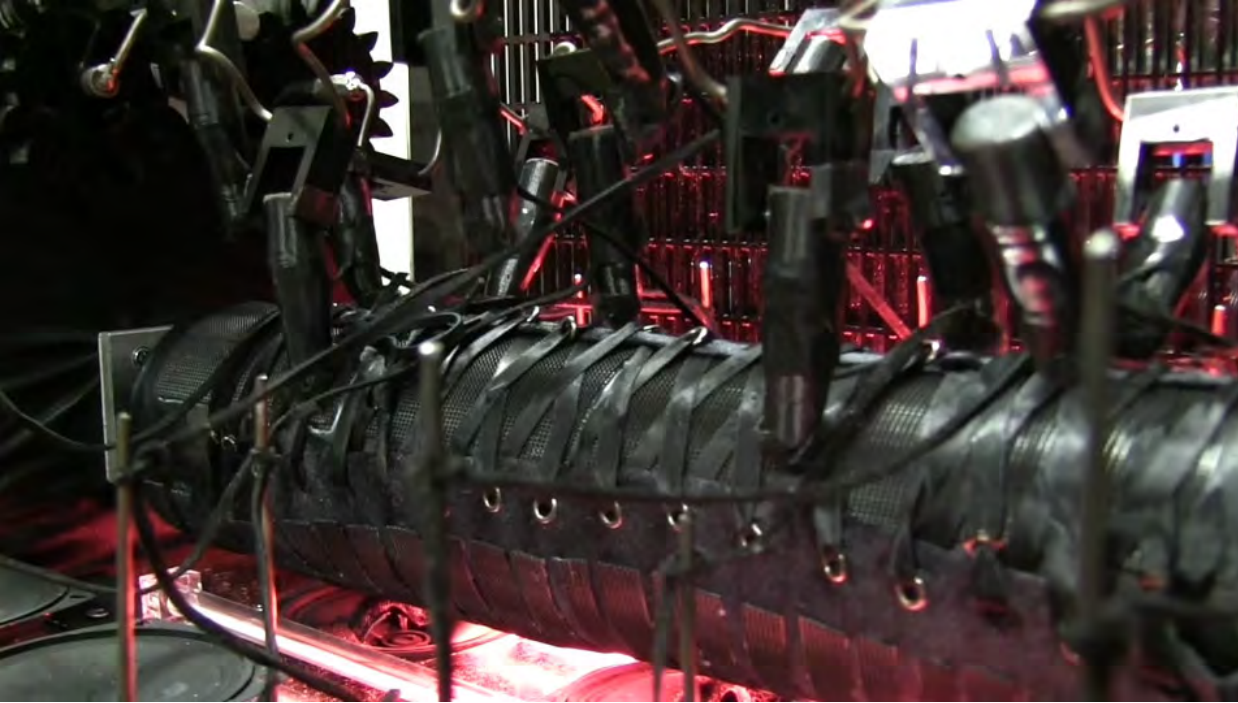
### **engine errors / self-portrait (2017)**

medium: digital prints, video projection

dimensions: 16' x 12'

In this piece, a neural network is trained on a facial images of Chinese engineering students to teach the computer how to dream up artificially-constructed portraits. This piece treats the network's inherent flaws as a medium in itself: by reappropriating the generative blurriness in the facial reconstructions it seeks to illustrate how novel AI technologies can be used as a self-fulfilling form of erasure. In this case, the ghostly images that result reflect society's tendency to dehumanize people of Asian descent often in terms that focus on them as an aggregate or as autonomous laborers devoid of individual identity. Here I impose myself onto these representations by projecting video of my own facial features on top of these images to create a computer-mediated subhuman composed from both the living body and the digitally-imagined.

<https://vimeo.com/249272106>



### **Autonomous Sense Object (2016)**

Materials: Wood, Steel, Acrylic, Velcro, 3D Printed Prosthetic Fingers, Leather, Lace, Speaker Cones, Electronics, Motors

In this piece, an appendage shrouded in leather bondage material is pecked, probed, and poked by a kinetic array of the artist's prosthetic velcro-tipped fingers. Several speakers affixed to the fingers are driven acoustically by the velcro extrications that transfer energy into the speaker cones. This mechanical transduction operating on the speaker cone uses the natural amplification from the materials to create a perpetual ripping sound.

This piece addresses issues related techno-eroticism, automata theory, and casts the body as a cyborgian object of erotic materiality. The BDSMR object complicates our awareness of sound by examining aurality as a fetish, as an agent in sensory arousal that derives from our darker, more lurid impulses.



## **BANDWIDTH (2016)**

Velcro, wood, steel, pulleys, motors, electronics 4'x3' and 3'x2'

This installation features two kinetic machines (approximately 4'x3' and 3'x2') that rotate arrays of cylindrical pulleys, each containing two-inch belts of industrial velcro strips. Three motors control the motion that gets applied to the pulleys. Between the two machines, there exists about 192 sq. inches of velcro-on-velcro contact which requires a significant amount of motor torque.

At some threshold the sounds emanating from the machines seem to etch out a virtual space that is flat and two-dimensional; it spans a larger space than the constraints of the machines' housings. As a result, each machine was positioned at approximately 60° contra laterally from one another to create an ideal listening angle from which to experience this uncanny wall of sound. I wanted to explore the psychoacoustic continuum between the delicate fiber-to-fiber extrications that occur at slower ripping speeds and the percept of noise as it arises in the dense layers of sonic rippage that accompany faster speeds.

<https://vimeo.com/167484822>



### **hiveMind (2015)**

wood, steel, ceramics, ceramic marbles, electronics, fabrics, lights. 15'x4'

*hiveMind* explores the sonic potentials latent in ceramic vessels as a site from which to convey a visual and auditory resonance. In doing so, it exposes the emergent acoustic properties of clay bowls as a sensory synchronicity between movement and sound. Two platforms, populated by hundreds of clay vessels, are pushed back and forth at different speeds to incite and sound ceramic marbles housed inside the bowls. As the platforms' motion change speed over time, different bowls rotate and loop with more velocity thereby amplifying their characteristic resonance in concert with the others. *hiveMind* was conceived as a site-specific installation for a stairwell landing at the Pioneer Works Center for Art and Technology in Red Hook, Brooklyn.

<https://vimeo.com/127874298>



**(six channels (six channels) ) (2015)**

ceramics, paper, wood, speakers, 6 channel audio. 20' x 12'

*(six channels(six channels))* broadcasts the sounds taken from various server farms (massive internet data centers) through six large ceramic cylinders. Treating the transmission of data as a sonic medium in itself, the ceramics act as a physical and acoustic conduit through which we are able to listen in on the massive flow of information being packed and parceled through our world's complex information networks. Because the clay cylinders impart their own characteristic resonance onto the server sounds, the sonic result is an ethereal hybrid that is at once palpable, organic, latent, and subterranean – a physical channel merged with a digital one.

please see <https://vimeo.com/126652315> for video documentation



### **triadic attractor (2015)**

steel, wood, magnets, motor, sensors, custom electronics, nine speakers. 8'x1'

*triadic attractor* explores the notion of momentum as a restoring force and sonifies the invisible waves in the ether of free space. This installation is an extension of the *push-pole* (2014) structures and was designed for a site-specific stairwell space. Three magnets are affixed to steel rods that are provoked to swing in the vicinity of nine magnetic-field sensors. The entire structure also acts as a physical antenna that picks up spurious radio frequencies, disrupting and interfering with the custom electrical circuitry. Specific frequencies were chosen that align with the resonant frequencies of the chamber of the stairwell space in which it is housed. The resultant sound of each sensor is distributed onto one of nine channels located throughout the vertical space.

please see <https://vimeo.com/128743201> for video documentation



### **dice roll (2014)**

wood blocks, dice, steel, motors, electronics, lights. 20'x15'

*dice roll* is a study in acoustic density that reveals a kinetic network of hundreds of rolling dice. The dice, as a multiplicitous sound object, incite the resonance inherent to the wood's material and topological orientation. The dice themselves are at once fixed and random, each tethered to the structures from which they hang. As the dice are rolled at different speeds, they occasionally self-organize into periodic rhythms and patterns. This installation seeks to merge the objects' cultural significations with their sounding gestures as signifiers of chance and probability. The emergence of the dice's sonic presence—in sheer volume and continuity—pervades the enclosing space, demarcating the auditory thresholds between order and chaos, pattern and noise, equilibrium and entropy.

<https://vimeo.com/96156680>



## **push-pole (2014)**

steel, magnets, wood, motors, electronics, custom analog circuits, 16 speakers. 16'x12'

*push-pole* is a kinetic system that focuses on the mediating forces involved in the transduction of energy into movement, movement into sound. This installation reveals the elegant dynamics involved in the physics of 'coupled oscillator systems'. It is comprised of sixteen high-powered magnets affixed to steel rods that are linked together and provoked into pendulum-like motion. As they swing, sensors hover below the pendula (attracting the rods and picking up the induced magnetic fields) and relay their signals to electrical circuits that produce sound. As such, the pendula partake in a type of dance with the conflicting agonistic forces, enlivening the system with a hypnotic, playful intelligence. This installation points to the ways in which we delimit boundaries between human, machine, cognition, and intentionality.

<https://vimeo.com/113036008>





## **mutatis mutandis (2012)**

ice block, aluminum and vinyl prints, speakers, 16 channel audio, video projectors

*mutatis mutandis* is a multi-sensory installation that uses glaciological data to control an audio and visual environment. This installation visualized and sonified data taken from a variety of glaciological research centers. Several computer algorithms specifically programmed for this installation control, modify, or synthesize glacial sounds through a variety of means. As the computer interprets streams of glacial data, we perceive glacial rates of change through the medium of sound. Different computational procedures enable the listener to experience thousands of years of recorded data in perceivable ways. A large 300 lb ice block, slowly melting in the center of the space, symbolizes our glaciological reference point in the present moment. From this vantage point, the glacial sounds form a living, breathing acoustic ecology dependent on time and reflective of the expansive contours of their history.

please see [www.nolanlem.com/mutatis\\_mutandis/](http://www.nolanlem.com/mutatis_mutandis/) for more information