

NOLAN LEM
www.nolanlem.com/
nolan.lem@gmail.com

EDUCATION

- Ph.D. Computer-Based Music Theory and Acoustics** *August 2022 (expected)*
Stanford University, Stanford, CA
Dissertation: “Synchronous Sound: Strategies for Collective Sound Generation and Diffusion”
- M.F.A Sound Art** *May 2015*
Columbia University, New York, NY
- B.S. Electrical & Computer Engineering** *May 2013*
University of Kansas, Lawrence, KS
- B.M. Studio Music and Jazz Saxophone** *May 2008*
University of Miami, Miami, FL

PUBLICATIONS AND CONFERENCE HISTORY

please see <https://www.nolanlem.com/research.html> for links to documents

- ‘Constructive Accumulation: A Look at Self-Organizing Strategies for Aggregating Temporal Events along the Rhythm Timbre Continuum’. Sound and Music Computing Conference. Saint Etienne, France *2022*
- “Beat Perception in the Swarm: a look at tapping synchronization strategies using coupled metronomes” Neurosciences and Music VII: Connecting Music across the Lifespan. Aarhus, Denmark *2021*
- ‘Extracting Beat from a crowd of coupled metronomes: effects of coupling strength and timbre on tapping synchronization’. International Conference on Music Perception and Cognition. Sheffield, UK *2021*
- “Menagerie: exploring the audio-visual rhythms of violence through data, triggers, and swarms” Proceedings of the Sound and Music Computing Conference (SMC). Torino, Italy *2020*
- “Art and AI: ‘Engine Errors / self-portrait’” International Conference on Computational Creativity (ICCC). Coimbra, Portugal *2020*
- “Extracting beat from a crowd of loosely coupled, concurrent periodic stimuli” Acoustical Society of America (ASA). San Diego, CA *2019*
- “Extracting beat from a crowd of loosely coupled, concurrent periodic stimuli” The Predictive Brain Conference. Marseilles, France *2019*
- “Kuroscillator: A Max-MSP Object for Sound Synthesis using Coupled-Oscillator Networks”. 14th International Symposium on Computer Music Multidisciplinary Research. Marseilles, France *2019*
- “Sound in Multiples: Synchrony and Interaction Design using Coupled-Oscillator Networks”. Sound and Music Computing Conference (SMC). Málaga, Spain. *2019*
- “Art and AI”. Artificial Intelligence (AI) Salon. Computer Science Department. Stanford, CA. *2019*
- Keynote Speaker. Symposium on Art and Technology. UTEC (Universidad Tecnológica del Uruguay). Montevideo, Uruguay *2019*
- ‘An Adaptive Model of Pulse in Jazz Percussion: Rhythmic Generation in Quasi-periodic Musical Contexts using Sequence-to-Sequence Learning’. Stanford Computer Science Department. Stanford, CA. *2018*
- ‘A Generative Model of Pulse Percept: Analyzing Performances of Jazz Drumming using Dynamic Beat Tracking and Recurrent Neural Networks’. Stanford Deep Learning Seminar. Stanford, CA. *2017*
- “Head Tracking Binaural Localization System for Horizontal Sound Source Detection”. Center for Computer Research in Music and Acoustics (CCRMA) Salon. Stanford, CA. *2016*

- “Velcro as a sensory interface and erotic material”. ‘Politics of the Machine: Art and After’ Conference. Copenhagen, Denmark 2017
- “Swarm Theory and Sonic Emergence: Swarm and Drone”. DorkBot Conference. Columbia University. NYC, NY 2014
- “Mutatis Mutandis: Sonification of Ice-Core Data”. New Interfaces for Musical Expression (NIME) Conference. University of Michigan. Ann Arbor, MI 2011
- “Sound in Data: Perceiving Climate Change”. Keynote Speaker, Undergraduate Research Symposium. University of Kansas. Lawrence, KS 2010
- “On Notational Interfaces for Free Jazz”. Maynooth Music Composition. Maynooth, Ireland 2009
- “International Association of Jazz Educators (IAJE)”. Representative. Lucerne, Switzerland 2008

SELECTED EXHIBITIONS

- 2022 *Upcoming (TBD)* Exhibition. JIRSANDEL Gallery. Copenhagen, Denmark.
- 2022 “Surface Song” Solo Exhibition. Eks Rummet Gallery. Copenhagen, Denmark.
- 2021 “Autonomous Sense Object” Video Documentation. London Fetish Film Festival, London, UK.
- 2020 “In Praise of Idleness” Solo Exhibition. Galerija Alkatraz, Ljubljana, Slovenia.
- 2020 “Engine Errors / Self-portrait” ICCC. Coimbra, Portugal
- 2019 “Menagerie” Solo Exhibition. Danish National Museum of Music. Copenhagen, Denmark.
- 2019 “Tout ce qu’on a construit” Group show. Vermont Studio Center. Johnson, Vermont.
- 2019 “Kuramoto Cycles” *Sound Happenings* Group show. Cantor Arts Museum, Stanford, CA. USA
- 2018 “Scratch” / “Noise Ordinance” *Escuchar*. Group show. Museum of Modern Art Buenos Aires (MAMBA), Buenos Aires, Argentina.
- 2018 “Tentacule” / “Activation” *Bruire*. Two person show. LHOSTE ART CONTEMPORAIN, Arles, France
- 2017 “INVISIBLE CHOIRS” Solo Exhibition. Pro Arts Gallery, Oakland, California. USA
- 2017 “Autonomous Sense Object” Group Exhibition. Morley Gallery, London, UK.
- 2017 “Autonomous Sense Object” *Magnitudes* Group Exhibition. Art345 Gallery, Harlem, NYC. USA
- 2016 “Neural Ordinance” PIONEER WORKS, Brooklyn, NYC. USA
- 2016 “BANDSWIDTH” *home*. Group show. Pro Arts Gallery, Oakland, CA. USA
- 2016 “HiveForm” *Flux Art Fair*. Group show. Harlem, NYC. USA
- 2015 “Hivemind” *Amplitudes*. Group show. PIONEER WORKS. Brooklyn, NYC. Permanent Collection
- 2014 “Dice Roll” / “Push-pull” Group show. Wallach Gallery. New York, NYC. USA
- 2014 “Seismodome” Hayden Planetarium at the American Museum of Natural History. New York, NYC.
- 2014 “Under the Viaduct” *Public Art Installation* River Side Park. Harlem, NYC. USA
- 2012 “Metabach encapsulate no.2” *Cryptograph: An Exhibition for Alan Turing* Group Show, Spencer Museum of Art. Lawrence, KS.
- 2012 “Mutatis Mutandis” *New Interfaces for Musical Expression Conference*. Ann Arbor, MI. USA
- 2012 “Mutatis Mutandis” Hall Center for the Humanities. Lawrence, KS. USA
- 2010 “Awkward Encounters” Great Plains Museum. Lincoln, NE. USA

TEACHING EXPERIENCE

Music Signal Processing, *Stanford University* 2018

The course presented fundamental elements of digital audio signal processing, such as sinusoids, spectra, the Discrete Fourier Transform (DFT), digital filters, z transforms, transfer-function analysis, and basic Fourier analysis in the discrete-time case. Matlab is used for in-class demonstrations and homework/lab assignments.

Music, Mind, and Human Behavior, *Stanford University* 2018

An introductory exploration of the question of why music is a pervasive and fundamental aspect of human existence. The class introduced aspects of music perception and cognition as well as anthropological and cultural considerations.

Fundamentals of Computer-Generated Sound, *Stanford University* 2017

Assisted students in basic digital signal processing for sound synthesis, multi-channel spatialization, and physical modelling and helped students carry out individual projects in computer-generated sound. Programming included ChuCK, javascript, and Web Audio API.

Neuroplasticity in Musical Gaming, *Stanford University* 2017

Using virtual, augmented, and mixed-reality paradigms for design and programming, this course examined how psychoacoustics, cognition, and neuroscience of sound affects our experience of computer-mediated spaces. Assisted students in carrying out game-based projects in a variety of programming languages using Oculus Rifts, Vives, and consumer-based EEG hardware. Programming included Unity (C), javascript, and Processing environments.

Psychophysics and Music Cognition, *Stanford University* 2016

Integrating perception, psychoacoustics, cognition, and neuroscience of music, this course taught undergraduate and graduate students the fundamentals of conducting experimental psychoacoustic studies with a focus on previous research in the field.

Physical Interaction Design for Music, *Stanford University* 2016

Co-taught course in physical computing in sound-related applications. Assisted students developing and implementing sensor and hardware-based designs for their individual projects which included work with arduinos, max/msp, and Processing.

Sound: Physics and Perception, *Columbia University* 2014

Co-taught studio course related to psychoacoustics, wave propagation, biological sound, physiology of hearing, and electronic sound production. Designed and carried out experiments demonstrating sonic principles.

GRANTS - AWARDS

Fulbright Scholarship Sound and Music Computing - Aalborg University Copenhagen. 2020

POWSOLO Sound Art Award: Best Artistic Discovery, Amsterdam, Netherlands 2020

MATA Festival Commission, New York City, NY . 2020

2019 FETA Prize in Sound Art, Miami, FL. USA . 2019

Mellon Dissertation Fellowship, Stanford University. Stanford, CA 2019

European Art-Science Technology Network for Digital Creation (EASTN-DC) Grant, Copenhagen, Denmark. 2019

Europe Center Grant, Stanford University. Stanford, CA 2018

Finalist, FETA Prize in Sound Art, Miami, FL. 2017

3rd Place, Engine Room International Sound Arts Competition, London, UK. 2017

New Music USA: QuBit, SOUNDART2016, New York City, NY 2016

Finalist, FETA Prize in Sound Art, Miami, FL 2015

National Science Foundation (NSF), Seismic Sound Lab at Lamont-Doherty Observatory at Columbia University. New York City, 2014

WORKSHOPS

Kinetic Sound Art: Interfacing sound and motion using human computer interfaces, *Ljubljana, Slovenia. LJUDMILA* 2020

Topics: basic principles of acoustic sound, robotics, mechanical motion and motor control using arduino, messaging between processing/max-Msp/supercollider/ to arduino, material characteristics and fabrication methods, etc...

Sound Arts Workshop, *Stanford University* Summer 2019

Week-long intensive workshop that focuses on hands-on approaches to working with sound as mediated by kinetic, light, and moving imagery.

Composing for the Swarm: Analysis, control, and production of interactive, sonic systems, *Columbia University*

Topics: Dynamical systems approaches to creating, aggregating, and compositing sound, swarm theory, numerical simulation and modelling, sonification, etc...

Exploring the interdisciplinary domains of auditory perception and sonic art,

Topics: basic psychoacoustics of human hearing, fundamentals of auditory system, contemporary art and perception, design strategies, etc...

RESIDENCIES

Statens Værksteder for Kunst, Artist Residency Copenhagen, Denmark. Winter 2021

Bemis Center for Contemporary Art, Artist Residency Omaha, NE. Summer 2020

GRAME (centre national de création musicale), Research Residency Lyon, France Winter 2020

European Art-Science-Technology Technology Network For Digital Creation (EASTN-DC), Artist Residency Copenhagen, Denmark 2020

Vermont Studio Center, Full Fellowship Johnson, VT. April 2019

GRAME (centre national de création musicale), Research Residency Lyon, France. 2019

Musée des arts et métiers, Artist Residency Paris, France. Summer 2018

IRCAM, Research Residency - Music Representation Team Paris, France Summer 2017

MassMoCA, Arts Residency North Adams, MA Summer 2016

PIONEER WORKS, Artist Residency Brooklyn, NYC Summer 2015

Signal Culture, Artist Residency Owego, NY Summer 2014

WORK EXPERIENCE

Sound Researcher 2013-2017

Seismic Sound Lab - Geophysics and Seismology. Lamont-Doherty Earth Observatory

Developed computer programs to sonify and visualize seismological data in multichannel applications.
Created open-source Python Library to acquire, render, and sonify earthquake data.

Sonification Researcher 2011-2012

Center for the Remote Sensing of Ice Sheets (CRISIS). EECS Department, University of Kansas

Developed sonification paradigms for rendering climate and glaciological data into sound and image primarily in C++ and Max/MSP.

MTV: Audio Intern, News and Documentaries 2007

Developed web application for distributing song playlists to viewers. Edited music that was selected for News and Documentary programs for MTV.

CONFERENCE REVIEWER

“Sound and Music Computing (SMC) Conference”. *2019-2022*

“New Interfaces for Musical Expression (NIME) Conference”. *2020-2022*

TECHNICAL SKILLS

Creative Coding: Arduino, Processing, Max/MSP/Jitter, Supercollider, CHuCK, RTCmix, Faust

Programming: Python, Matlab, C/C++, Ruby, Shell, SQL, git, L^AT_EX

Web: HTML/CSS, JQuery, Django, PHP, Javascript, WebAudioAPI

3D Modeling Design: Eagle, RHINO, Blender, FUSION360

Experience with: VHDL, Assembly

Relevant Coursework: Deep Learning for Audio, Audio Signal Processing, Perceptual Audio Coding, Spatial Audio, Psychoacoustics

Languages: English (native), French (fluent)