



Nolan Lem

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EDUCATION

- Ph.D. Stanford University** 2020
Center for Computer Research in Music and Acoustics (CCRMA)
Computer Based Music Theory and Acoustics
- Columbia University** 2015
Master of Fine Arts (MFA)
- University of Kansas** 2013
Bachelors of Science in Electrical Engineering (BSEE)
- University of Miami (FL)** 2008
Studio Music and Jazz Saxophone Performance (BM)

**TEACHING
EXPERIENCE**

- Music Signal Processing (MUS320)** Fall 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** Spring 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** Fall 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***Spring 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*Winter 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*Fall 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.

[Columbia University]

Sound: Physics and Perception*Winter 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.



RELATED EXPERIENCE

Seismic Sound Lab – Lamont-Doherty Earth Observatory Columbia University 2014

Sonification Researcher

Developed computer programs to sonify and visualize seismological data in multichannel applications primarily using digital signal processing techniques in python to acquire, render, and sonify earthquake data.

Center for the Remote Sensing of Ice Sheets (CRISIS) – EECS Department KU 2011-2012

Sonification Researcher

Developed programmatic model for rendering climate and glaciological data into sound and image. Programming in C++ with audio synthesis in Max/MSP.

MTV News and Documentaries 2007

Audio Department Intern

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

**GRANTS – AWARDS -
COMISSIONS**

- 2018 Sennheiser Store, Sound Installation – San Francisco, CA
- 2018 Europe Center Grant – Stanford University, CA
- 2017 Finalist, FETA Prize in Sound Art – Miami, FL
- 2017 3rd Place – Engine Room International Sound Arts Competition – London, UK
- 2016 New Music USA: QuBit – SOUNDART2016 – Lower East Side, NYC
- 2015 Finalist, FETA Prize in Sound Art – Miami, FL
- 2014 West Harlem Art Fund: Under the Viaduct – Sound Art Installation Group Show
- 2014 National Science Foundation (NSF) – Seismic Sound Lab: Sights, Sounds, and Space
- 2013 Rummer Design Award – EECS Department KU
- 2011 Biodiversity Institute: Hall Center for the Humanities (KU) *Mutatis Mutandis* Commission
- 2010 Spencer Museum of Art – Reflection/Projection sound installation – Lawrence, KS



RESIDENCIES

- 2019 Vermont Studio Center – Full Fellowship Artist Residency – Johnson, VT
- 2019 GRAME (*Centre national de création musicale*) – Research Residency – Lyon, France
- 2018 *Musée des arts et métiers* – Artist Residency – Paris, France
- 2017 Cité international des arts – Artist Residency – Paris, France
- 2017 IRCAM Research Residency – Music Representation Team – Paris, France
- 2016 MassMoCA – Artist Residency – North Adams, MA
- 2016 Pioneer Works Center for Art and Technology – Music Residency Program – Brooklyn
- 2015 Signal Culture – Artist Residency – Owego, NY

PAPERS - CONFERENCES

- 2019 "Sound in Multiples: Synchrony and Interaction Design using Coupled Oscillator Networks" – Sound and Music Computing Conference (SMC), Malaga, Spain
- 2018 Keynote Speaker – UTEC (Universidad Tecnológica del Uruguay) Symposium on Art and Technology
- 2018 "Velcro as a sensory interface and erotic material" – British Computer Society, Politics of the Machine Conference – Copenhagen, DEN
- 2014 "Toward an Acoustemology of Sound Art: Dice Roll (2014)" – Columbia Ethnomusicology
- 2013 "Swarm Theory and Sonic Emergence: Swarm and Drone" – DorkBot Conference, Columbia University
- 2011 "Mutatis Mutandis" audio visual installation – New Interfaces for Musical Expression (NIME) – Ann Arbor, MI
- 2010 Keynote Speaker Undergraduate Honors Research Symposium – Sound in Data: Perceiving Climate Change – University of Kansas

EXHIBITIONS

- 2019 The Anderson Collection at **Cantor Arts Center** – Stanford, CA
neural ordinance, 2 channel audio
- 2019 **Vermont Studio Center** "The FRIDGE SHOW" – Johnson, VT
Breathe Deep, mixed media
- 2018 (May) "ESCUCHAR" **Museum of Modern Art Buenos Aires (MAMBA)** – Buenos Aires, AR
Scratch - 8 channel audio
Kuramoto Cycles – 8 channel audio
- 2018 (Mar) **L'HOSTE Art Contemporain Gallery** — Arles, France
Tentacule - sculpture
Activation - sculpture
- 2017 (Nov) **Pro Arts Gallery** -- INVISIBLE CHOIRS, Solo Exhibition – Oakland, CA
Activations - sculpture
Rocks in roll - sculpture
Long Live the New Flesh - sculpture



- Fingers* - digital renderings
Engine Errors / Self-Portrait - mixed-media projection
- 2017 **CCRMA** Stanford University
neural Ordinance, multi-channel audio composition
- 2017 **CEMEC Festival: neural Ordinance**, UCSD – San Diego, CA
- 2017 **Morley Gallery** – London, UK
autonomous sense object – sound sculpture
- 2017 Magnitudes Group Show – **ART345 Gallery** – East Harlem, NYC
autonomous sense object – sound sculpture
- 2016 “HOME” Group Show – **Pro Arts Gallery** – Oakland, CA
BANDSWIDTH, sound sculpture
- 2016 **FLUX art fair** – Corn Exchange Building – West Harlem, NYC
HiveForm – sound sculpture
- 2015 “Amplitudes” Group Show – **Pioneer Works** – Brooklyn, NYC
HiveMind – sound sculpture (permanent collection)
Triadic Attractor – sound sculpture
- 2015 **Connelly Theater** – “The Hour of the Star” – Lower East Side, NYC
Sound Design
- 2014 **Hayden Planetarium at the American Museum of Natural History** – NYC
SeismoDome – immersive multichannel audio for planetarium
- 2014 West Harlem Art Fund - **NYC Public Park Sound Installation**
Under the Viaduct – multi-channel audio
- 2014 **Wallach Gallery** – Columbia University – NYC
Dice Roll – sound sculpture
Push-Pole – sound sculpture
- 2012 **Spencer Art Museum** – Cryptograph: an exhibition for Alan Turing – Lawrence, KS
MetaWebern no.2 – digital rendering
- 2012 **New Interfaces for Musical Expression Conference (NIME)** – Ann Arbor, MI
mutatis mutandis – audio visual installation
- 2012 **Hall Center for the Humanities** – University of Kansas
mutatis mutandis – audio visual installation
- 2011 **Spencer Art Museum** – Lawrence, KS
Reflection/Projection – multi-channel sound installation
- 2010 **Great Plains Museum** – Lincoln, NE
Awkward Encounters – two channel sound



TECHNICAL SKILLS

PROGRAMMING	Python, Matlab, Processing, Arduino, C/C++, PSPICE, Simulink experience with VHDL, assembly language
WEB	HTML, CSS, PHP, Javascript, WebAudioAPI
AUDIO	Supercollider, Max/MSP/Jitter, CHuCK, RTCmix, Faust
FABRICATION	EAGLE PCB Layout, Blender 3D Modelling Design, 3D printing
RELEVANT COURSEWORK	Deep Learning for Audio, Audio Signal Processing, Perceptual Audio Coding, Spatial Audio, Computational modelling in Psychoacoustics