

MYUNGIN LEE

◇ Santa Barbara, CA ◇ myunginlee@mat.ucsb.edu ◇ <http://www.myunginlee.com/> ◇ +1-805-200-6440

Research Interests

Multi-modal Instrument Design using Signal Processing and Machine Learning

A researcher designing multi-modal instrument based on scientific theory, composition, signal processing & machine learning, and gestural interface. Skills: C/C++, Python, MATLAB with proficiency for research

Education

University of California, Santa Barbara, Ph.D. Candidate, Media Arts and Technology, United States

September 2017 – Expected at June 2023

Hanyang University, M.Sc. in Electronics and Computer Engineering, Seoul, Korea

- "Blind Estimation of Reverberation Time on Multi-Channel Microphone using Deep Neural Network"

March 2015 – February 2017

Hanyang University, B.Sc. in Electronics and Computer Engineering, Seoul, Korea

March 2008 – February 2015

Work Experience

Nokia Bell Labs. Experiments in Art & Technology (E.A.T.)

June 2020 – August 2020

Summer Internship

Republic of Korea Air Force, 3rd Training Wing Group

January 2010 – February 2012

Central administrative clerk (Mandatory military service)

Teaching Experience

Teaching

Fall 2022. MUS 109IA - Direct Digital Synthesis - Processing and Composition

(Instructor: Myungin Lee)

Winter 2022. MUS 109IA - Direct Digital Synthesis - Processing and Composition

(Instructor: Myungin Lee)

Teaching Assistant

Winter 2021. MAT240B - Digital Audio Programming: The Series

(Instructor: Dr. Karl Yerkes)

Fall 2020. MAT 240C - Digital Audio Programming: The Series

(Instructor: Dr. Karl Yerkes)

Spring 2020. MAT 276IA - Direct Digital Synthesis - Processing and Composition

(Instructor: Prof. JoAnn Kuchera-Morin)

Spring 2019. MAT 276IA - Direct Digital Synthesis - Processing and Composition

(Instructor: Prof. JoAnn Kuchera-Morin)

Spring 2019. MAT 240A - Digital Audio Programming: The Series

(Instructor: Dr. Karl Yerkes)

Research Experience

Graduate Student Researcher [Ph.D. Candidate]

September 2017 – Present

AlloSphere Research Group in Media Arts and Technology, University of California, Santa Barbara, US

- Advisor: Prof. JoAnn Kuchera-Morin, Prof. Curtis Roads, & Prof. Misha Sra

- **A Multi-modal, multi-User interactive instrument in 3D space using the smartphone for gesture control:**
 - Developing real-time audio-visual instruments for composition (C++) using ocean science, bio-science, quantum physics, and Newtonian physics
 - Developed gesture-based smartphone 3D interface using signal processing and machine learning.
- **TINC (Toolkit for Interactive Computation)**
 - The Toolkit for Interactive Computation (TINC) provides a set of C++ and python classes to assist in the interactive exploration of large datasets by managing parameter spaces, interactive computation and caching of data (<https://github.com/AlloSphere-Research-Group/tinc>)
 - National Science Foundation Grant No. 2004693:
Elements: Cyber-infrastructure for Interactive Computation and Display of Materials Datasets
- **The AlloSphere & AlloLib:**

The *AlloSphere* is a three-story full-surround, multimodal, immersive facility in the Media Arts and Technology at the University of California, Santa Barbara to represent large and complex data, including immersive visualization, sonification, and interactivity. *AlloLib* is a cross-platform suite of C++ components for building interactive multimedia tools and applications.

 - Participating the development of the system (<https://github.com/AlloSphere-Research-Group/allolib>)

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- **Music source conducting based on gestural control using machine learning:**

Music interaction with gesture recognition of conducting gestures using controllers with gestural sensors

- Developed and performed machine learning and signal processing based music interaction system

Graduate Student Researcher [Master's]

March 2015 – February 2017

Acoustic, Speech Signal Processing and Machine Learning Lab., Hanyang University, Seoul, Korea

- Website: <https://dsp.hanyang.ac.kr> - Advisor: Prof. Joon-Hyuk Chang

- **Reverberation time estimation using machine learning:**

Obtaining room acoustic information from sound sources received by microphones.

- Conducted a study with single & multi-channel based algorithm using deep neural network.
- Developed an estimation algorithm for dereverberation and acoustic model.
- Contributed distributive research with *LG electronics*.

- **Machine learning**

- Performed experiments on the application of various machine learning techniques with *Pytorch, Tensorflow, Python, Kaldi, and MATLAB*
- Applications: reverberation time estimation, acoustic models, jointly trained neural network, bandwidth expansion, and gesture interpretation.
- Contributed distributive research with *Samsung electronics*.

- **Crosstalk cancellation:** Reproducing audio to utilize binaural audio signals with two loudspeakers by offsetting the crosstalk components

- Developed crosstalk cancellation algorithms based on HRTF with low sensitivity.
- Exclusively participated a national project; Information Technology Research Centre: Center for Ultra Realistic Audio Technologies (*ITRC: CURAT*)

- **Multi-channel audio spatialization:** Synthesis of audio signals with directivity using multiple loudspeakers.

- Developed an adaptive multi-channel audio spatialization algorithm (*MATLAB*)
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Publications & Patents

Publications

- **Myungin Lee**, "Entangled: A Multi-Modal, Multi-User Interactive Instrument in Virtual 3D Space Using the Smartphone for Gesture Control," *New Interfaces for Musical Expression (NIME'21)*, Jun., 2021.
- **Myungin Lee**, "A Multi-User Interactive Instrument in the 3D Space Using the Gesture of Smartphones," *Korea Electro-Acoustic Music Society's Annual Conference (KEAMSAC)*, Oct., 2019
- **Myungin Lee**, "Deep neural network based music source conducting system," *International Computer Music Conference (ICMC)*, Aug., 2018.
- **Myungin Lee**, Joon-Hyuk Chang, "Deep neural network based blind estimation of reverberation time based on multi-channel microphones," *Acta Acustica united with Acustica*, May, 2018.
- **Myungin Lee**, Joon-Hyuk Chang, "Blind Estimation of Reverberation Time on Multi-Channel Microphone using Deep Neural Network," Master's thesis, Feb, 2017.
- **Myungin Lee**, Joon-Hyuk Chang, "Blind Estimation of Reverberation Time using Deep Neural Network," *IEEE International Conference on Network Infrastructure and Digital Content (IC-NIDC)*, Sep., 2016.
- Jeehye Lee, **Myungin Lee**, Joon-Hyuk Chang, "Ensemble of Jointly Trained Deep Neural Network-Based Acoustic Models for Reverberant Speech Recognition," *arXiv:1608.04983*, 2016.

Reviewing Experience

- *International Computer Music Conference (ICMC)* 2019

Patents

- Multichannel Microphone-based Reverberation Time Estimation Method and Device which use Deep Neural Network Technical Field, US Patent: US10854218B2, 2017.
- Multi-Channel Microphone based Reverberation Time Estimation using Deep Neural Network, Korea Patent: KR101871604B1, 2016.

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Performance and Exhibitions

- September 2022, Exhibition, "*Coexistence with the SARS-CoV-2 virus*," Ars Electronia Festival, Austria
 - May 2022, Audiovisual Concert, "*AlloLib Audiovisual Concert*," SYMADES 2022, the California NanoSystems Institute, UCSB, Santa Barbara, USA
 - June 2019, Art installation, "*A Multi-User Interactive Instrument in the 3D Space Using the Gesture of Smartphones*," the MAT 2019 End of Year Show: MADE [at] UCSB, the California NanoSystems Institute, UCSB, Santa Barbara, USA
 - April 2019, CREATE Ensemble Performance, "*Ballet Mécanique (2019)*," at Lotte Lehmann Concert Hall, UCSB, Santa Barbara, USA
 - August 2018, Art installation, "*Deep neural network based music source conducting system*," International Computer Music Conference (ICMC), Daegu, Korea.
 - June 2018, Art installation, "*Deep neural network based music source conducting system*," the MAT 2018 End of Year Show: Invisible Machine, the California NanoSystems Institute, UCSB, Santa Barbara, USA
 - June 2018, CREATE Ensemble Performance, "*Loading (2018)*," at SBCAST, Santa Barbara, USA
 - May 2018, CREATE Ensemble Performance, "*Loading (2018)*," at Lotte Lehmann Concert Hall, UCSB, Santa Barbara, USA
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Awards & Fellowships

- Graduate Student Researcher in the AlloSphere Research Group 2018 - 2021
- *Signal Intelligence Research Center (SIRC) Fellowship*, Defense Acquisition Program Administration 2015 - 2016
 - A study on technique of distinguishing voice for voice recovery
- *Brain Korea 21 Plus (BK 21 Plus) Scholarship*, National Research Foundation of Korea 2015 - 2016
- *Advanced Research Center Program Fellowship*, National Research Foundation of Korea 2015 - 2016
 - Development of Core Technologies for High-Performance Speech Processing in Future Wearable Devices
- *Nano-Material Technology Development Program Fellowship*, National Research Foundation of Korea 2015 - 2016
 - Development of signal processing technique based on Biomimetic tactile sensor for texture perception
- Runner-up Award in the Department of Electronic Engineering's Graduation Competition 2014
 - Adaptive multi-channel audio spatialization