

Sungho Lee

Curriculum Vitae

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Postdoctoral researcher @ Machine Learning & Vision Lab, KAIST

Research keywords — audio inverse problems, differentiable signal processing, generative modeling

Publications

Journal Articles

- J1 **Differentiable Acoustic Radiance Transfer**
Sungho Lee, Matteo Scerbo, Seungu Han, Min Jun Choi, Kyogu Lee, and Enzo De Sena
IEEE Transactions on Audio, Speech, and Language Processing (TASLPRO), 2026 [arXiv](#)
- J2 **Reverse Engineering of Music Mixing Graphs with Differentiable Processors and Iterative Pruning**
Sungho Lee, Marco A. Martínez-Ramírez, Wei-Hsiang Liao, Stefan Uhlich, Giorgio Fabbro, Kyogu Lee, and Yuki Mitsufuji
Journal of Audio Engineering Society (JAES), 2025 [jaes](#) [arXiv](#)
- J3 **Differentiable Artificial Reverberation**
Sungho Lee, Hyeong-Seok Choi, and Kyogu Lee
IEEE/ACM Transactions on Audio, Speech, and Language Processing (TASLP), 2022 [demo](#) [arXiv](#)

Conference Papers

- C1 **Exploring the Design Space of Representation Learning for Audio Transformations**
Sungho Lee, Marco A. Martínez-Ramírez, Jung Hyun Koo, Wei-Hsiang Liao, Kyogu Lee, and Yuki Mitsufuji
International Society for Music Information Retrieval Conference (ISMIR), 2026 [arXiv](#) [code](#)
- C2 **Rethinking Speech Representation Aggregation in Speech Enhancement: A Phonetic Mutual Information Perspective**
Seungu Han, Sungho Lee, and Kyogu Lee
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2026 [arXiv](#)
- C3 **Few-step Adversarial Schrödinger Bridge for Generative Speech Enhancement**
Seungu Han, Sungho Lee, Juheon Lee, and Kyogu Lee
ISCA Interspeech (Best student paper award nominee), 2025 [arXiv](#)
- C4 **TokenSynth: A Token-based Neural Synthesizer for Instrument Cloning and Text-to-Instrument**
Kyungsu Kim, Jung Hyun Koo, Sungho Lee, Haesun Jeong, and Kyogu Lee
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2025 [demo](#) [arXiv](#) [code](#)
- C5 **Searching for Music Mixing Graphs: A Pruning Approach**
Sungho Lee, Marco A. Martínez-Ramírez, Wei-Hsiang Liao, Stefan Uhlich, Giorgio Fabbro, Kyogu Lee, and Yuki Mitsufuji
International Conference on Digital Audio Effects (DAFx) (Best show & tell award), 2024 [demo](#) [arXiv](#) [code](#)
- C6 **Emosical: An Emotion-Annotated Musical Theatre Dataset**
Hayoon Kim, Ahyeon Choi, Sungho Lee, Hyunjin Jung, and Kyogu Lee
Conference on Empirical Methods in Natural Language Processing (EMNLP), Findings, 2024 [ACL](#) [code](#)
- C7 **Yet Another Generative Model for Room Impulse Response Estimation**
Sungho Lee, Hyeong-Seok Choi, and Kyogu Lee
IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), 2023 [demo](#) [arXiv](#)
- C8 **Blind Estimation of Audio Processing Graph**
Sungho Lee, Jaehyun Park, Seungryeol Paik, and Kyogu Lee
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2023 [demo](#) [arXiv](#)
- C9 **Exploiting Time-Frequency Conformers for Music Audio Enhancement**
Yunkee Chae, Jung Hyun Koo, Sungho Lee, and Kyogu Lee
ACM International Conference on Multimedia (ACM MM), 2023 [demo](#) [arXiv](#) [code](#)

- C10 **Global HRTF Interpolation via Learned Affine Transformation of Hyper-Conditioned Features**
Jin Woo Lee, Sungho Lee, and Kyogu Lee
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2023 [demo](#) [arXiv](#) [code](#)

Workshop & Demo Papers

- W1 **LipCoder: Voice-Enabled Coding Toolkit**
Hayoon Kim, Sungho Lee, Juwhi Kim, Bongwon Suh, and Kyogu Lee
ACM SIGACCESS Conference on Computers and Accessibility (ASSETS), Poster & Demo, 2026
- W2 **GRAFX: An Open-Source Library for Audio Processing Graphs in PyTorch**
Sungho Lee, Marco A. Martínez-Ramírez, Wei-Hsiang Liao, Stefan Uhlich, Giorgio Fabbro, Kyogu Lee, and Yuki Mitsufuji
International Conference on Digital Audio Effects (DAFx), Demo, 2024 [arXiv](#) [code](#) [documentation](#)
- W3 **Wavespace: A Highly Explorable Wavetable Generator**
Hazounne Lee, Kihong Kim, Sungho Lee, and Kyogu Lee
International Society for Music Information Retrieval Conference (ISMIR), Late-Breaking Demo, 2024 [arXiv](#) [code](#)
- W4 **Beat-Aligned Spectrogram-to-Sequence Generation of Rhythm-Game Charts**
Jayeon Yi, Sungho Lee, and Kyogu Lee
International Society for Music Information Retrieval Conference (ISMIR), Late-Breaking Demo, 2023 [demo](#) [arXiv](#) [code](#)

Patents

- P1 **Multi-modal Guitar Performance Transcription Apparatus and Method for the same**
Kyogu Lee, Sungho Lee, Chang-Bin Jeon, Jiwon Kim, Jongho Choi, Hayoon Kim, Yong-Ho Kim, and Jang-Woo Lee
Domestic Patent, 2025 [doi](#)

Preprints & Under Review

- R1 **UNISE: Speech Enhancement via Noise-Invariant Learning for Improved Content Preservation**
Seungu Han, Sungho Lee, Eunbum Kim, Seane Ok, and Kyogu Lee
- R2 **Actionable Pronunciation Feedback via Disentangled Speech Representations**
Hayoon Kim, Sungho Lee, and Kyogu Lee
- R3 **Solving Blind Non-linear Forward and Inverse Problem for Audio Applications**
Jaehyun Park, Sungho Lee, Hayoon Kim, and Kyogu Lee

Experiences

Academia

- KAIST, *Postdoctoral researcher* Fall 2026–present
School of Computing, Machine Learning & Vision Lab
Funded by the InnoCORE program, Ministry of Science and ICT (MSIT)
Supervisor: Hyunwoo J. Kim

Education

- Seoul National University, *Ph.D.* Fall 2020–Spring 2026
Department of Intelligence and Information, Music and Audio Research Group
Thesis: *Solving Inverse Problems of Audio Systems with Differentiable Processing and Generative Modeling*
Advisor: Kyogu Lee
- Pohang University of Science and Technology (POSTECH), *B.Sc.* Spring 2016–Spring 2020
Department of Creative IT Engineering

Industry

- Meta Reality Labs, *Research intern* Summer 2026
Context-aware remixing of user-captured audio from smart glasses
Supervisor: Sanjeel Parekh

- Sony AI, *Research intern* Spring 2026, Summer 2023
Representation learning for audio transformations (2026) [C1](#)
Differentiable signal processing for music mixing (2023) [J2](#) [C5](#) [W2](#)
Supervisor: Marco A. Martínez-Ramírez
- Supertone, *Research intern* Spring 2023, Summer 2021
Impulse response estimation for audio post-production (2023) [C7](#)
Efficient full-band speech enhancement and singing voice separation (2021)
Product: Supertone Air (research, model training & product design) [page](#)
Supervisor: Hyeong-Seok Choi

Funded Projects

- Intelligent audio signal processing with multimodal understanding and reasoning 2026
InnoCORE program, MSIT, Korean Government, *Applicant* [C1](#)
- Universal speech enhancement on full-band audio 2024
Supertone, *Research lead* [C3](#)
- Deep learning methods for post-production of musical audio 2022–2023
MCST, Korean Government, *Applicant* [C8](#) [C9](#)
- Sound event detection and localization; room acoustics analysis 2021–2023
IITP, Korean Government, *Applicant* [J3](#)
- Analysis and learning of noise, vibration, and harshness (NVH) characteristics 2022
Nexen Tire, *Research lead*
- Real-time audiovisual guitar tablature transcription 2022
Stra, *Research lead* [P1](#)
- Flexible display for simultaneous video and sound display using photonic nanomaterials 2020–2022
MSIT, Korean Government, *Applicant*

Invited Talks

- Solving Inverse Problems of Audio Systems: Inductive Biases, Data, and Scale Aug. 3, 2026
Institute of Sound Recording (IoSR), University of Surrey
- Inverse Problems in Audio Post-production Oct. 7, 2024
Music and AI Lab, National Taiwan University
- Deep Learning Meets Audio Processing Graphs Nov. 16, 2023
Center for Digital Music (C4DM), Queen Mary University of London

Teaching

- Data Science Program, Samsung, *Teaching Assistant* 2021–2022
- Machine Listening, Seoul National University, *Teaching Assistant* 2021

Journal Reviews

- IEEE Transactions on Audio, Speech, and Language Processing (TASLPRO) 2025–
- EURASIP Journal on Audio, Speech, and Music Processing (JASM) 2025–
- Journal of Audio Engineering Society (JAES) 2025–
- Elsevier Computer Speech & Language (CSL) 2026

Conference Reviews

- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2025–
- IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) 2025–

- IEEE International Joint Conference on Neural Networks (IJCNN) 2025–
- International Conference on Digital Audio Effects (DAFx) 2026
- International Society for Music Information Retrieval Conference (ISMIR) 2026
- ISCA Interspeech 2026
- IEEE Spoken Language Technology Workshop (SLT) 2026
- Korean Society for Music Informatics Conference (KSMI) 2026