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, Junghyun 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, Junghyun 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, Junghyun 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, Eungbum Kim, Seaone 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
- International Conference on Learning Representations (ICLR) 2027