

Jin Woo Lee

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Massachusetts Institute of Technology (MIT)
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EDUCATION

- Seoul National University (SNU)**
Ph.D. in Intelligence & Information August 2024
Thesis: Physical Modeling for String Instrument Sound Synthesis based on Finite-difference Scheme and Automatic Differentiation
Committee: Kyogu Lee (Advisor; SNU), Wonjong Rhee (SNU), Nojun Kwak (SNU), Juhan Nam (KAIST), Dasaem Jeong (Sogang Univ.)
- Pohang University of Science and Technology (POSTECH)**
B.Sc. in Mechanical Engineering August 2019
Thesis: Deep Learning Approach in Multi-scale Prediction of Turbulent Mixing-layer

PREVIOUS ACADEMIC AND INDUSTRY POSITIONS

| | | |
|---------------------------|--------------------------------|-----------------------|
| Gaudio Lab | AI Scientist | Feb. 2025 – Present |
| Meta | Research Scientist Intern | Jun. 2024 – Dec. 2024 |
| Seoul National University | Teaching Assistant | Sep. 2023 – Dec. 2023 |
| Supertone | Research Scientist Intern | Jan. 2021 – Mar. 2021 |
| Republic of Korea Army | Sergeant (Mechanic/Crew Chief) | Jan. 2015 – Oct. 2016 |

TUTORIAL SESSION AND TALK

- Differentiable Physical Modeling Sound Synthesis: Theory, Musical Application, and Programming** 2025
International Society for Music Information Retrieval (ISMIR)

INVITED LECTURE

- Physics-based Differentiable Sound Rendering and Machine Listening 10/18/2024
Communication Sciences and Disorders (CSD) Department, University of Iowa (Invited Speaker) Iowa City, IA
- Differentiable Physical Modeling for Sound Synthesis: From Design to Inverse Problems 10/04/2024
Center for Computer Research in Music and Acoustics (CCRMA), Stanford University (Invited Speaker) Stanford, CA
- Differentiable Modal Synthesis for Physical Modeling of Planar String Sound and Motion Simulation 06/20/2024
Music and Audio Computing Lab, KAIST (Invited Speaker) Daejeon, Korea
- Differentiable Finite Difference Schemes for Sound Synthesis 11/17/2023
AIIS Retreat, Seoul National University Seoul, Korea

- Towards Sound Synthesis using Physical Modeling and Differentiable Finite Difference Schemes
SANE Workshop 10/26/2023
Brooklyn, NY
- Referenceless Acoustic Echo Cancellation Measures using Speech Quality and Intelligibility Improvement 10/23/2023
WASPAA (Conference Oral Presenter) New Paltz, NY
- NFS: Neural Fourier Shift for Binaural Speech Rendering 06/20/2023
Music and Audio Collaborative Workshop, Seoul National University Seoul, Korea
- Sound Synthesis and Physical Modeling 07/11/2023
MARG NSS Seminar, Seoul National University Seoul, Korea
- On the Hyperelastic Deformation of Dielectric Elastomer Actuator and its Acoustic Actuation 12/20/2022
Workshop on Nanomaterial Technology Development, Pohang University of Science and Technology Pohang, Korea
- Neural Fourier Shift for Binaural Speech Rendering 11/04/2022
AIIS Retreat, Seoul National University Seoul, Korea
- RSSD: Representation Selective Self-distillation and wav2vec 2.0 Feature Exploration for SASV 09/21/2022
Interspeech (Conference Oral Presenter) Incheon, Korea

COURSES TAUGHT (WITH # OF STUDENTS)

| | | |
|---------------------------|---|----------------------------|
| Seoul National University | <i>Machine Listening</i> (38) | Teachig Assistant · 2023F |
| Seoul National University | <i>Physical Modeling and Numerical Sound Synthesis</i> (10) | Student Instructor · 2023S |

PUBLICATIONS

- **Dissertation**
Physical Modeling for String Instrument Sound Synthesis based on Finite-difference Scheme and Automatic Differentiation, *Ph.D. Thesis* 2024
- **Journal Articles**
 1. Inverse Nonlinearity Compensation of Dielectric Elastomers for Acoustic Actuation
IEEE Access 2024
Jin Woo Lee, Gwang-Seok An, Jeong-Yun Sun, Kyogu Lee
- **Conference Proceedings**
 1. Differentiable Modal Synthesis for Physical Modeling of Planar String Sound and Motion Simulation
The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS) 2024
Jin Woo Lee, Jaehyun Park, Min Jun Choi, Kyogu Lee
 2. String Sound Synthesizer on GPU-Accelerated Finite Difference Scheme
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024
Jin Woo Lee, Min Jun Choi, Kyogu Lee
 3. AECSQI: Referenceless Acoustic Echo Cancellation Measures using Speech Quality and Intelligibility Improvement

IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) 2023

Jin Woo Lee, Hyeong-seok Choi, Kyogu Lee

4. Neural Fourier Shift for Binaural Speech Rendering

IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2023

Jin Woo Lee, Kyogu Lee

5. Global HRTF Interpolation via Learned Affine Transformation of Hyper-conditioned Features

IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2023

Jin Woo Lee, Sungho Lee, Kyogu Lee

6. Representation Selective Self-distillation and wav2vec 2.0 Feature Exploration for Spoof-aware Speaker Verification

International Speech Communication Association (ISCA) Interspeech 2022

Jin Woo Lee, Eungbeom Kim, Junghyun Koo, Kyogu Lee

• **Other Publications**

1. Deep Learning Approach in Multi-scale Prediction of Turbulent Mixing-layer

arXiv preprint 2019

Jin Woo Lee, Sangseung Lee, Donghyun You

PROFESSIONAL SOCIETIES

| | | |
|--------------------------------|---|--------|
| Academic Paper Reviewer | <i>Neural Information Processing Systems (NeurIPS)</i> | 2025 – |
| | <i>International Conference on Learning Representations (ICLR)</i> | 2025 – |
| | <i>IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)</i> | 2025 – |
| | <i>IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)</i> | 2024 – |
| | <i>International Speech Communication Association (ISCA) Interspeech</i> | 2023 – |
| Membership | <i>International Society for Music Information Retrieval (ISMIR)</i> | 2024 – |
| | <i>IEEE Signal Processing Society (IEEE SPS)</i> | 2023 – |
| | <i>International Speech Communication Association (ISCA)</i> | 2022 – |

AWARDS, GRANTS, AND HONORS

| | | |
|----------------------------------|---|-------------|
| Seoul National University | <i>Lecture & Research Scholarship</i> | 2023 |
| | <i>BrainKorea 21 Four</i> | 2021 – 2023 |
| | <i>BrainKorea 21 Plus</i> | 2019 |

CONFERENCE TALKS

1. Differentiable Modal Synthesis for Physical Modeling of Planar String Sound and Motion Simulation
The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS) December 10–15, 2024
2. String Sound Synthesizer on GPU-Accelerated Finite Difference Scheme
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) April 14–19, 2024
3. AECSQI: Referenceless Acoustic Echo Cancellation Measures using Speech Quality and Intelligibility Improvement

4. Neural Fourier Shift for Binaural Speech Rendering

IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)

June 04–10, 2023

5. Global HRTF Interpolation via Learned Affine Transformation of Hyper-conditioned Features

IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)

June 04–10, 2023

6. Representation Selective Self-distillation and wav2vec 2.0 Feature Exploration for Spoof-aware Speaker Verification

International Speech Communication Association (ISCA) Interspeech

September 18–22, 2022

TECHNICAL SKILLS

Programming Languages C/C++, Python, MATLAB**Music/Audio Engineering** Sound Recording, Studio Mixing, Reaper, JUCE**Electrical Engineering** Digital Signal Processing, Physical Modeling**Mechanical Engineering** Microcontroller, Computational Fluid Dynamics, Metal Machining, Welding, CAD**Multiphysics Simulation** COMSOL, Blender, Ansys