

# Dayun Choi

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🌐 <https://choishio.github.io/>

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"I am a Master's–PhD integrated student in Electrical Engineering at KAIST, specializing in **deep learning for target sound extraction (TSE)** in complex acoustic scenes. My research focuses on utilizing **spatial queries**, such as direction-of-arrival (DoA), to extract desired multichannel signals, with potential applications in AR/VR. In addition to algorithmic development, I have hands-on experience in the deployment of speakers, sensors, and audio interfaces in **real-world experiments**, which has given me practical insight into audio signal processing. I am also interested in multimodal systems that integrate visual or textual cues, as well as generative methods for spatial audio, which I plan to explore further."

## Education

Mar, 2022 – Present

- **Master's and PhD Integrated Course Student** in School of Electrical Engineering at Korea Advanced Institute of Science and Technology (KAIST)  
*Advisor: Prof. Jung-Woo Choi*  
Research Assistant at Smart Sound Systems (SSS) Lab  
Focus: Deep Learning-based Target Sound Extraction on Multichannel Mixture using Spatial Queries  
GPA: 3.88/4.3 (95.8/100) – via 81 credits.

Mar, 2018 – Feb, 2022

- **B.S. in Electronic Engineering** at Sogang University  
*Advisor: Prof. Yangmo Yoo*  
Undergraduate Intern at Medical Imaging Computing Systems (MICS) Lab  
Research Project: Deep Learning-based Video Classification on Lung Ultrasound Imaging  
GPA: 4.12/4.3 (98.6/100) – via 134 credits. (*Summa Cum Laude*)

## Publications

### Journal Articles

- 1 D. Choi and J.-W. Choi, "SoundCompass: Navigating target sound extraction with effective directional clue integration in complex acoustic scenes", *arXiv preprint arXiv:2509.18561*, 2025. ↗ URL: <https://arxiv.org/abs/2509.18561>, ↗ Demo: <https://choishio.github.io/demo-SoundCompass/>.
- 2 Y. Shul, D. Choi, and J.-W. Choi, "CST-former: Multidimensional attention-based transformer for sound event localization and detection in real scenes", *arXiv preprint arXiv:2504.12870*, 2025. ↗ URL: <https://arxiv.org/abs/2504.12870>.
- 3 D. Choi and J.-W. Choi, "Target sound extraction on reverberant mixture", *The Journal of the Acoustical Society of America (JASA)*, vol. 154, no. 4\_supplement, A270–A271, 2023. ↗ DOI: <https://doi.org/10.1121/10.0023494>.

### Conference Proceedings

- 1 D. Choi and J.-W. Choi, "Multichannel-to-multichannel target sound extraction using direction and timestamp clues", in *Proc. International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, Hyderabad, India, 2025, pp. 1–5. ↗ DOI: <https://doi.org/10.1109/ICASSP49660.2025.10890145>, ↗ Demo: [https://choishio.github.io/demo\\_M2M-TSE/](https://choishio.github.io/demo_M2M-TSE/).

- 2 D. Choi and J.-W. Choi, "Target sound extraction on multichannel reverberant mixture", in *2024 Autumn Conference of the Acoustical Society of Korea (ASK)*, ASK, Busan, Korea, 2024, pp. 170–171.
- 3 D. Choi and J.-W. Choi, "Target sound extraction on reverberant mixture using sound-class label and timestamp information", in *2024 Spring Conference of the Acoustical Society of Korea (ASK)*, ASK, Jeju, Korea, 2024, pp. 335–336.
- 4 D. Choi, D. Lee, and J.-W. Choi, "Low complexity dnn model for multichannel speech enhancement", in *2023 Spring Conference of the Korean Society of Noise and Vibration Engineering (KSNVE)*, KSNVE, Samcheok, Korea, 2023, pp. 132–132.
- 5 D. Lee, D. Choi, and J.-W. Choi, "DeFT-AN RT: Real-time multichannel speech enhancement using dense frequency-time attentive network and non-overlapping synthesis window", in *Proc. Interspeech*, ISCA, Dublin, Ireland, 2023, pp. 864–868. DOI: <https://doi.org/10.21437/Interspeech.2023-2437>.

## Research Projects

### KAIST

Jul, 2024 – Present

- **IoT-based Eavesdropping Attack Detection and Defense Technology** funded by National Research Foundation of Korea (NRF) and STEAM research grant with National University of Singapore (NUS)
- Developed DNN models for speech dialogue restoration and enhancement from adjacent indoor spaces
  - Generated simulated and real-world datasets using Pyroomacoustics library, loudspeakers, and multiple IoT sensors to evaluate system viability in real-world environments
  - Developed software program user interface and hardware products
  - Tools: Python (PyTorch), Matlab, NI SignalExpress, LabVIEW | KRK ROKIT 5 (RP5 G3), RME Audio FIREFACE UC, NI 9234, Sensors (352C66, 355B04, HY929)

May, 2024 – Present

- **General-Purpose AI for Integrated Analysis and Generation of Spatial Audio** funded by National Research Foundation of Korea (NRF)
- Developed Universal Spatial Audio Analysis Network to infer source directions, positions, classes, and room acoustics, and separate signals into object-oriented formats
  - Developed Universal Spatial Audio Generation Network to synthesize realistic 3D audio from single-channel or separated sources, supporting multi-modal input and 6-DoF spatial rendering
  - Tools: Python (PyTorch)

Jan, 2023 – Present

- **Noise Cancellation and Speech Recognition Technology Robust to Battlefield Environments** funded by Center for Applied Research in Artificial Intelligence (CARAI)
- Developed DNN models for robust noise cancellation in battlefield scenarios
  - Tools: Python (PyTorch)

### Sogang University

Sep, 2021 – Dec, 2021

- **Real-time COVID-19 Detection System from Lung Ultrasound Videos**
- Developed DNN models for video classification of lung ultrasound data
  - Explored model compression techniques for real-time deployment
  - Developed system user interface
  - Tools: Python (TensorFlow, PyQt)

## Research Projects (continued)

Jul, 2021

- **AI-based Automobile Recognition System** in The 2nd Software Pre-Education Program for Hyundai Mobis - Sogang University (FoSS)
  - Pre-trained DNN models for object detection using Open-Images dataset
  - Deployed model on Jetson Nano and validated automobile detection performance
  - Tools: Python (PyTorch), Jetson Nano

## Assistantships

### KAIST

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|------------------------|--|
| Summer, 2025           | ■ [EE495] Individual Study ( <i>Advisor: Prof. Jung-Woo Choi</i> )   |
| Spring, 2025 – Present | ■ <b>Lab Head</b> of Smart Sound Systems Lab ( <i>Advisor: Prof. Jung-Woo Choi</i> )   |
| Winter, 2024           | ■ [EE495] Individual Study ( <i>Advisor: Prof. Jung-Woo Choi</i> )   |
| Autumn, 2024           | ■ [EE202] Signals and Systems ( <i>Lecturer: Prof. Jung-Woo Choi</i> ) ( <b>Head TA</b> )  |
| Spring, 2024           | ■ [EE488] Introduction to Audio Signal Processing ( <i>Lecturer: Prof. Jung-Woo Choi</i> ) ( <b>Head TA</b> ) & [EE495] Individual Study ( <i>Advisor: Prof. Jung-Woo Choi</i> ) |
| Winter, 2023           | ■ [EE202] Signals and Systems ( <i>Lecturer: Prof. Jung-Woo Choi</i> ) ( <b>Head TA</b> )  |
| Autumn, 2023           | ■ [EE202] Signals and Systems ( <i>Lecturer: Prof. Jung-Woo Choi</i> )   |
| Spring, 2023           | ■ [EE305] Introduction to Electronics Design Lab ( <i>Lecturer: Prof. Jun-Bo Yoon</i> )  |
| Fall, 2022             | ■ [EE202] Signals and Systems ( <i>Lecturer: Prof. Jung-Woo Choi</i> )   |

## Honors & Awards

### KAIST

Mar 2<sup>nd</sup>, 2024

- **The 1st place** at Technical Committee on Architectural Acoustics Student Paper Award for December Sydney meeting

### Sogang University

Feb 21<sup>st</sup>, 2022

- Honors

Mar 30<sup>th</sup>, 2020

- **Dean's List** for Electronic Engineering

Mar, 2020 – Feb, 2022

- National Scholarship for Science and Engineering

Mar 29<sup>th</sup>, 2019

- **Dean's List** for Electronic Engineering

Nov 29<sup>th</sup>, 2018

- **Dean's List** for Electronic Engineering

Nov 16<sup>th</sup>, 2018

- **The 3rd Prize** at the 7th Proposal Contest of General Elective Subjects

## Miscellaneous Experiences

### KAIST

Jun 18<sup>th</sup>, 2024

- **Representative Presenter (Oral)** of SSS Lab for KAIST-NUS Joint Seminar

Apr 5<sup>th</sup>, 2024

- **Representative Presenter (Oral)** of SSS Lab for the 5th SORI Workshop

Jul 13<sup>th</sup>, 2023

- **Representative Presenter (Poster)** of SSS Lab for the 4th SORI Workshop

### Sogang University

Jul 19<sup>th</sup> – 30<sup>th</sup>, 2021

- The 2nd Software Pre-Education Program for Hyundai Mobis - Sogang University (FoSS)

Jun 29<sup>th</sup> – Jul 9<sup>th</sup>, 2019

- The 24th Overseas Culture Tour to Greece & Türkiye

## Miscellaneous Experiences (continued)

Jan, 2019 – Feb, 2020

- Head of education and culture department of Hyunwoohoe (Classical Guitar Club)

## Skills

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|-----------------------|---|
| Programming Languages | ■ Python/Matlab (Advanced), C/VHDL/Linux/HTML (Intermediate)  |
| ML Frameworks         | ■ PyTorch/TensorFlow (Advanced), PyTorch Lightning (Intermediate)   |
| Software              | ■ OrCAD/PSpice (Advanced), NI SignalExpress/Audacity (Intermediate), nanoHUB/Unity/LabVIEW (Elementary)   |
| Hardware              | ■ Loudspeaker: KRK ROKIT 5 (RP5 G3)/Audio Interface: RME Audio FIREFACE UC/NI Data Acquisition Tool: NI 9234/Sensor: 352C66, 355B04, HY929, Polytec PDV-100/Microphone Array: ReSpeaker Mic Array v2.0 (Intermediate), Arduino/EasyFPGA-Combo2/Jetson Nano (Elementary) |
| Languages             | ■ Korean (Native), English (TOEIC: 735 – expired)   |