

# JAYEON JASON YI

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## Objective

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Master's student in ECE with a focus in SigProc/ML seeking to extend interests & expertise in audio and AI in a **PhD Program** starting August 2025, preferably focusing on **AI and speech, music, audio, etc.**

## Education

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### University of Michigan, Ann Arbor, MI

*Master of Science in Electrical and Computer Engineering*

Coursework: Matrix Methods in Signal Processing, Probability and Random Processes, ML, Optimization Theory, Electronic Music.

**Aug 2023 – Current**

*current GPA: 4.00+ / 4*

### Seoul National University, Seoul, Republic of Korea

*Bachelor of Science in Electrical and Computer Engineering*

Coursework: Digital and Speech Signal Processing, Algorithms and Data Structures, OS, Compilers, Computer Architecture, Circuit Theory, Microelectronics, Information Theory, Academic English, Engineering Mathematics, ...

**Mar 2018 – Aug 2023**

*GPA: 4.19 / 4.30 ( 3.97 / 4.00 ); Rank 7/148*

## Skills

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**Languages:** Python (very fluent), Modern C++ (moderate) / MATLAB, Julia, Javascript (coursework-level)

**Platforms:** Windows + WSL, Linux (Ubuntu/Debian), Pytorch

**Software & Tools:** Cloud Computing (GCP / AWS / RunPod), Git/Github, Notion, etc.

**Music Composition:** FL Studio 21. A few songs provided or sold to labels/games

## Experience

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### Audio Lab, University of Illinois Urbana-Champaign

*Visiting Student / Supervised by Prof. Minje Kim*

- Working on a speech-coding related project

**Sep 2024 – Current**

*Champaign, IL*

### Amazon.com, Inc.

*Applied Scientist Intern, Hardware-Technology & Architecture*

- Successfully conducted an intern research project related to audio coding

**May 2024 – Aug 2024**

*Sunnyvale, CA*

### DNN/CV Group, University of Michigan

*Temporary Research Assistant / Supervised by Prof. Hun-Seok Kim*

- Evaluated various prediction algorithms for compressing pictures taken with a lens array
- Collaborated with hardware designers to write MATLAB code to be used as a reference for hardware design
- Investigated algorithms for geometric lens distortion correction and proposed a compensation scheme to facilitate fixed-point implementation
- Surveyed and fine-tuned image superresolution algorithms

**Sep 2023 – May 2024**

*Ann Arbor, MI*

### Music and Audio Research Group, Seoul National University

*Student Intern / Supervised by Prof. Kyogu Lee*

- Researched real-time-capable, low-latency models for speech declipping (ICASSP 2024)
- Investigated automated content generation for rhythm-oriented games (ISMIR 2023 LBD, see below)
- Investigated and implemented audio streaming pipelines for AI-informed rescue drones for minimal latency
- Investigated blind parameter matching for artificial reverberators

**Jul 2022 – Jun 2023**

*Suwon, Gyeonggi Province, Republic of Korea*

### Software Platforms Lab, Seoul National University

*Student Intern / Supervised by Prof. Byung-Gon Chun*

- Compiled and automated benchmarks for various DNN architectures and hardware settings (eg. CUDA MPS/MIG). Later extended to a poster work accepted to Korean Computer Congress 2022 (See below)
- Debugged and maintained an in-house elastic training framework (Python, Pytorch, Horovod)

**Jan – Feb 2022**

*Seoul, Republic of Korea*

### Republic of Korea Army

*Sergeant, Unit 3707*

- Investigated real-life telecommunications applications of linear algebra
- Implemented technical-standard-conformant software tools for use by analysts (including myself)
- Various analysis/research results recognized by the Command, winning 10+ days of vacations as a reward

**May 2020 – Sep 2021**

*Seongnam, Gyeonggi province, Republic of Korea*

### Samsung Electronics Co., Ltd

*Student Intern, C-LAB*

- Wrote a HTTP server that automatically labels and segments in-house video object segmentation (VOS) dataset
- Presented and participated in seminars related to Deep-learning and Computer-Vision
- Proposed ways to strengthen C-LAB's initiative to foster creative endeavors within Samsung, as a team project

**Jan – Feb 2020**

*Seoul, Republic of Korea*

## Honors

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### Presidential Science Scholarship (Republic of Korea)

2022 – 2023

- Full Tuition Scholarship awarded to ~150 STEM students nationwide, on behalf of the president of ROK
- Additional stipend of 2.5M KRW(~1.8k\$) per semester

### Merit Scholarship (Seoul National University)

2018 – 2022

- Full Tuition Scholarship based on GPA
- Awarded for five consecutive semesters (returned the fifth due to receipt of Presidential Science Scholarship)

## Publications

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### Yi, J., Koo, J., Lee, K. (2024). “**DDD: A Perceptually Superior Low-Response-Time DNN-based Declipper.**”

*Accepted to ICASSP 2024* ([Link to preprint & code](#))

- Utilized adversarial learning objectives to improve speech declipping performance. Extensive quantitative and qualitative evaluation of proposed/baseline approaches
- Surveyed various speech enhancement / source separation models, finding many fail to converge for the declipping task
- MUSHRA-like subjective test shows our method outperforms previous SOTA on heavily clipped speech (SNR=1dB)
- Qualitative analysis showed generative loss is effective in reconstructing higher-order formants
- Objective analysis showed our method faithfully retrieves original speech, despite using generative loss

### Yi, J., Lee, S., Lee, K. (2023). “**Beat-Aligned Spectrogram-to-Sequence Generation of Rhythm-Game Charts.**”

*Accepted to ISMIR 2023 Late-Breaking/Demo (LBD) Session* ([Link to preprint & code](#))

- Task resembles music onset detection / transcription; given music and metadata, “charts” - directions for video game players to perform certain actions in sync with the music - are generated
- Reformulated the problem as a “Spectrogram-to-Sequence” problem, effectively removing binary class imbalance associated with previous formulations
- Proposed to beat-align and length-normalize training samples - a procedure found to be integral for successful training
- Gathered, filtered, and preprocessed the dataset from scratch, optimizing data for optimal training throughput
- Outperforms past approaches in rhythmical correctness, measured in micro-F1 scores

### Maeng, J., Yi, J., Park, J., Chun, B. (2022). “**Analysis of Auxiliary Resource Aware Allocation of Deep Learning Jobs.**” *Accepted to Korea Computer Congress 2022.* ([Link to Preprint](#))

- Study investigates the utility of co-allocating deep-learning jobs, and strategies for co-allocation which are aware of CPU/GPU compute requirements. The study concludes that resource-aware allocation can save training time when four models with different resource requirements are simultaneously trained on two machines.
- Investigated the utility of Volta MPS / MIG in boosting throughput when training multiple models on a single GPU, setting up benchmarks based on [NVIDIA/DeepLearningExamples](#)
- Benchmarked CPU/GPU resource requirements for a wide variety of CV, NLP, and Recommendation models

## Other Projects

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### Visualizing Telematic Music Performance (Supervised by Profs. M. Gurevich, J. Granzow, and B. Gillespie) **Jan 2024 –**

- Project aims to facilitate real-time collaborations between musicians in remote locations, using a robot which moves according to motor instructions derived from motions of musicians far away, at real-time (<30ms) latency
- Learned Max/MSP to build/maintain software patches for the robot
- Helped organize a music performance utilizing the robot as a staff member

### Pult KOR-JPN translator (Independent Project)

2018 – 2020

- Gathered, performed OCR on novels, aligned sentences with VECAlign to assemble a Korean-Japanese parallel corpus on par with biggest KOR-JPN parallel corpus (WikiMatrix) publicly available at the time
- Trained a 6-layer Transformer model with this data and fairseq, evaluating BLEU. Generated translations were on par with the best corporate Machine Translation solutions at the time such as Naver Papago
- Deployed the model on a AWS EC2 instance; wrote a flask server; coded a [simple browser extension for Firefox](#) to request translations to the EC2 instance and apply them to the html.