Catherine Hae Seung Jeon

Google Scholar — GitHub — LinkedIn — Website

RESEARCH INTERESTS

† **Robust Deep Learning**
- *Noise/Out-of-distribution Robustness, Data Augmentation*

† **Efficient Deep Learning**
- *Continual Learning, Few-shot Learning, Data-Efficient Learning*

† **Representation Learning**
- *Contrastive Learning, Metric Learning, Feature Embedding Networks*

† **AI for Social Good**
- *AI for Healthcare, AI for Science, AI for Security*

EDUCATION

Ewha Womans University — *09/2024 — 08/2026 (Expected)*
M.S. in Computer Science & Engineering (Advisor: Prof. S.E. Oh) — *Seoul, South Korea*
- GPA: overall 4.25/4.30

Ewha Womans University — *03/2020 — 08/2024*
B.S. in Computer Science & Engineering — *Seoul, South Korea*
- GPA: overall 4.15/4.30
- Honors: Dean's List (7 out of 8 semesters), Summa Cum Laude

PUBLICATIONS

Conference Publications

Hwang, C.*, **Jeon, Haeseung***, Hong, J., Kang, H., Mathews, N., Kim, G. & Oh, S.E. (2025). "Enhancing Search Privacy on Tor: Advanced Deep Keyword Fingerprinting Attacks and BurstGuard Defense." In *Proceedings of the 20th ACM Asia Conference on Computer and Communications Security (**ASIACCS**)*. [CORE A, Acceptance Rate = 20%]

Hwang, C.*, **Jeon, Haeseung***, Kim, G., Hong, J., Kang, H., & Oh, S.E. (2024). "DKF: Employing Deep Learning for Keyword Fingerprinting Attacks on Tor." In *Proceedings of the Korea Computer Congress (**KCC**)*. [Short Paper] [Distinguished Paper Award]

Workshop/Poster Publications

Jeon, Haeseung, Hong, J., Hong, S., Kang, H., Kim, B., Oh, S. E., & Kim, N. (2025). "Domain-Adapted Automatic Speech Recognition with Deep Neural Networks for Enhanced Speech Intelligibility Prediction." In *Proceedings of the 6th Clarity Workshop on Improving Speech-in-Noise for Hearing Devices (**Interspeech Workshop**)*. [Short Paper] [CPC3 Top 5]

Hwang, C*, **Jeon, Haeseung***, Kim, G., Hong, J., Kang, H., & Oh, S.E. (2024). "Securing Search Privacy on Tor: Deep Keyword Fingerprinting and BurstGuard Defense." Presented at the *40th Annual Computer Security Applications Conference (**ACSAC**)*. [Poster]

Under-Review Journal/Conference Publications

Jeon, Haeseung*, Kim, S.*, Mathews, N., Kang, H., & Oh, S.E. (2025). "RoFiRe: Robust Website Fingerprinting on Real-World Tor Traffic via Improved Augmentation and Normalization." Under review at the *2026 ACM Web Conference (**WWW**)*.

Park, J., **Jeon, Haeseung**, Ji, A., Piplai, A., Rahman, M. S., & Oh, S.E. (2025). "TabCL: Continual Malware Classification with Tabular-Aware Generation." Under review at the *30th Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD**)*.

Kim, N., Chen, M., **Jeon, Haeseung**, Nakamura, K. A., & Bai, M. R. (2025). "Toward Speaker Coil Impedance-Based Sensing: Acoustic Load Analysis Using Deep Learning." Under review at the *IEEE Transactions on Instrumentation and Measurement (**TIM**)*.

Kim, N., Nakamura, K., Chen, M., **Jeon, Catherine Hae Seung**, & Bai, M. R. (2025). "Speakers as Sensors: Artificial Intelligence-Powered Impedance-Based Acoustic Load Analysis." Under review at the *Journal of the Acoustical Society of America (**JASA**)*.

*Equally contributing authors, listed in alphabetical order.

RESEARCH EXPERIENCE

Ewha Womans University | AI Security Lab — *09/2024 — Present*
Graduate Research Assistant & Lab Head (Advisor: Prof. S.E. Oh) — *Seoul, South Korea*

- Proposed a robust few-shot learning model with an LLM-inspired component (pre-norm, RMSNorm) and a window-based heterogeneous augmentation method in collaboration with RIT. Outperformed previous SOTA, a SimCLR-based contrastive learning model, by up to 12% across n-shot, concept drift, and open-set recognition tasks without large-scale pre-training.
- Leading advanced time-series embedding model development, such as metric learning models and FENs, in collaboration with the University of Edinburgh and the U.S. NRL.

Purdue University | **Sensor, Electro-Acoustics Technology Lab** *05/2025 — Present*
Part-Time Researcher (Research Advisor: Prof. N. Kim) *Indiana, United States*
- Directed the development of a speech clarity prediction model to support hearing aid users. Suggested a two-phase model by fine-tuning an ASR backbone on speech-in-noise audio and masked text to simulate inaudibility, and stacking Transformer encoders for clarity prediction.
- Enhanced the CNN acoustic load prediction model that uses a speaker impedance as a feature. Achieved near-perfect accuracy across four different speakers, demonstrating the potential of DL as an effective and efficient diagnostic tool.

UTEP | **Intelligent and Quantum Secure Advanced Cyber Defense Lab** *06/2025 — 08/2025*
Visiting Researcher (Research Advisor: Prof. M.S. Rahman) *Texas, United States*
- Built a continual learning (CL) framework with a conditional tabular GAN and improved storage/training efficiency by generative replay (GR). Drove experiments and achieved up to 16% improvements over the baselines (GAN and TVAE) in Class-IL/Time-IL scenarios.

Ewha Womans University | **AI Security Lab** *01/2023 — 08/2024*
Undergraduate Research Assistant (Research Advisor: Prof. S.E. Oh) *Seoul, South Korea*
- Led research on the first DL-based fingerprinting model for network traffic, achieving a 41-55% improvement over a previous SOTA. Built a Selenium crawler to collect 300K+ fresh samples over 1+ years, profiled unique data patterns, and benchmarked ML baselines (Random Forest and SVM) on the new datasets.

PROJECTS

Seoul National University | **THUNDER Research Group** *02/2025*
Accelerator Programming Bootcamp Participant *GitHub*
- Led re-implementation of the CPU-based MoE model with custom CUDA kernels to enable GPU-based parallelism. Analyzed bottlenecks using Nsight Systems, applied advanced optimization techniques such as CUDA streams, kernel fusion, and warp occupancy optimization.
- Achieved a 650× throughput improvement and a 3rd place award in the competition.

INDUSTRY EXPERIENCE

Samyang Data Systems Inc. | **Cloud Solutions Team** *03/2023 — 06/2023*
Cloud Engineer Intern *Seoul, South Korea*
- Implemented a Golang monitoring agent and E2E pipeline that collects, stores, and visualizes real-time metrics from AWS infrastructure by utilizing InfluxDB and Grafana. Deployed agents to 10+ client servers, ensuring software reliability through stress tests.

TEACHING EXPERIENCE

Ewha Womans University | **Computer Algorithms** *SP 2025*
Teaching Assistant *Seoul, South Korea*
- Provided technical guidance and feedback on Python algorithm implementation.

AWARDS & SCHOLARSHIPS

EWU Research Assistant Scholarship — *half-tuition* *FA 2024*
EWU Outstanding Ewha Scientist Admissions Scholarship — *half-tuition for 2 years* *FA 2024 — Present*
Korea Computer Congress Distinguished Paper Award (top 6%) *SP 2024*
EWU National Program of Excellence in Software Scholarship — *KRW ₩1M* *SP 2024*
Huawei ICT Talent Development Scholarship — *KRW ₩1M* *FA 2023*
EWU Excellence Honors Scholarship (top 6%) — *quarter-tuition* *FA 2023*
EWU Highest Honors Scholarship (top 2%) — *half-tuition* *FA 2020, SP 2022, SP 2023*
EWU W4 Admissions Scholarship (top entrant) — *full-tuition for 4 years* *SP 2020 — SP 2024*

COMMUNITY ENGAGEMENT

EWU CS Undergraduate Lab Pair, Invited Speaker *09/2025*
UTEP CS Summer Research Symposium, Invited Speaker *08/2025*
EWU CS Undergraduate Open Lab Seminar, Invited Speaker *03/2025*
EWU Undergraduate Peer Tutoring Program, Lecturer *06/2022, 06/2024*
GDSC Devfest π 2024: Responsible AI in action, Invited Speaker *03/2024*
GDSC Devfest Cloud 2023, Organizer *12/2023*
AWS Cloud Club (ACC), Cloud Team Executive *09/2023 — 08/2024*
Google Developer Student Clubs (GDSC), Backend Team Executive *09/2022 — 07/2024*