Soo Min Kwon

Contact Information

Email: soominkwon0402@gmail.com
Github: github.com/soominkwon
Website: soominkwon.github.io
LinkedIn: linkedin.com/in/soominkwon

Education

University of Michigan — Ann Arbor, MI
Ph.D., Electrical Engineering and Computer Science — Sept. 2022 – May 2026 (Expected)
- Thesis: "Deep Learning through Low-Dimensional Representations: Theory and Algorithms"
- Advisors: Prof. Laura Balzano and Prof. Qing Qu

Rutgers University — New Brunswick, NJ
M.S., Electrical and Computer Engineering — Sept. 2020 – May 2022
- Advisor: Prof. Anand D. Sarwate

Rutgers University — New Brunswick, NJ
B.S., Electrical and Computer Engineering (High Honors) — Sept. 2016 – May 2020
- Minor: Mathematics

Work Experience

Student Researcher — Aug. 2025 – Current
Google — New York, NY
- Researching methods for accelerating post-training methods for LLM alignment, hosted by Himanshu Jain and Ziteng Sun

Applied Scientist Intern — Aug. 2024 – Nov. 2024
Amazon — Seattle, WA
- Developed a causal inference framework using deep learning methods for the SCOT team that reduced variance estimates by over 10%

Applied Research Data Science Intern — May 2022 – Aug. 2022
LinkedIn Corporation — Sunnyvale, CA
- Productionized a machine learning pipeline for the infrastructure team, reducing MAPE by over 15% in forecasting hardware needs for the next calendar year

Preprints
(† Equal Contribution)

[1] **S. M. Kwon**†, A. S. Xu†, C. Yaras, L. Balzano, Q. Qu. "Out-of-Distribution Generalization of In-Context Learning: A Low-Dimensional Subspace Perspective". Submitted to *Neural Information Processing Systems* (*NeurIPS*), 2025. [**Online**]

[2] L. Balzano, T. Ding, B. D. Haeffele, **S. M. Kwon**, Q. Qu, P. Wang, Z. Wang, C. Yaras. "An Overview of Low-Rank Structures in the Training and Adaptation of Large Models". Submitted to *IEEE Signal Processing Magazine*, 2025 (α-β Order). [**Online**]

[3] **S. M. Kwon**†, C. Blocker†, H. Raja, J. Fessler, L. Balzano. "Dynamic Subspace Estimation from Undersampled Data using Grassmannian Geodesics". Submitted to *Transactions on Machine Learning Research* (*TMLR*), 2025.

[4] X. Li, **S. M. Kwon**, I. Alkhouri, S. Ravishankar, Q. Qu. "Decoupled Data Consistency for Solving General Inverse Problems with Diffusion Models." Submitted to the *IEEE Journal of Selected Topics in Signal Processing* (*JSTSP*), 2025. [**Online**]

Publications

[1] A. Ghosh†, **S. M. Kwon**†, R. Wang, S. Ravishankar, Q. Qu. "Learning Dynamics of Deep Matrix Factorization Beyond the Edge of Stability". In *International Conference on Learning Representations* (*ICLR*), 2025. [**Online**]

[2] C. Lee, **S. M. Kwon**, Q. Qu, H. Lee. "BLAST: Block-Level Adaptive Structured Matrices for Efficient Deep Neural Network Inference." In *Neural Information Processing Systems* (*NeurIPS*), 2024. [**Online**]

[3] **S. M. Kwon**, L. Ding, L. Balzano, Q. Qu. "On the Relationship Between Small Initialization and Flatness in Deep Networks." In *International Conference on Learning Representations* (*ICLR*) *Workshop on Bridging the Gap Between Practice and Theory in Deep Learning*, 2024.

[4] **S. M. Kwon**, Z. Zhang, D. Song, L. Balzano, Q. Qu. "Efficient Compression of Overparameterized Deep Models." In *International Conference on Artificial Intelligence and Statistics* (*AISTATS*), 2024. [**Online**]

[5] B. Song†, **S. M. Kwon**†, Z. Zhang, X. Hu, Q. Qu, L. Shen. "Solving Inverse Problems with Latent Diffusion Models via Hard Data Consistency." In *International Conference on Learning Representations* (*ICLR*), 2024 (**Spotlight, Top 5%**). [**Online**]

[6] D. K. Saha, V. Calhoun, **S. M. Kwon**, A. D. Sarwate, R. Saha, S. Plis. "Federated, Fast, and Private Visualization of Decentralized Data". In *International Conference on Machine Learning* (*ICML*) *Workshop on Federated Learning*, 2023. [**Online**]

[7] **S. M. Kwon**, X. Li, A. D. Sarwate. "Low-Rank Phase Retrieval with Structured Tensor Models." In *International Conference on Acoustics, Speech and Signal Processing* (*ICASSP*), 2022. [**Online**]

[8] D. K. Saha, V. D. Calhoun, Y. Du, Z. Fu, R. Panta, **S. M. Kwon**, A. D. Sarwate, S. M. Plis. "Privacy-Preserving Quality Control of Neuroimaging Datasets in Federated Environments". In *Organization for Human Brain Mapping* (*OHBM*), 2021. [**Online**]

[9] **S. M. Kwon**, A. D. Sarwate. "Learning Predictors from Multidimensional Data with Tensor Factorizations". In *Rutgers University Aresty Undergraduate Research Journal*, 2021. [**Online**]

[10] **S. M. Kwon**, S. Yang, J. Liu, X. Yang, W. Saleh, S. Patel, C. Mathews, Y. Chen. "Hands-Free Human Activity Recognition Using Millimeter-Wave Sensors". In *IEEE International Symposium on Dynamic Spectrum Access Networks* (*DySPAN*), 2019. [**Online**]

Awards & Honors

Harvey G. and Joyce H. Behner Graduate Fellowship	2024
University of Michigan PhD Rackham Merit Fellowship	2023
Rutgers ECE Outstanding Master's Student Award	2022
Rutgers ECE Outstanding Teaching Assistant Award	2021
Rutgers ECE Departmental Leadership & Service Award	2020
Rutgers WINLAB GA/TA Grant	2020 – 2020
Rutgers University Dean's List	2018 – 2020

Reviewer Service

Neural Information Processing Systems (NeurIPS), 2025

International Conference on Machine Learning (ICML), 2024

Neural Information Processing Systems (NeurIPS) Workshop on Diffusion Models, 2023

Conference on Parsimony and Learning (CPAL), 2024

Neural Information Processing Systems (NeurIPS), 2024