Soo Min Kwon

Contact Information

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Education

University of Michigan — Ann Arbor, MI
Ph.D., Electrical Engineering & Computer Science — Sept. 2022 – May 2026
- Advisors: Prof. Laura Balzano & 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

Professional Experience

Graduate Research Assistant — Sept. 2022 – Present
University of Michigan — Ann Arbor, MI
- Investigating an implicit regularization property in the learning dynamics of gradient descent for training deep networks when starting with small initialization
- Developed an efficient algorithm using Python that leveraged generative models (e.g. diffusion models) to solve inverse problems such as inpainting and deblurring
- Investigated and proposed a provably efficient algorithm in Jax for the compression of deep learning models by studying its learning dynamics

Applied Research Data Science Intern — May 2022 – Aug. 2022
LinkedIn Corporation — Remote
- Designed and productionized an efficient machine learning pipeline that improved LinkedIn's data cluster forecasting model by over 10% MAPE that was used for hardware ordering for the next calendar year
- Optimized several machine learning algorithms such as XGBoost and deep neural networks in Scala and Python

Graduate Research Assistant — Sept. 2020 – May 2022
Rutgers University — New Brunswick, NJ
- Developed a state-of-the-art algorithm in Python to recover time-dependent data from partial information of imaging data
- Designed and implemented an algorithm that allows hospitals to share private data for outlier detection by using t-SNE plots

Data Science Intern — May 2020 – Aug. 2020
Centene Corporation — Remote
- Automated the process of detecting expedition phrases in healthcare forms using Restricted Boltzmann Machines and Convolutional Neural Networks in Tensorflow
- Designed and optimized several machine learning algorithms (support vector machines, logistic regression, XGBoost) for statistical inference on diseases given pharmacy data

Publications

* **S. 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. [Paper]
* **S. Kwon**, Z. Zhang, D. Song, L. Balzano, Q. Qu. "Efficient Compression of Overparameterized Deep Models." In *Conference on Parsimony and Learning (CPAL) Spotlight Track*, 2024. [Paper]
* B. Song†, **S. 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%)**. [Paper]
* D. K. Saha, V. Calhoun, **S. 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. [Paper]
* **S. 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. [Paper]
* D. K. Saha, V. D. Calhoun, Y. Du, Z. Fu, R. Panta, **S. 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. [Paper]
* **S. Kwon**, A. D. Sarwate. "Learning Predictors from Multidimensional Data with Tensor Factorizations". In *Rutgers University Aresty Undergraduate Research Journal*, 2021. [Paper]
* **S. Kwon**, S. Yang, J. Liu, X. Yang, W. Saleh, S. Patel, C. Mathews, Y. Chen. "Demo: Hands-Free Human Activity Recognition Using Millimeter-Wave Sensors". In *IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, 2019. [Paper]

Preprints

* X. Li, **S. Kwon**, I. Alkhouri, S. Ravishankar, Q. Qu. "Decoupled Data Consistency for Solving General Inverse Problems with Diffusion Models." Submitted to the *Conference on Computer Vision and Pattern Recognition Conference (CVPR)*, 2024.

Technical Skills

* **Programming Languages:** Python, MATLAB, Scala, SQL, C++
* **Libraries:** PyTorch, TensorFlow, Jax, Scikit-learn, NumPy, SciPy, Pandas
* **Software:** AWS EC2, Git, Visual Studio, Tableau, Jupyter Notebook, Microsoft Office,LaTeX

Awards & Honors

* 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

Certificates

Neural Networks and Deep Learning (License #M6TYH2SFB6QV, by Andrew Ng, Coursera)

Reviewer Service

* Conference on Parsimony and Learning (CPAL), 2024
* Neural Information Processing Systems (NeurIPS) Workshop on Diffusion Models, 2024