

Joohwan Ko

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EDUCATION

University of Massachusetts Amherst

Ph.D. in Computer Science (Advisor: Prof. Justin Domke)

Amherst, MA

2024 – May 2028(Expected)

Korea Advanced Institute of Science & Technology (KAIST)

M.S. in Industrial and Systems Engineering

Daejeon, Korea

2024

Yonsei University

B.A. in Economics; Minor in Applied Statistics

Seoul, Korea

2022

SUMMARY

CS PhD researcher working at the intersection of **probabilistic machine learning and stochastic optimization**, developing scalable inference and optimization methods for modern machine learning models. Published at NeurIPS, ICML, and ICLR, with research experience in **Bayesian inference, generative modeling, and large-scale deep learning optimization**.

RESEARCH EXPERIENCE

Flatiron Institute - Simons Foundation

Guest Researcher at CCM (Center for Computational Mathematics)

New York, NY

Aug 2026 – Present

Flatiron Institute - Simons Foundation

Summer Research Intern

New York, NY

Jun 2026 – Aug 2026

- Optimizer for pre-training and Mixture-of-Experts, with [Diana Cai](#), [Robert M. Gower](#), and [Tetiana Parshakova](#).

SELECTED PUBLICATIONS

SoftServe: A Scalable Quasi-Newton Method for Deep Learning [\[pdf\]](#)

[Joohwan Ko](#), [Tetiana Parshakova](#), [Diana Cai](#), [Robert M. Gower](#)

Preprint, 2026

Amortized Factor Inference Networks for Posterior Inference [\[pdf\]](#)

[Joohwan Ko](#), [Justin Domke](#)

Preprint, 2026

Model Informed Flows for Bayesian Inference [\[pdf\]](#)

[Joohwan Ko](#), [Justin Domke](#)

Annual Conference on Neural Information Processing Systems (NeurIPS), 2025

Latent Target Score Matching, with an Application to Simulation-Based Inference [\[pdf\]](#)

[Joohwan Ko](#), [Tomas Geffner](#)

NeurIPS Workshop on Machine Learning and the Physical Sciences (MLPS), 2025

Provably Scalable Black-Box Variational Inference with Structured Variational Families [\[pdf\]](#)

[Joohwan Ko](#)*, [Kyurae Kim](#)*, [Woo Chang Kim](#), [Jacob R. Gardner](#)

International Conference on Machine Learning (ICML), 2024

Learning to Scale Logits for Temperature-Conditional GFlowNets [\[pdf\]](#)

[Minsu Kim](#)*, [Joohwan Ko](#)*, [Taeyoung Yun](#)*, [Dinghuai Zhang](#), [Ling Pan](#), [Woochang Kim](#), [Jinkyoo Park](#), [Emmanuel Bengio](#), [Yoshua Bengio](#)

International Conference on Machine Learning (ICML), 2024

(* denotes equal contribution)

ADDITIONAL PUBLICATIONS

ConvT3: Structured State Kernels for Convolutional State Space Models [\[pdf\]](#)

Jaeyoung Hong, Yun Young Choi, [Joohwan Ko](#), Minseon Gwak
International Conference on Learning Representations (ICLR), 2026

Learnable Orthogonal Decomposition for Non-Regressive Prediction for PDE [\[link\]](#)

Yun Young Choi*, Kyujin Han*, [Joohwan Ko](#)*, Sangwook Baek, Seunghwan Lee
ACM International Conference on Information and Knowledge Management (CIKM), 2025

Relaxed Sequence Sampling for Diverse Protein Design [\[pdf\]](#)

[Joohwan Ko](#), Aristofanis Rontogiannis, Yih-En Andrew Ban, Axel Elaldi, Nicholas Franklin
Machine Learning in Structural Biology (MLSB), 2025

Learning Multiphase and Multiphysics System with Decoupled State Space Model [\[pdf\]](#)

Yun Young Choi, Seunghwan Lee, Minhoo Lee, JinHaeng Lee, [Joohwan Ko](#), Changwoong Moon
International Conference on Learning Representations (ICLR) Workshop XAI4Science, 2025

Demystifying SGD with Doubly Stochastic Gradients [\[pdf\]](#)

Kyurae Kim, [Joohwan Ko](#), Yi-An Ma, Jacob R. Gardner
International Conference on Machine Learning (ICML), 2024

Layer-Adaptive State Pruning for Deep State Space Models [\[pdf\]](#)

Minseon Gwak, Seongrok Moon, [Joohwan Ko](#), PooGyeon Park
Annual Conference on Neural Information Processing Systems (NeurIPS), 2024

Enhancing Topological Dependencies in Spatio-Temporal Graphs with Cycle Message Passing Blocks

Minho Lee, Yun Young Choi, Sun Woo Park, Seunghwan Lee, [Joohwan Ko](#), Jaeyoung Hong
The Third Learning on Graphs Conference (LOG), 2024

Multilevel Approach to Efficient Gradient Calculation in Stochastic Systems [\[pdf\]](#)

[Joohwan Ko](#), Michael Poli, Stefano Massaroli, Jinkyoo Park, Woo Chang Kim
International Conference on Learning Representations (ICLR) Workshop on Physics for Machine Learning, 2023

(* denotes equal contribution)

ACADEMIC SERVICE

Reviewer, Neural Information Processing Systems (NeurIPS)	2025–2026
Reviewer, International Conference on Machine Learning (ICML)	2025–2026
Reviewer, International Conference on Learning Representations (ICLR)	2025–2027

HONORS, AWARDS & RESEARCH SUPPORT

ACCESS-CI Explore Allocation, Principal Investigator – 200,000 ACCESS Credits	2026–2027
Neural Information Processing Systems (NeurIPS) Travel Award	2025
CICS Scholarship – \$5,000, awarded to select PhD admits	2024
Government-Funded Scholarship for all semesters attended at KAIST	2022–2024
IITP Scholarship – \$50,000, awarded for visiting student at CMU, Korea IITP	2022–2023

TEACHING EXPERIENCE

Flows, Diffusions and Bayesian Seminar Organizer at UMass Amherst	Fall 2026
Machine Learning TA at UMass Amherst	Fall 2025
Advanced Statistics TA at KAIST	Spring 2023

SKILLS & LANGUAGES

Skills: Python (JAX, PyTorch, TensorFlow, NumPyro)
Languages: Korean (native), English (fluent)