Jaehoon Hahm

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Email: jh141@illinois.edu **Website**: jaehoon-hahm.github.io **LinkedIn**: linkedin.com/in/j-hahm

Research Interest

AI for Science, ML + Quantum, Generative Models, Geometric Deep Learning, Representation Learning, Neural Quantum States.

Work Experience

Meta Reality Labs
Research Scientist Intern *2026.05 – 2027.01*
- Mentor: Jogendra N. Kundu
- Paper: VFMDistill: Zero-shot Ensemble Teacher Foundation Model for Eye Tracking with Zero or Few Target Device Data

Education

University of Illinois Urbana-Champaign (UIUC)
Ph.D. Physics *2024.08 – 2028.12 (Expected)*
- Advisor: Bryan K. Clark
- Research: ML + Quantum Many-body Physics, Neural Quantum States, Quantum Monte Carlo

Graduate School of Data Science, Seoul National University (SNU)
M.S. Data Science *2022.03 – 2024.02*
- *Thesis: Isometric Representation Learning for Disentangled Latent Space of Diffusion Models*
- Advisor: Joonseok Lee

Seoul National University (SNU)
B.S. Physics, Mathematics *2016.03 – 2022.02*
- *Thesis: Improvement in Variational Quantum Algorithms by Measurement Simplification*
- Advisor: Young June Park
- Mandatory Military Service: Republic of Korea Army, 2019.07 – 2021.02

Seoul Science High School
Graduated with Distinction *2013.03 – 2016.02*
- One year early matriculation to a high school for gifted students in science

Publications

[P5] Stable Reward Fine-tuning of One-step Generators via Backward Drifting
Jiwoo Yoon, Hyunsoo Song, Hoseong Hwang, Jaehoon Hahm, Kyumin Choi, Minjung Gim, Jaewoong Choi1†
Under Review at CVPR 2027

[P4] Self-Consistent Reward Steering for Target-aware Crystal Generation
Seunghoon Yi*, Youngwoo Cho*, Jeongwoo Shin, Jaehoon Hahm, Joonseok Lee, Hongkee Yoon†
Under Review at ICLR 2027

[P3] TILT: Model-Intrinsic Reward Alignmnet for Compositional Diffusion
Debottam Dutta, Jianchong Chen, Jaehoon Hahm, Romit Roy Choudhury†
Under Review at ICLR 2027

[P2] Optimal Crystal Flow for Fast and Reliable Crystal Generation
Seunghoon Yi*, Youngwoo Cho*, Jaehoon Hahm, Jeongwoo Shin, Soo Kyung Kim, Jaegul

Choo, Joonseok Lee, Hongkee Yoon†
Under Review at ICLR 2027

[P1] Geometric Flow Matching for Learning Quantum Many-Body States with Classical Shadows
Jaehoon Hahm, Bryan Clark†
Under Review at ICLR 2027

[C5] Can Intrinsic Rewards Enable Compositional Alignment in Diffusion?
Debottam Dutta, Jaehoon Hahm, Jianchong Chen, Romit Roy Choudhury†
SPIGM @ ICML 2026

[C4] Equivariant Latent Alignment via Flow Matching under Group Symmetries
Sunghyun Kim*, Jaehoon Hahm*, Jeongwoo Shin, Joonseok Lee†
International Conference on Machine Learning (ICML) 2026

[C3] SummDiff: Generative Modeling of Video Summarization with Diffusion
Kwanseok Kim*, Jaehoon Hahm*, Sumin Kim, Jinhwan Sul, Byunghak Kim, Joonseok Lee†
International Conference on Computer Vision (ICCV) 2025, Highlight (263/11,239 = 2.3%)

[C2] Generative Modeling of Quantum Distribution with Functional Flow Matching
Jaehoon Hahm*, Tak Hur*, Joonseok Lee, Daniel K. Park†
Quantum Techniques in Machine Learning (QTML) 2024

[C1] Isometric Representation Learning for Disentangled Latent Space of Diffusion Models
Jaehoon Hahm*, Junho Lee*, Sunghyun Kim, Joonseok Lee†
International Conference on Machine Learning (ICML) 2024

[W1] Improvement in Variational Quantum Algorithms by Measurement Simplification
Jaehoon Hahm, Hayeon Kim, Young June Park
arXiv:2312.06176

Misc. Experience

Graduate Research Assistant 2024.03 – 2024.08
Advisor: Daniel K. Park Stat. & DS, Yonsei Univ.
- Generative Modeling of Quantum Distribution with Functional Flow Matching

Graduate Research Assistant 2024.03 – 2024.08
Advisor: Joonseok Lee Samsung Research C-LAB
- Measuring video-text alignment using pre-trained VLMs

Undergraduate Research Assistant 2018.07 – 2019.04, 2021.02 – 2021.12
Advisor: Young June Park, funded by *Samsung Beyond Limit* project ECE, SNU
- Measurement Simplification post-processing method that accelerates variational quantum algorithms.
- Quantum KNN using IBM quantum computers using Qiskit API.

Undergraduate Research Assistant 2021.02 – 2021.12
Advisor: Taehyun Kim CSE, SNU

- Measuring gate fidelities using randomized benchmarking protocol, by self-developed control framework based on IBM Qiskit.

Undergraduate Research Assistant 2021.07 – 2021.12
Advisor: Hyunyong Choi Physics, SNU
- Diamond NV center control experiments including Rabi oscillation, spin echo, and dynamical decoupling.

Republic of Korea Army 2019.07 – 2021.02
Chemical, Biological, Radiological, and Nuclear Reconnaissance, 5th Infantry Division
- Discharged as sergeant, after 19 months of mandatory military service at one of the front borderlines of Korea.

Patent

Korea Patent
SummDiff: Generative Modeling of Video Summarization with Diffusion 2025

Teaching Experience

TA, UIUC
PHYS212: University Physics, Electricity & Magnetism 2025
PHYS435: Electromagnetic Fields I 2024

TA, SNU
M2480.001100: Principles & Applications of Data Science 2023

Professional Experience

Conference Reviewer
NeurIPS 2026
ICLR 2027

Languages

Programming: Python, C, C++, Java, MATLAB, Mathematica
Deep Learning: PyTorch, JAX, TensorFlow, NumPy
Quantum: IBM Qiskit, Google Cirq, PennyLane, TensorFlow Quantum
Natural Languages: English (Professional), Korean (Native)

References

Bryan K. Clark 2024.08 - Current
Ph.D. Advisor (UIUC) bkclark@illinois.edu

Jogendra N. Kundu 2026.05 - Current
Intern Manager (Meta) jogendrak@meta.com

Romit R. Choudhury 2026.02 - Current
Collaborator (UIUC) croy@illinois.edu

Joonseok Lee 2022.03 - 2024.08
M.S. Advisor (SNU) joonsek@snu.edu