

Minchan Jeong

Ph.D. in AI, KAIST (Advisor: Prof. Se-Young Yun)

Expected Graduation: Aug 2026

Military Service: Republic of Korea (in service through Aug 2027)

Thesis: Operator Spectral Estimation Beyond IID Data

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minchanjeong.github.io ↗

Google Scholar ↗ • GitHub ↗

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EDUCATION

2021–Aug 2026 **Ph.D. in AI**, Kim Jaechul Graduate School of AI, KAIST Seoul, S. Korea

2017–2020 **B.S. in Physics and Mathematics** (Double Major), Seoul National University Seoul, S. Korea
Summa Cum Laude (GPA: 3.98/4.30)

SELECTED PUBLICATIONS (*: CO-FIRST AUTHOR)

A complete list is available on Google Scholar ↗.

Peer-Reviewed Papers

- 2026 J. Oh*, **M. Jeong***, J. Ko, S.-Y. Yun. From Belief Entrenchment to Robust Reasoning in LLM Agents. *TACL* (to appear).
- 2025 **M. Jeong***, J. J. Ryu*, S.-Y. Yun, G. W. Wornell. Efficient Parametric SVD of Koopman Operator for Stochastic Dynamical Systems. *NeurIPS 2025*. **[Code]**
- 2022 D. Bienstock*, **M. Jeong***, A. Shukla*, S.-Y. Yun*. Robust Streaming PCA. *NeurIPS 2022*.
- 2022 G. Lee*, **M. Jeong***, Y. Shin, S. Bae, S.-Y. Yun. Preservation of the Global Knowledge by Not-True Distillation in Federated Learning. *NeurIPS 2022*.

Workshop Papers

- 2025 B. Cho*, F. den Breejen*, **M. Jeong***, T. Kim, N. Ho, J. Cha, Y.-H. Baek, S.-Y. Yun. Transformer-Based Short-term Precipitation Post-Processing: Leveraging Extensive Data and Short Training. *MLESIM 2025*.

In Progress

- 2026 **M. Jeong***, J. J. Ryu*, S.-Y. Yun, G. W. Wornell. Variational Monte Carlo for Quantum Excited States via Nested Low-Rank Approximation. *Manuscript under review, 2026*.

RESEARCH EXPERIENCE

Research Engineer | AlphaWeather Project (Mar 2022 – Dec 2024)

Sponsored by: National Institute of Meteorological Sciences (NIMS), Republic of Korea

- **High-Throughput Data Pipeline:** Architected a parallelized ETL pipeline for heterogeneous GRIB2 data. Implemented process-level parallelism to resolve I/O blocking, enabling the training of a ViT-based model that achieved a **30% CSI improvement** over physics-based baselines.
- **JAX Production Optimization:** Engineered the operational inference engine for GraphCast.
 - *Inference Efficiency:* Refactored JAX memory allocation to dynamically offload variables to CPU RAM, preventing OOM on legacy GPUs during long-horizon forecasting. Developed a lightweight concurrency manager, reducing global prediction latency by 3x via optimized single-node job scheduling. **[Code]**
 - *Determinism and Stability:* Diagnosed and resolved XLA non-determinism in production environments, ensuring bitwise reproducibility of forecast inferences.
 - *Physics Reconciliation:* Engineered a custom Top-of-Atmosphere Solar Radiation (TISR) module to resolve ERA5 input mismatches. Implemented this fix prior to the release of the official DeepMind GraphCast patch.

ML Researcher | Hankook Tire (Mar 2021 – Jan 2022)

- *Generative Inverse Design*: Engineered a high-dimensional material search system (>800 feedstocks) using Normalizing Flows, achieving >30% material cost reduction.
- *Constrained Optimization*: Integrated flow-based generative models with online optimization to synthesize recipes satisfying viscoelastic properties with >99.5% constraint compliance.

AWARDS

2024	Minister of Environment Award (1st Place), National Weather Big Data Contest, Power Demand Forecasting Track.
2021	4th Place Overall (2nd Place in Student Track), NeurIPS 2021 ML4CO Competition, Dual Task.

PATENTS

2023	S.-Y. Yun, S. Kim, M. Jeong , J. Oh, G. Lee. <i>Federated Learning system, Federated Learning method, and recording medium storing instructions to perform federated Learning method.</i> US Patent App. 18/489,087 (Pub. No. US 2025/0061376 A1); KR Patent App. 10-2023-0107066.
2022	G. Lee, M. Jeong , S.-Y. Yun, S. Bae, J. Ahn, S. Kim, W. Chung. <i>System, method, and computer-readable storage medium for Federated Learning of local model based on learning direction of global model.</i> US Patent App. 17/974,545 (Pub. No. US 2023/0136378 A1); KR Patent App. 10-2021-0149758, 10-2022-0075187.

INVITED TALKS

Jul 2025	“The Expansion of AI-based Weather Forecasting: From Short-term Precipitation to Global Foundation Models.” Weather AI Workshop, Korea Computer Congress (KCC) 2025.
Mar 2025	“Fine-Tuning and Temporal High-Resolution Forecasting Strategies for Global Medium-Range AI Weather Models.” Numerical Modeling Center, Korea Meteorological Administration (KMA).

ACADEMIC SERVICE

Reviewer: NeurIPS 2025 (Top Reviewer), NeurIPS 2022.

TECHNICAL SKILLS

Languages Python, C, Julia.

Frameworks JAX (FermiNet extension, GraphCast), PyTorch.

Math background Functional analysis, spectral theory, Koopman operators, variational methods, stochastic calculus, PDE.

Updated July 20, 2026