# Minchan Jeong

Graduate School of AI, Advisor: Se-Young Yun

Korea Advanced Institute of Science and Technology (KAIST)

(Ph.D. Expected: 2026)

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## EDUCATION

**Ph.D. Track**  Graduate School of AI, Korea Advanced Institute of Science And Technology, since March 2021.
> Highlighted Coursework: Machine Learning Theory

**B.S. Mathematics**  Double Major, Seoul National University, 2020. GPA: 4.06/4.30.
> Highlighted Coursework: Linear Algebra I/II, Non-Linear Dynamics and Chaos, Mathematical Analysis I/II

**B.S. Physics**  Seoul National University, 2020. GPA: 3.98/4.30, *Summa Cum Laude*.
> Highlighted Coursework: Quantum Mechanics I/II, Computational Physics

## RESEARCH AREAS

> My primary focus currently is on AI-based global medium-range weather forecasting, a field that I find both exciting and well-aligned with my research interests.

My research interests are centered around integrating the empirical successes of deep learning with the rigor of mathematical frameworks. I have participated in research aimed at mathematically elucidating experimental phenomena and conducting real-world experiments in statistical modeling.

**Key Areas of Expertise**:

> **Deep Learning**     AI-Based Weather Forecasting, Natural Language Processing, Federated Learning
>
> **Online Learning**   Principal Component Analysis (PCA), Bandit Algorithms

## PROJECT

[Mar 2022 - Currently]
**Alpha Weather: Development of Artificial Intelligence-based Precipitation Forecasting Technology**:
National Institute of Meteorological Sciences, Republic of Korea.

- (Project Goal) We aim to solve the *short-range* prediction of precipitation (rainfall) up to 5 days in the future by post-processing NWPs.
- (2024) Team Lead. Launched the 'AI-based global medium-range weather forecasting' project with existing team members and 3 LAB interns. As of Apr 2024, working on re-implementing current SOTA global models and crafting the simplest base global model achievable.
- (2023) Team Lead. Converted Large-scale GRIB files into tensors, streamlining data analysis workflows and supporting main project objectives. Managed participant engagement and served as the primary liaison with the National Institute.

- (2022) Handled data preprocessing for numerical models and researched interpolation methods to enhance sparse station data.

[Mar 2021 - Jan 2022]
**AI-Based Development of Reliable Prediction Models & Inverse Design for Tire Recipes**: Hankook Tire, Republic of Korea.

- (Project Goal) This project aims to develop AI models for reliable prediction & recommend tire recipes.

- Conducted overall implementation and tabular data feature analysis.


## PUBLICATIONS (*: CO-FIRST AUTHOR)

2023 [C7] G Lee, **M. Jeong**, S. Kim, J. Oh, S. Yun. "FedSoL: Bridging Global Alignment and Local Generality in Federated Learning" *The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024*.

2023 [C6] H. Lee*, **M. Jeong***, S. Yun, K. Kim. "Findings of the Association for Computational Linguistics: EMNLP 2023" (Long Paper).

2023 [C5] J. Oh*, J. Kim*, **M. Jeong**, S. Yun. "Toward Risk-based Optimistic Exploration for Cooperative Multi-Agent Reinforcement Learning." In *2023 International Conference on Autonomous Agents and Multiagent Systems*.

2023 [C4] J. Ko, S. Park, **M. Jeong**, S. Hong, E. Ahn, D. Chang, S. Yun. "Revisiting Intermediate Layer Distillation for Compressing Language Models: An Overfitting Perspective." *Findings of the Association for Computational Linguistics: EACL 2023* (Long Paper).

2023 [C3] J. Kim, S. Yun, **M. Jeong**, J. Nam, J. Shin, R. Combes. "Contextual Linear Bandits under Noisy Features: Towards Bayesian Oracles." In *The 26th International Conference on Artificial Intelligence and Statistics*.

2022 [C2] D Bienstock*, **M Jeong***, A Shukla*, SY Yun* "Robust Streaming PCA." In *Thirty-seventh Annual Conference on Neural Information Processing Systems*.

2022 [C1] G. Lee*, **M. Jeong***, Y. Shin, S. Bae, S. Yun "Preservation of the Global Knowledge by Not-True Distillation in Federated Learning." In *Thirty-seventh Annual Conference on Neural Information Processing Systems*.


## RESEARCH INTERNSHIP

2020    HYKE Hwarang Lab, Seoul National University. Advisor: Seung Yeal Ha.
   - Studied Kuramoto-Lohe model on Riemannian Manifold

2020    Atmospheric Science Group, Seoul National University. Advisor: Seok-Woo Son.
   - Conducted a numerical validation of the dynamics of sudden stratospheric warming using Finite Amplitude Wave Activity (FAWA)

## TEACHING ASSISTANT

**Korean Advanced Institute of Science and Technology**

2023-F        Advanced Topics in Deep Reinforcement Learning

2022-F        Optimization for AI

2022,23-S    Machine Learning Theory

## INVITED PANNEL TALKS

2022        "Renaissance@SNU : NeurIPS 2022 Preview." Vessl AI. Seoul, Republic of Korea.  Oct 24.

## GRANTS AND AWARDS

**Awards and Honors**

2021        **Student 2nd Winner (Overall 4th)**, Dual Task - ML4CO: Machine Learning for Combinatorial Optimization, NeurIPS 2021 Competition

2017–20    **Dean's List** - Recognized 4 times during 8 semesters for academic performance.

**Competitive Grants and Fellowships**

2020        **SNU Development Fund Scholarship**

2017–20    **Eminence Scholarship** (awarded 3 times) and **Merit-Based Scholarship** (awarded 3 times)

## PATENTS

2023        S. Yun, S. Kim, **M. Jeong**, J. Oh, G. Lee. *Federated Learning system, Federated Learning method, and recording medium storing instructions to perform federated Learning method.* United States Patent 18/489,087, Korean Patent 10-2023-0107066.

2022        G. Lee, **M. Jeong**, S. Yun, S. Bae, J. Ahn, S. Kim, W.Chung. *System, method, and computer-readable storage medium for Federated Learning of local model based on learning direction of global model.* United States patent US8650186B2. United States Patent 17/974,545, Korean Patent 10-2021-0149758, 10-2022-0075187.

## SERVICE

**Academic Peer Review**

*NeurIPS 2022*

**Service to the Field**

*MobiHoc 2022* Student Volunteer

Updated March 29, 2024