MINWU KIM

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Research Interests: LLM Reasoning, Reinforcement Learning, Test-Time Scaling

EDUCATION

New York University Abu Dhabi — Aug 2018 - Jun 2024
B.Sc. in Computer Science, Minor in Applied Math — *Abu Dhabi, UAE*

- GPA: 4.0/4.0 (Latin Honors: summa cum laude)
- Awards: Full Academic Scholarship, University Honors Scholar.
- Leave of absence for mandatory national military service: 2019 - 2021 (2 years)

PUBLICATIONS

[1] **M. Kim**, and K. Ross, Difficulty-Rebalancing Prefix for Training Reasoning LLM, *to be submitted to ICML 2026*.

[2] **M. Kim***, A. Shrestha*, S. Shrestha, A. Nepal, and K. Ross, Reinforcement Learning vs. Distillation: Understanding Accuracy and Capability in LLM Reasoning, in *NeurIPS 2025 MATH-AI Workshop*, 2025.

[3] S. Shrestha, **M. Kim**, A. Nepal, A. Shrestha, and K. Ross, Warm Up Before You Train: Unlocking General Reasoning in Resource-Constrained Settings, in *EMNLP*, 2025.

[4] **M. Kim***, S. Shrestha*, and K. Ross, Mathematical Reasoning in Large Language Models: Assessing Logical and Arithmetic Errors across Wide Numerical Ranges, preprint, 2025.

[5] A. Nepal, S. Shrestha, A. Shrestha, **M. Kim**, J. Naghiyev, R.Shwartz-Ziv, and K. Ross, Layer Importance for Mathematical Reasoning is Forged in Pre-Training and Invariant after Post-Training, in *NeurIPS MATH-AI Workshop*, 2025.

[6] **M. Kim**, S. Benabderrahmane, and T. Rahwan, Interpretable Machine Learning Model for Predicting Activist Investment Targets, in *The Journal of Finance and Data Science*, 2024.

RESEARCH EXPERIENCES

NYU Deep Reinforcement Learning Lab — Sept 2024 - Aug 2026
Research Assistant (advisor: Prof. Keith Ross) — *Abu Dhabi, UAE*

- Currently developing a prefix-based data augmentation approach that leverages the model's rare mistakes and rare successes to challenge easy reasoning tasks and scaffold hard tasks, thereby amplifying learning signals for RLVR. [1]
- Analyzed the impact of RLVR and distillation on accuracy and capability of LLMs, showing RLVR improves easy questions at the cost of hard ones, while distillation improves both (only) when new knowledge is introduced. [2]
- Designed a data-efficient training method for reasoning LLMs by distilling non-domain-specific reasoning traces, improving performance across math and coding; combine with RLVR to enhance efficiency, generalization, and final performance. [3]
- Created *GSM-Ranges*, a GSM8K-variant math benchmark spanning wide numerical ranges, with a novel grading method that separates logical and arithmetic errors; discovered that larger magnitudes increase both error types. [4]
- Discovered that critical layers for mathematical reasoning form during pretraining and remain invariant after post-training methods such as reinforcement learning, distillation, and instruction tuning. [5]

NYU Data Science and AI Lab — Feb 2023 - May 2024
Research Assistant (advisor: Prof. Talal Rahwan) — *Abu Dhabi, UAE*

- Developed an interpretable prediction model for activist fund targets in the US stock market, achieving SOTA performance (+12 AUROC); incorporated novel governance and ownership factors and explain dynamics in shareholder activism.
- Published in *The Journal of Finance and Data Science* and presented findings to *Bloomberg*'s activism data team for integration into its screening tools. [6]

KDI School of Public Policy and Management — May 2023 - Dec 2023
Research Assistant (advisors: Prof. Jaehyuk Park, Prof. Seohyun Lee) — *Sejong, South Korea*

- Analyzed long-term impacts of the 1997 Asian Financial Crisis on the Korean elderly (1997–2020) using census microdata; uncovered heterogeneous treatment effects across subgroups with casual forest method.

NYU Embodied AI and Robotics Lab — Oct 2023 - Dec 2023 / May 2024 - Aug 2024
Research Assistant (advisor: Prof. Yi Fang) — *Abu Dhabi, UAE*

- Constructed an agentic workflow pipeline and developed a RAG chatbot for the NYUAD community, leveraging 40K+ documents and deployed during freshman orientation week to enhance access to school resources.
- Elevated the product to a multi-LLM-agent ecosystem across eight NYUAD departments, enabling API-driven tool automation; selected for the NYU Engineering Ventures Incubator.

WORK EXPERIENCES

Dify June 2024 - Aug 2024
AI Engineer Intern *Suzhou, China*

- Architected a drag-and-drop GraphRAG LLM app development platform; devised a novel approach for cost-efficient graph construction and node retrieval; implemented interactive graph visualization and editing features.

Breaking Feb 2022 - Dec 2022
Software Engineer, Co-founder *Seoul, South Korea*

- Co-founded *Breaking*, an online platform enabling news report trading between users and press agencies; received an angel investment offer from *Sherpa Ventures* ($75k approx.).
- Designed and developed the RESTful server API with Java Spring Boot and Spring Data JPA.

TEACHING EXPERIENCES

CS-UH-3260 - *Special Topics in Computer Science: AI and Machine Learning* Feb 2025 – May 2025
Teaching Assistant *Abu Dhabi, UAE*

- Designed and graded assignments in LLM and RL; delivered guest lectures on emerging topics in AI.

PROJECTS & LEADERSHIP

NYUAD Business and Finance Society Jan 2022 - Oct 2022
Freelance Writer *Abu Dhabi, UAE*

- Published 40+ macroeconomics articles weekly; garnered 30k+ views.

Resow Aug 2022 - Dec 2022
Software Engineer *New York, US*

- Developed and tested a P2P second-hand online marketplace for the NYU community with MERN Stack.

ADNOC Bloomberg UAE Trading Challenge Mar 2022 - Apr 2022
Algorithmic Trader *Abu Dhabi, UAE*

- Implemented an algorithm to select high-volume tickers on the Dubai Financial Market, using RSI and MACD crossovers for trade signals; outperformed the market benchmark by 5.2%, ranking 17th among 282 teams.

Republic of Korea Army Dec 2019 - Jun 2021
Sergeant *Gyeryong, South Korea*

- Served as a Chinese Language Specialist at *Personnel Command, Republic of Korea Army HQ.*

TECHNICAL SKILLS

Programming	Python, C/C++, R, Java, Javascript, SQL
Frameworks	Pytorch, Keras, Sklearn, HuggingFace, TRL, Langchain, EconML, Spring Boot
Languages	English (fluent), Chinese (fluent; educated in China up to high school), Korean (native)