Soheun Yi

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Education

Carnegie Mellon University, *Ph.D., Statistics.* **09.2023–Present**

Carnegie Mellon University, *M.S., Statistics.* **09.2023–05.2025**

Seoul National University, *B.S., Mathematical Sciences.* **03.2017–08.2023**

- *Summa Cum Laude*
- On leave from Fall 2019 to Spring 2021 for mandatory military service in the Republic of Korea.

Research Interests

- **Optimal transport** and **continuous dynamics**.
- **Statistics** and **machine learning** for **science**.

Publications

(* for equal contribution.)

[1] J. Lee*, **Soheun Yi***, and E. K. Ryu. "Convergence Analyses of Davis–Yin Splitting via Scaled Relative Graphs". *SIAM Journal on Optimization* (2025).

[2] **Soheun Yi** and E. K. Ryu. "Convergence analyses of Davis–Yin splitting via scaled relative graphs II: convex optimization problems". *Optimization* (2025).

[3] J. Cho, K. Sreenivasan, K. Lee, K. Mun, **Soheun Yi**, J. Lee, A. Lee, J. Sohn, D. Papailiopoulos, and K. Lee. "Mini-Batch Optimization of Contrastive Loss". *Transactions on Machine Learning Research* (2024).

[4] **Soheun Yi**, J. Alison, and M. Kuusela. "Toward Model-Agnostic Detection of New Physics Using Data-Driven Signal Regions". 2024. arXiv: 2409.06960.

[5] **Soheun Yi** and S. Lee. "Filter, Rank, and Prune: Learning Linear Cyclic Gaussian Graphical Models". *Proceedings of The 27th International Conference on Artificial Intelligence and Statistics (AISTATS)*. 2024.

Research Experience

Graduate Research Assistant, *Dept. of Statistics & DS*, CMU, **01.2024–Present**
Advisor: John Alison and Mikael Kuusela.
Topic: Toward Model-Agnostic Detection of New Physics Using Data-Driven Signal Regions. [4]

Visiting Researcher, *Deep Learning Division*, Krafton. **04.2023–07.2023**
Topic: Contrastive Learning, Neural Radiance Field

Research Intern, *Graduate School of Data Science*, Seoul National University, **03.2022–08.2023**
Advisor: Sanghack Lee.
Topic: Causal Discovery on Linear Cyclic Gaussian Graphical Models. [5]

Research Intern, *Dept. of Mathematical Sciences*, Seoul National University, **01.2022–12.2022**
Advisor: Ernest K. Ryu.
Topic: Convergence Analyses of Davis–Yin Splitting via Scaled Relative Graphs. [1]

Employment

Quantitative Analyst, *Hyperithm*, Seoul. **08.2019–08.2021**

- Developed and implemented quantitative trading strategies.
- Maintained transaction review systems.
- Programming experiences:
  - Transaction log parsing (`RegEx`, `BigQuery`),
  - Processing and visualizing market data (`Pandas`),
  - Options pricing and trading simulation (`NumPy`, `SciPy`).

Teaching Experience

Teaching Assistant, *Advanced Statistical Theory*. **Spring 2025**

- Advanced Ph.D. level course on mathemtical statistics.

Teaching Assistant, *Intermediate Statistics*. **Fall 2024, 2025**

Teaching Assistant, *Advanced Data Analysis*. **Spring 2024**

Teaching Assistant, *Modern Regression*. **Fall 2023**

Teaching Assistant, *Mathematical and Numerical Optimization*. **Fall 2022**

Deputy Leader, *Team Korea at Romanian Master of Mathematics*. **02.2019**

Teaching Assistant, *Korea Mathematics Olympiad Winter School*. **01.2018**

Awards and Honors

Overseas Ph.D. Scholarship, *Korea Foundation for Advanced Studies*. **2023–Present**

Pair Merit Prize, *Simon Marais Mathematics Competiton*. **2020**

- Top $4/150 = 3\%$ of participants.

Undergraduate Scholarship, *Korea Foundation for Advanced Studies*. **2019–2023**

Gold Prize, *Korea Undergraduates Mathematics Competition*. **12.2018**

Presidential Science Scholarship, *Korea Student Aid Foundation*. **2017–2023**

Finalist for International Mathematical Olympiad, *Korean Mathematical Society*. **2016**

- Top 13 participants in Korea.

Silver Medal, *Romanian Master of Mathematics*. **2016**

Selected Graduate Courses

- Advanced Machine Learning Theory and Methods.
  - 2nd place in the quantitative data analysis project hosted by Trexquant.
- Scalable High Performance Computing.
  - Implemented the fastest CUDA program among 100 participants in the term project.