# Soheun Yi

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**Homepage:** soheunyi.github.io

## Education

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| **Carnegie Mellon University**, *PhD, Statistics.* | **09.2023–Present** |
| **Carnegie Mellon University**, *MS, Statistics.* | **09.2023–05.2025** |
| **Seoul National University**, *BS, Mathematical Sciences.* | **03.2017–08.2023** |

- *Summa Cum Laude*
- Fall 2019–Spring 2021: On leave for mandatory military service.

## 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]  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).

[3]  **Soheun Yi**, J. Alison, and M. Kuusela. "Toward Model-Agnostic Detection of New Physics Using Data-Driven Signal Regions". *ML4PS Workshop at NeurIPS* (2024). arXiv: 2409.06960.

[4]  **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.

[5]  **Soheun Yi** and E. K. Ryu. "Convergence Analyses of Davis–Yin Splitting via Scaled Relative Graphs II: Convex Optimization Problems" (2022). arXiv: 2211.15604.

## Research Experience

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| **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.* [3]

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| **Visiting Researcher**, *Deep Learning Division*, Krafton. | **04.2023–07.2023** |

*Topic: Contrastive Learning, Neural Radiance Field*

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| **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.* [4]

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|---|---|
| **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 exprinces:
  - 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 (36709)*.                   **Spring 2025**
- Advanced PhD level course on mathemtical statistics.

**Teaching Assistant**, *Intermediate Statistics (36705)*.                       **Fall 2024**

**Teaching Assistant**, *Advanced Data Analysis (36402)*.                        **Spring 2024**

**Teaching Assistant**, *Modern Regression (36401)*.                             **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

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

**Simon Marais Mathematics Competiton**, *Pair Merit Prize*.                     **2020**
- Top 4/150 = 3% of participants.

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

**Korea Undergraduates Mathematics Competition**, *Field 1 Gold Prize*.          **12.2018**

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

**Korean Mathematical Society**, *Finalist for International Mathematical Olympiad*.  **2016**
- Top 13 participants in Korea.

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