

# JISUN LEE

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## EDUCATION

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- Ph.D.**     **University of California, Berkeley, USA**  
- Industrial Engineering & Operations Research, August 2020 - present (expected May 2025)  
- Advisor: Alper Atamtürk [\[link\]](#)
- M.S.**     **Seoul National University (SNU), Republic of Korea**  
- Industrial Engineering, August 2019  
- Advisor: Kyungsik Lee [\[link\]](#)  
- Thesis: An Approximation Scheme for the Probability Maximizing Combinatorial Optimization Problem [\[link\]](#)
- B.S.**     **Seoul National University (SNU), Republic of Korea**  
- Industrial Engineering, August 2017  
- Thesis: A Study on the Corporate Credit Rating Prediction Model using Convolution Neural Network with Time Series Data

## PAPERS

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**Convex hull of mixed-integer quadratic optimization problems with separable cost matrices**

Jisun Lee, Andrés Gómez, and Alper Atamtürk. (Working paper, presented at MIP Workshop 2024)

- Unique properties of (block) separable matrices are studied, a polynomial-time DP algorithm and a tight SOCP reformulation is proposed.

**Efficient sampling from  $\epsilon$ -optimality solution set**

Jisun Lee, Alper Atamtürk, and Ignacio Aravena Solís. (Working paper)

- A parallelizable sampling technique that efficiently generates well-distributed points within an  $\epsilon$ -optimal solution set is proposed.

**Cut generation for hybrid model predictive control by linking consecutive periods**

Jisun Lee and Alper Atamtürk. (Working paper)

- Novel tightening cuts and techniques for MIQPs, leveraging matrix decomposition and second-order cone constraints, are developed.

**Strong formulations for hybrid model predictive control [\[pdf\]](#)**

Jisun Lee, Hyunki Im, and Alper Atamtürk.

(To be submitted, presented at MIP Workshop 2023, INFORMS 2023, SIAM Optimization Conference 2023)

- Proposed strong formulations for MIQPs arising in hybrid model predictive control, utilizing cuts derived by disjunctive programming and perspective reformulation.
- Application to the energy management of power-split hybrid electrical vehicle is demonstrated.

**A fully polynomial time approximation scheme for the probability maximizing shortest path problem [\[pdf\]](#)**

Jisun Lee, Seulgi Joung, and Kyungsik Lee. European Journal of Operational Research, 2022.

- An FPTAS that iteratively solves deterministic shortest path problems to find an approximate solution with guaranteed bound on a directed graph with Gaussian random arc lengths is proposed.

## PRESENTATION

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**2024 Mixed Integer Programming Workshop**, Kentucky, USA. [\[poster\]](#)

- Strong formulation of hybrid control problem with tridiagonal inverse matrix.

**2019 European Conference on Operational Research**, Dublin, Ireland. [\[slides\]](#)

- An approximation scheme of the probability maximizing combinatorial optimization problem.

**2019 Fall Conference of Korean Institute of Industrial Engineers**, Seoul, Republic of Korea.

- A fully polynomial time approximation scheme for the probability maximizing shortest path problem.

**2019 Spring Conference of Korean Institute of Industrial Engineers**, Seoul, Republic of Korea.

- An approximation scheme of the probability maximizing combinatorial optimization problem.

## TEACHING ASSISTANT

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IEOR 262A **Mathematical Programming I**

UC Berkeley, Fall 2024

IEOR 165 **Engineering Statistics, Quality Control, and Forecasting**

UC Berkeley, Spring 2024

IEOR 142 **Introduction to Machine Learning and Data Analytics**

UC Berkeley, Spring 2023

## RESEARCH INTEREST

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- Integer Programming, Combinatorial Optimization, Convex Optimization

- Applications: Statistical Learning, Control Optimization

- Optimization Under Uncertainty: Stochastic Optimization, Robust Optimization

## SKILLS

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Programming Language: Python, Java, C++

Modeling & Analysis Tool: Gurobi, Mosek, Xpress, CPLEX, Drake, MPI, MATLAB, R, Arena

## HONORS & AWARDS

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**UC Berkeley IEOR Departmental Fellowship**, 2020.

**Exellence Prize (3rd Prize) in KIIE Master's Thesis Competition**, 2019.

**Brain Korea 21 Plus Scholarship**, 2018.

**National Scholarship for Science & Engineering**, Korea Student Aid Foundation, 2016.

**SNU Scholarship for Academic Achievement**, 2015.

**Uisan Engineering Scholarship**, 2014.

**4th Prize in SNU Big Data Institute 2nd Datathon**, 2014.