

JISUN LEE

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EDUCATION

- 2020.8 - current **UC Berkeley**, California, United States
- Ph.D. Candidate of Industrial Engineering & Operations Research
 - Advisor: Alper Atamtürk [\[link\]](#)
- (2019.9 - 2020.7) Graduated, but continued research at SNU, while preparing for PhD program
- 2017.9 - 2019.8 **Seoul National University (SNU)**, Seoul, Republic of Korea
- Master of Science, Department of Industrial Engineering
 - Advisor: Kyungsik Lee [\[link\]](#) (Mathematical Programming Lab.)
 - Thesis: An Approximation Scheme for the Probability Maximizing Combinatorial Optimization Problem [\[link\]](#)
- 2013.3 - 2017.8 **Seoul National University (SNU)**, Seoul, Republic of Korea
- Bachelor of Science, Department of Industrial Engineering
 - Thesis: A Study on the Corporate Credit Rating Prediction Model using Convolution Neural Network with Time Series Data

RESEARCH EXPERIENCE

- 2021.5 - current **Berkeley Computational Optimization Lab (BCOL)**, Berkeley, USA
- Research: Complexity Study and Strong Formulations of Hybrid Control Problem
 - Strong Formulations for Hybrid Model Predictive Control
 - Cut generation using disjunctive programming and perspective formulation
 - Application on energy management of power-split hybrid electrical vehicle
 - Cut Generation for Hybrid Model Predictive Control by Linking Consecutive Periods
 - Matrix decomposition to strengthen formulations by utilizing linear dynamical system
 - Tightening techniques for quadratic functions with binary & continuous variables that depend on value of indicator variables
- 2024.6 - 2024.8 **Lawrence Livermore National Lab (LLNL)**, Livermore, USA
- Research: Efficient Sampling from ϵ -Optimality Solution Set
 - Two-Sample Splitting Method for Mixed-Integer Programming
 - Revise no-good cuts to generate strong cuts that split the polytope into smaller subpolytopes
 - Parallelized sampling method which generates well-scattered samples
 - Sampling method which generates well-scattered samples
 - Application to unit commitment problem instances in power system
- 2017.9 - 2019.8 **Mathematical Programming Lab of SNU**, Seoul, Republic of Korea
- Research: Chance-Constrained and Probability Maximizing Mixed-Integer Programming, Approximation Schemes and Heuristics for MIP with Uncertainty
 - Approximation Schemes for Probability Maximizing Shortest Path Problem
 - Proved \mathcal{NP} -hardness even on directed acyclic graph with arcs with integer mean lengths
 - Proposed pseudo-polynomial time exact algorithms, along with nontrivial special cases that can be solved in polynomial time
 - Proposed a fully polynomial time approximation scheme (FPTAS) that iteratively solves deterministic shortest path problems, and can be applied to devise FPTAS for other probability maximizing combinatorial optimization problems

PAPERS & PUBLICATIONS

Jisun Lee, Andrés Gómez, and Alper Atamtürk, *Convex hull of mixed-integer quadratic optimization problems with separable cost matrices*. (working paper)

Jisun Lee, Alper Atamtürk, and Ignacio Aravena Solís, *Efficient sampling from ϵ -optimality solution set*. (working paper)

Jisun Lee and Alper Atamtürk, *Cut generation for hybrid model predictive control by linking consecutive periods*. (working paper)

Jisun Lee, Hyunki Im, and Alper Atamtürk, *Strong formulations for hybrid model predictive control*. [\[pdf\]](#)
(To be submitted, Presented at MIP 2023, INFORMS 2023, SIAM Optimization Conference 2023)

Jisun Lee, Seulgi Joung, and Kyungsik Lee, *A fully polynomial time approximation scheme for the probability maximizing shortest path problem*, European Journal of Operational Research 300(1), 35-45, 2022. [\[pdf\]](#)

PRESENTATION

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

2024.8 - current	INDENG 262A Mathematical Programming I (UC Berkeley, GSI)
2024.1 - 2024.5	INDENG 165 Engineering Statistics, Quality Control, and Forecasting (UC Berkeley, GSI)
2023.1 - 2023.5	INDENG 142 Introduction to Machine Learning and Data Analytics (UC Berkeley, GSI)

RESEARCH INTEREST

- Discrete Optimization: Combinatorial Optimization, Integer Programming
- Control Optimization: Hybrid Control, Model Predictive Control (MPC)
- Optimization Under Uncertainty: Stochastic Optimization, Robust Optimization
- Statistical Learning, Machine Learning, Optimization in ML, Sparse Learning

SKILLS

Programming Language: Python, Java, C++

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

RELATED EXPERIENCES

- 2016.7 - 2016.8 **nTels**, Seoul, Republic of Korea
- Internship, IoT/Platform Service Planning Assistant
 - Structuring the company's existing IoT technologies and designing business items
 - Proposed and modeled a bike sharing platform management system using IoT facilities
- 2016.5 - 2016.10 **2016 Student Engineering Research Team Project**, WISET
- Project: Corporate Credit Rating Analysis Using Artificial Neural Network
 - Proposed a credit rating of corporate using time series data of corporate's financial data and text data retrieved from news and media
- 2015.1 - 2015.2 **Big Data Institute of SNU**, Seoul, Republic of Korea
- Internship, Research Assistant
 - Project: Improvement of the Patent Retrieval System
 - Reviewed research papers on patent retrieval system and proposed ideas to improve the search rate of related patents

HONORS & AWARDS

- UC Berkeley IEOR Departmental Fellowship**, 2020.
- Exellence Prize (3rd Prize) in KIIE Master's Thesis Competition**, 2019.
- *A fully polynomial time approximation scheme for the probability maximizing shortest path problem.*
- 4th Prize in SNU Big Data Institute 2nd Datathon**, 2014.
- *Personalized Informative Venture Simulation (PIVS).*
- 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.