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 & WORK 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

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

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

PAPERS & PUBLICATIONS

Jisun Lee and Alper Atamtürk, *Cut Generation for Hybrid Model Predictive Control by Linking Consecutive Periods.* (working paper)

Jisun Lee, Hyungki 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

2019 European Conference on Operational Research, Dublin, Ireland. [pdf]
- 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

2024.1 - current	**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
- Machine Learning, Optimization in ML, Sparse Learning

SKILLS

Programming Language: Python, Java, C++

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

HONORS & AWARDS

UC Berkeley IEOR Departmental Fellowship, 2020.
Exellence Prize (3rd Prize) in KIIE Master's Thesis Competition, 2019.
- *A fully polynomial time approximiation 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.