

Amy B.Z. Zhang

2 West Loop Road, New York, NY 10044
607-882-5759 | bz275@cornell.edu

PERSONAL STATEMENT

Fifth year PhD candidate at Cornell studying Operations Research. My research focuses on designing principled yet simple approximation to dynamic programming (DP) problems. Seeking industry opportunities in developing/ utilizing pattern mining and optimization models, particularly in healthcare, transportation and logistics.

EDUCATION

- Ph.D. in Operations Research and Information Engineering (ORIE), Cornell University** Dec 2021
- *Advisor*: Prof. Itai Gurvich
 - *Concentration*: Applied Probability and Statistics; *Minor*: Computer Science, Mathematical Programming
- Honors B.Sci. in Mathematical Economics & Statistics, University of Toronto (UToronto)** June 2016
- *Minor*: Computer Science
 - Graduated with High Distinction • Dean's List Scholar 2013-2016 • GPA **3.95**

SKILLS

Programming: Python, SQL, Julia, MATLAB, Java, VBA, SAS, R, Latex.

Technical: modeling, algorithms, data analysis, stochastic processes, machine learning.

INDUSTRY EXPERIENCES

- Operations Research Scientist** | Wayfair Inc - Boston, MA June 2019 - Aug 2019
- Developed in-house supply chain optimization tool that finds the minimum cost allocation of weekly containers from overseas suppliers onto transpacific vessels, based on routing and contractual volume constraints.
 - Clarified problem scope by facilitating cross-team communications. Extracted operational insights from SQL databases. Identified key usability needs and revised model to significantly improve saving potentials.
 - Implemented Gurobi model using Python. Presentation to team applauded for insights and delivery.
- Analyst Intern** | Pinpoint Asset Management Ltd - Hong Kong May 2014 - Aug 2014
- Created *entropy-based* portfolio selection technique for Chief Investment Officer Qiang Wang. Designed model to incorporate personal market trend predictions in optimizing ratio of chosen assets. Implemented Excel tool using VBA. Base case performance comparable to benchmark in backtesting.
 - Conducted fundamental analysis on various sectors to support colleagues from global offices.

RESEARCH EXPERIENCES

Research Assistant | Cornell Tech | Supervisor: Prof. Itai Gurvich Jan 2017 - present
MDP Approximation via State Aggregation Using Local Moment Matching

We develop an approximate algorithm for Markov Decision Process by combining the efficiency of state aggregation with the guarantees of moment matching. We relate the solution of the original chain to that of a sister chain via a PDE, whose dependence on the transition matrix is reduced to the first two moments, in the style of CLT. This sister chain is constructed with aggregation, where moment matching informs the choice of parameters, enabling reduced complexity and guaranteed performance.

Model Learning With Moment Matching

Models learned from samples results in inaccuracies when data is limited, with sample complexity requirements adversely affected by large variance. It is intuitive to use coarser, thus computationally cheaper, approximation during early stages of learning, as the accuracy loss from estimation may limit the benefit from higher fidelity. Moreover, due to our view of transitions through moments, the variance from finite samples is expected to be smaller given certain system structures. Therefore we explore this interaction of our ADP approximation and model estimation through the lens of bias-variance tradeoff within the framework we put forth.

NSERC Researcher | University of Toronto | Supervisor: Prof. Chi-Guhn Lee May 2015 - Oct 2015

Adaptive Signal Control in Heavy Traffic Situations using Markov Decision Process.

We focused on developing adaptive control for traffic signal at congested intersections, optimizing the length of green-signal phases for each direction to minimize total wait. I formulated the dynamics of a 10-lane intersection using discrete-time Markov Decision Processes, and implemented MATLAB-based solutions.

SELECTED COURSES

Graduate Level: Algorithms | Machine Learning | Probability | Networks | Game Theory | Convex Optimization

Undergraduate:

- Statistics: Data Analysis | Database Design | Time Series Analysis | Data Mining
- Computer Science: Graph Theory | Neural Networks | Software Design | Combinatorics
- Economics & Finance: Microeconomics | Math Theory of Finance | Innovation & Entrepreneurship

AWARDS & SCHOLARSHIPS

- Anna And Alex Beverly Memorial Fellowship | UToronto 2016
- NSERC Undergraduate Student Research Award | Government of Canada 2015
- Dr. James A. & Connie P. Dickson Scholarship In Science & Mathematics | UToronto 2014-2015
- George Roderick Fraser Scholarship | UToronto 2012-2015
- Avie Bennett Scholarship | UToronto 2012

PRESENTATION

Low-rank MDP Approximation via Moment Coupling, INFORMS Annual Meeting 2020

TEACHING EXPERIENCES

Teaching Assistant | Cornell University

- ENGRD 2700: Probability and Statistics | Instructor: Jefferson Huang Fall 2016
Leading recitations • Holding office hours • Grading
- ORIE 4820: Spreadsheet-Based Modeling and Data Analysis | Instructor: Kathryn Caggiano Spring 2017
Assisting labs • Holding office hours • Grading
- ORIE 4350: Intro to Game Theory | Instructor: Krishnamurthy Iyer Fall 2017
Creating handouts & solutions • Leading recitations • Holding office hours • Grading
- ORIE 4350: e-Logistics | Instructor: Huseyin Topaloglu Spring 2019
Grading • Holding office hours
- ORIE 5530: Modeling under Uncertainty | Instructor: Mark S. Squillante Fall 2019
Holding office hours & review sessions • Grading

LEADERSHIP & ACTIVITIES

- Co-president of the PhD student association at Cornell Tech. Mentor in department mentorship program.
- Interests: self-guided traveling, choral singing, racquet sports.