LIU, ZHI

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GENERAL RESEARCH INTEREST

I am broadly interested in the study of societal systems using mechanism design and data science/machine learning techniques, particularly those settings with fairness implications and strategic behavior of participants. Most recently I am working in collaboration with the New York City Parks Department to redesign and optimize their methods of scheduling inspections for public service requests.

EDUCATION

Ph.D. student in Operations Research, Cornell Tech, New York, NY 2020 - Present
Committee members: Prof. Nikhil Garg (chair), Prof. Shane Henderson, Prof. Siddhartha Banerjee

B.Eng. in Industrial Engineering, Tsinghua University, Beijing, China 2016 - 2020
Minor in Applied Statistics; Thesis advisor: Prof. Junlong Zhang
Thesis: Combating Misinformation in a Pandemic: a Network Interdiction Approach

RESEARCH PROJECTS

Redesigning Service Level Agreements in Public Operations.
Zhi Liu and Nikhil Garg. *Working paper* (2023).
Abstract: We propose a general framework for evaluating and re-designing implementable Service Level Agreements, commonly seen in government operations. By leveraging historical data, we are able to accurately solve for optimal SLAs and an implementable scheduling policy and can validate them through simulation. We evaluate possible objectives in the optimization stage and uncover their real-world implications in efficiency and equity for city residents.

Quantifying Spatial Reporting Disparities in Resident Crowdsourcing.
Zhi Liu, Uma Bhandaram and Nikhil Garg. *Under Review at Nature Computational Science* (2023).
Conference version appeared in *ACM EC'22*.
Abstract: We propose a powerful and general approach to measure residents' reporting behavior in crowdsourcing settings, e.g., 311 systems across North American cities, by using only the reports and no proxies for ground-truth conditions. Applied to data from NYC and Chicago, our method reveals substantial reporting heterogeneity across space, demographics, and time.

Test-optional policies: Overcoming strategic behavior and informational gaps.
Zhi Liu and Nikhil Garg. In *AAAI/ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization* (2021)
Abstract: Under the setting of test-optional admissions and with strategic applicants, we study sufficient conditions for the admission policy to be non-discriminatory towards students who truly lack access to tests due to factors such as the pandemic, which contain randomization and certification.

EXPERIENCE

Research Intern, **The New York Public Library** Summer 2023
Part of the Siegel Family Endowment PiTech PhD Impact Fellowship
Supervisor: Sarah Rankin

Teaching Assistant for CS5433, **Cornell Tech** Spring 2023
Course title: Blockchains, Cryptocurrencies, and Smart Contracts

Teaching Assistant for ORIE5355, **Cornell Tech** Fall 2022/2021
Course title: Applied Data Science: Decision-Making Beyond Prediction

Research Assistant, **Cornell Tech** Spring 2023/2022
Supervisor: Prof. Nikhil Garg

Research Assistant, **Rice University** Summer 2019
Supervisor: Prof. Andrew Schaefer
Developed a numerical solver for PDEs, by translating them into Linear Programs.

INVITED TALKS AND POSTERS

INFORMS Annual Conference 10/2022
Equity in Resident Crowdsourcing: Measuring Under-reporting without Ground Truth Data.

ACM Conference on Economics and Computation 07/2022
Equity in Resident Crowdsourcing: Measuring Under-reporting without Ground Truth Data.

NYC Ops Day (Poster) 04/2022
Equity in Resident Crowdsourcing: Measuring Under-reporting without Ground Truth Data.

Cornell ORIE Ph.D. Colloquium 04/2022
Equity in Resident Crowdsourcing: Measuring Under-reporting without Ground Truth Data.

NeurIPS Strategic Machine Learning Workshop (Poster) 12/2021
Test-optional policies: Overcoming strategic behavior and informational gaps.

ACM Conference on EAAMO 10/2021
Test-optional policies: Overcoming strategic behavior and informational gaps.

MISCELLANEOUS

Fellowships

Siegel Family Endowment PiTech PhD Impact Fellowship Summer 2023
Cornell University Fellowship Spring 2021
Eleanor and Howard Morgan PhD '68 Graduate Fellowship Fall 2020

Skills

Programming: Python, R; **Modelling**: Stan, Gurobi; **Languages**: Chinese, English