

# TINGHAN (JOE) YE

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## EDUCATION

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### Cornell University

Ithaca, NY

B.S. Operations Research and Engineering (*Honors*)

Aug. 2021 - May 2023 (*expected*)

### University of Illinois at Urbana - Champaign

Champaign, IL

Major: Civil Engineering Minor: CS, Econ, Business

Aug. 2019 - May 2021

*Coursework:* Stochastic Processes (PhD level), Algorithms, Simulation, Optimization, Engineering Probability & Stats., Real Analysis, Linear Algebra, Combinatorics, Differential Equations, Database Systems, Data Structures, Discrete Structures, Systems Engineering & Economics, Finance, Accounting

## PUBLICATIONS & PRESENTATIONS

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- **T. Ye** & D. Shmoys, “A Min-max Theorem for the Minimum Fleet Size Problem”. Under Review at *Operations Research Letters*.
  - Poster presented at *INFORMS Annual Meeting*, Indianapolis, IN, Oct. 2022 and *Young Researchers Workshop*, Ithaca, NY, Oct. 2022.
- **T. Ye**, S. Liu & E. Kontou, “Managed Residential Electric Vehicle Charging Minimizes Electricity Bills while Meeting Driver and Community Preferences”. Under Review at *Transport Policy*.
  - Poster won Second Place for Undergraduate Level INFORMS Mini Poster Competition (2021).
- **T. Ye**, J. Zhu, E. Zhang, A. Shi & S. Henderson, “SimOpt - A Library of Simulation Optimization Problems and Solvers”, *Cornell Engineering Learning Initiatives Poster Session*, Apr. 2022.
  - Work acknowledged in Eckman, D. J., S. G. Henderson, and S. Shashaani (2022).
- S. Wang, [...], **T. Ye**, “Attention Dynamic Model for Solving Threshold Covering Location Problem of Siting COVID-19 Vaccine Sites”. Under Review at *International Journal of Geographical Information Science*.
  - Contributed to the literature review of COVID-19-related spatial optimization models.
- **T. Ye** & H. Wang, “Regional Disparities of Electric Vehicle Marginal Emissions - Evidence from China Market,” *Journal of Advanced Management Science*, Vol. 10, No. 2, pp. 36-43, June 2022. doi: 10.18178/joams.10.2.36-43
  - Presented at *11th International Conference on Economics, Business and Marketing Management*, Singapore, Feb. 2022.
- **T. Ye** & D. Shmoys, “Optimizing Final Exam Schedule at Cornell University”. Working paper.
  - Poster presented at *Cornell Undergraduate Research Board Spring Symposium*, May 2022
- **T. Ye**, “Understanding College Students’ Motivation to Take COVID-19 Vaccination Shots from College Subreddit Comments”. Working paper.

## RESEARCH EXPERIENCE

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### Scheduling for Cornell Registrar and Engineering Advising

Aug. 2021 - Present

*Supervisor: David Shmoys*

*Department of Operations Research and Engineering, Cornell*

- Develop heuristics and new constraints to efficiently solve an exam scheduling optimization model using Python and Gurobi; the new model ensures zero conflicts and reduces the number of back-to-back finals by 36%.
- Revamp an optimization model for matching faculty advisors with freshmen in engineering via OR-Tools; new model considers room capacity and ensures international students are not singled out.
- Work reflected in the schedules of FA 22 & SP 22 final exams and FA 22 ENGRG 1050-Engineering Seminar.

### **Taxi Routing Optimization**

May 2022 - Present

*Supervisor: David Shmoys*

*Department of Operations Research and Engineering, Cornell*

- A taxi routing problem can be solved via bipartite matching, where a maximum cardinality matching corresponds to the minimum number of taxis needed to cover all trips.
- Prove a min-max theorem: the maximum number of pairwise incompatible trips equals the minimum number of taxis needed.
- Demonstrate on an NYC taxi dataset and obtain a 35% reduction in the total number of taxis needed.
- Computational results are integrated into a lab of ENGRI 1101-Engineering Applications of OR.
- Sponsored in part by ELI Undergraduate Research Funds.

### **Simulation Optimization Library**

Aug. 2021 - Present

*Supervisor: Shane Henderson*

*Department of Operations Research and Engineering, Cornell*

- Create and implement simulation optimization problems, e.g. a COVID-19 testing frequency problem and an emergency medical service volunteer problem.
- Design, test, and compare simulation optimization solvers, e.g. stochastic line search and projected gradient (for problems with linear constraints).
- Sponsored by Meyer A. Gross '58 (Cornell Engineering Learning Initiatives).

### **Residential Electric Vehicle Charging Patterns and Management**

Nov. 2020 - June 2022

*Supervisor: Eleftheria Kontou*

*Department of Civil and Environmental Engineering, UIUC*

- Clustered and analyzed large time-series residential energy data; developed Gurobi optimization models for residential electric vehicle charging that minimizes electricity costs while meeting driver and community preferences.
- The optimal charging schedule reduces daily total electricity costs by 38.27% on a summer weekday and by 44.3% on a winter weekday.
- Sponsored by Research Support Grant from Illinois Office of Undergraduate Research.

### **Spatial Optimization of COVID-19 Testing and Vaccination Planning**

July 2022 - Present

*Supervisor: Shaohua Wang*

*Chinese Academy of Sciences*

- Working on developing deep reinforcement learning models for spatial optimization problems with applications to COVID-19 testing and vaccination sites location in China.

### **CVS Health Supply Chain Simulation Analysis**

Sep. 2021 - Present

*Supervisor: David Goldberg & Mark Lewis*

*ORIE, Cornell*

- Coordinate with CVS contacts and lead a team of 20 to design and build a discrete-event simulation model in Python that simulates the life cycles of totes (containers that move products around) in the supply chain of CVS Health.
- The model assesses the costs and effectiveness of implementing RFID technology in the stores and distribution centers, which can potentially address the existing tote shrinkage problem in CVS.

### **Understand College Students' Motivation to Take COVID-19 Vaccination through Reddit Comments**

Jan. 2022 - Present

*Independent Research*

- Employed sentiment analysis on Reddit comments via TextBlob and NRCLEXP packages and ran a multiple linear regression with interactions to investigate the relationship between students' fear level towards COVID-19 and their motivation to take vaccination shots.

### **Museum Artwork and Philanthropy Data Analytics**

Sep. 2021 - Present

*Supervisor: David Goldberg & Mark Lewis*

*ORIE, Cornell*

- Collaborate with contacts from the Johnson Museum of Art to revamp the museum's internal database and analyze donation information, which aims to enhance visitor engagement and increase museum donation in the long run.

- Piloting a QR-code initiative that collects and analyzes visitor and donor information; clustering the museum's annual fund-giving data to identify key donors.

## AWARDS AND RECOGNITION

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- **CRA Outstanding Undergraduate Researchers Award Cornell ORIE Nominee (2022)**
  - This award program recognizes undergraduate students in North American colleges and universities who show outstanding potential in an area of computing research.
- **Tau Beta Pi Scholarship (2022-23)**
  - Awarded to junior Tau Beta Pi members on a competitive basis of high scholarship, campus leadership and service, and promise of future contributions to the engineering profession.
- **Best in Category: Engineering & Design in Cornell CURB Fall Forum (2022)**
  - Awarded to the poster entitled "Scheduling for Engineering Registrar - ENGRG 1050 Matching Tool".
- **Dean's List (2020-22)**
- **Honorable Mention in the Mathematical Contest In Modeling (2021)**
  - Developed an ARIMA model for forecasting Asian Hornet spread; performed sentiment analysis on laboratory comments and formulated an SVM model for classifying Asian Hornet based on geolocation and sentiment scores; developed a deep-learning image recognition model to distinguish between wasp species.
- **James Scholar in Grainger College of Engineering (2020-21)**
  - An honors program that recognizes academically outstanding students in each college at UIUC
- **Wilson H. Tang CEE International Scholarship (2020)**
  - Awarded to one international student per year in the CEE department with outstanding academic achievement.

## CAMPUS INVOLVEMENT

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### **Cornell ORIE Undergraduate Society**

Aug. 2021 - Present

*Co-President & Team Lead*

*Ithaca, NY*

- Coordinate external meetings with university offices, industry and non-profit partners and internal meetings with the Cornell teams and professors.
- Assist in planning and organizing social and academic events.

### **Teaching Assistant / Course Assistant**

2020 - 2022

*Cornell ORIE & UIUC CS*

- ORIE 4580\5580\5581: Simulation Modeling and Analysis in FA 22
- SYSEN 5200: Systems Analysis Behavior and Optimization in SP 22
- CS 125: Introduction to Computer Science (OOP in Java) in FA 20

### **Chinese Union - Illinois Chinese Student Organization**

Apr. 2020 - June 2021

*Project Management Director & Executive Board Member*

*Champaign, IL*