

Micah Chen

minghao.c@columbia.edu | (734) 510-0059 | 636A, 500 W 120 St, New York, NY, 10025

SUMMARY

Awarded and results-driven Ph.D. candidate specializing in AI, data analytics, statistical modeling, and optimization with hands-on experience developing scalable solutions in drone routing, path planning, and sensing. Seeking a 2025 summer internship to apply expertise in data-driven decision-making and optimization.

SKILLS

- **Method:** Stochastic Optimization, Uncertainty Quantification, Reinforcement Learning, Machine Learning
- **Programming:** Python (sklearn, pytorch, pandas, tensorflow, openAI gym), MATLAB, R, Git, MS Azure, ROS

EDUCATION

Columbia University

New York, NY

Ph.D. in Smart Cities, GPA: 3.9/4.0, Calatrava Family Fellow

Sep 2022 - May 2026 (Expected)

- *Thesis:* Data-driven Sensing, Planning, and Routing for Risk-Aware Urban Air Mobility
- *Selected Courses:* Reinforcement Learning, Robot Learning, Continuous Optimization, High Dim Probability

University of Michigan (UM)

Ann Arbor, MI

Dual M.S.E. in Industrial & Operations Engineering and Intelligent Systems Engineering

Sep 2020 - May 2022

Shanghai Jiao Tong University (SJTU) – UM Joint Institute

Shanghai, CN

Dual M.S.E. in Electric and Computer Engineering

Sep 2020 - June 2021

RESEARCH EXPERIENCE

Bayesian Wind Estimation Using Motion Data from Uncrewed Aerial Vehicles (UAVs)

New York, NY

Graduate Research Assistant, *NSF Center for Smart Streetscapes*

Mar 2024 - Present

- Developed a novel on-board UAV motion data-assisted Bayesian framework for fast urban wind estimation
- Collected, cleaned, and preprocessed 2.4 million+ raw IMU and GPS data points from DJI Mavic 4 flight tests
- Implemented the entire pipeline in Python, accelerating computations via engineering optimizations (batch size tuning, initialization) and mathematical techniques (linearization, cutting-plane methods)
- Achieved simulation and experimental results matching high-precision wind sensors
- Trained a deep neural policy with PPO to adaptively plan informative paths for efficient wind field sensing

Learning Optimal Drone Dispatching in Unknown Urban Wind Field

Ann Arbor, MI

Graduate Research Assistant, *NSF Center for Autonomous Air Mobility and Sensing*

Oct 2023 – Oct 2024

- Built a Bayesian bandit framework to optimize dispatching for efficient wind sensing with minimal delays
- Designed an efficient sampling algorithm with provable convergence to find optimal policies balanced cost
- Analyzed action-reward distribution to assist UM collaborators improve wind-informed reward models
- Validated with the real Boston wind data, outperforming conventional methods in convergence and regret

Energy-constrained, Risk-averse Drone Delivery under Dynamic Urban Winds

New York, NY

Graduate Research Assistant, *Columbia University*

Mar 2023 – Jan 2025

- Constructed a Markov model using historical meteorological data to predict wind patterns for drone routing
- Quantified flight risks considering wind impact on drone flights through probabilistic physical models
- Developed mixed-integer programs for stochastic time-dependent routing with nonlinear constraints
- Proposed a novel parallel heuristic to realize a 100x speedup over advanced solvers for large-scale practices
- Awarded **Honorable Mention** (2nd/6 finalists) in 2024 INFORMS Best Student Presentation Competition

PROFESSIONAL EXPERIENCE

Northeastern Securities

Shanghai, CN

Quantitative Analyst Intern, *Real Estate and Property Group*

May 2020 – July 2020

- Coded real estate data collection and preprocessing pipeline from Wind (Chinese Bloomberg) for analysis
- Evaluated futures of 16 real estate stocks with data-driven predictive statistical models with visualizations

SELECTED PUBLICATIONS

- **Chen, M.**, et al. Bayesian Low-altitude Urban Wind Estimation for UAVs. To appear in the *International Conference on Robotics and Automation (ICRA) 2025*.
- **Chen, M.**, et al. (2024). Wind-informed Cost Distributions for Uncrewed Aerial System Dispatch Strategies. In *AIAA SCITECH 2024 Forum* (p. 1079).
- **Chen, M.**, et al. (2023). Drone Delivery Routing with Stochastic Urban Wind. In *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)* (pp. 2260-2267). IEEE.