# Jiayi (Marco) Chen

Email : jc6601@columbia.edu
marcochen0720.github.io
Mobile : (+1) 332-268-9388


**Research Interests:** Information Design, Online Learning, Data-Driven Decision-Making, Multi-agent Systems

## Education

- **Columbia University** — New York, NY
  *M.A. in Statistics* — *Sep 2025 – Dec 2026 (expected)*
  - Doctoral-Level Coursework: Convex Optimization, Stochastic Modeling, Reinforcement Learning, Diffusion Models
  - Additional Coursework: Modern Analysis, Honors Probability Theory/Linear Regression/ Statistical Inference
- **Soochow University** — Suzhou, China
  *B.A. in Accounting, B.S. Applied Psychology; GPA: 3.8/4.0* — *Sep 2021 – Jun 2025*
  - Selected Coursework: Calculus, Linear Algebra, Probability & Statistics
- **University of California, Berkeley** — Berkeley, CA
  *Visiting Student, Berkeley Global Access Program (IEOR); GPA: 3.95/4.00* — *Jan 2024 – May 2024*
  - Selected Coursework: Introduction to Optimization Modeling, Introduction to Stochastic Processes, Machine Learning and Data Analytics II, Analysis and Design of Databases

## Working Papers

- **Information Design for Mitigating Volunteer's Dilemma**, with Weiliang Liu, Tao Lin, and Wei Tang

## Presentations

- **Information Design for Mitigating Volunteer's Dilemma** — San Francisco, CA
  *INFORMS Annual Meeting, Invited Session: Data-Driven Optimization & Analytics for Social Impact* — *Nov 2026*

## Research Experience

- **Information Design for Mitigating Volunteer's Dilemma** — Remote
  *Research Assistant; Advisors: Profs. Weiliang Liu & Wei Tang (CUHK), Tao Lin (CUHK-SZ)* — *Jul 2025 – Present*
  - Formulated a volunteer dispatch platform's disclosure of responder availability as Bayesian persuasion with multiple strategic receivers, maximizing the probability of at least one response under symmetric equilibrium
  - Proved a support-reduction theorem for arbitrary population sizes, reducing the nontrivial disclosure problem to a finite-dimensional convexification over two posterior regions
  - Established a sharp uniform 3/4-approximation guarantee for full information relative to the optimal provision probability; extended the bound to private costs stochastically dominated by the uniform benchmark
  - Calibrated the model to published statistics from 5,646 Dutch cardiac-arrest dispatch activations; benchmarked policies using grid-based linear programming with local refinement, finding full information achieved 99.05% of the computed optimum in the baseline calibration
- **Coarse Understanding in Persuasion** — New York, NY
  *Research Assistant; Advisor: Prof. Yuchen Hu (Columbia University)* — *Jun 2026 – Present*
  - Developed a repeated Bayesian persuasion framework for learning unknown receiver belief-updating rules, modeled through coarse state partitions, from observed actions
  - Derived a linear programming benchmark for optimal signaling under known updating rules and established the sufficiency of direct action recommendations
  - Formulated action-based estimation and a minimax-regret signaling objective, deriving an observable squared-loss criterion for learning the receiver's prediction rule
- **Framework-agnostic Evaluation for Healthcare Agents** — Remote
  *Research Assistant; Advisor: Prof. Yu Ma (UW–Madison)* — *May 2026 – Sep 2026*
  - Developed a framework-agnostic evaluation approach for healthcare multi-agent systems, distinguishing candidate availability, aggregation errors, and execution failures
  - Examined how component contributions depend on the receiving agent's access to evidence and downstream decision process, addressing information and interaction effects obscured by aggregate task scores
  - Implemented frozen-state replay and controlled interventions across medical QA and EHR tool-use tasks to assess component effects on predictive quality, task completion, and computational cost

- **Eating Context and Well-Being: A Daily Diary Study** Suzhou, China
  *Undergraduate Thesis; Advisor: Prof. Chujun Wang (Soochow University)* *Dec 2024 – Apr 2025*
  - Analyzed 420 daily records from 60 participants in a 7-day diary study using linear mixed models (REML) and Bayesian mixed models in R to examine associations between eating context, meal calorie ratings, and emotional well-being
  - Estimated asymmetric within-person changes in photo-based meal calorie ratings: +29.1% for solitary-to-communal transitions (95% credible interval: 8.5% to 48.9%), versus -3.8% in the reverse direction, with the latter interval spanning zero

## Selected Projects

- **Constrained Reinforcement Learning for Volunteer and EMS Dispatch** Columbia University
  *Course Project, ORCS 6529 Advanced Reinforcement Learning* *Mar 2026 – May 2026*
  - Formulated volunteer (CFR) dispatch over an EMS baseline as a constrained MDP with hidden severity, stochastic acceptance, and timeliness, equity, and workload constraints, calibrated to NYC EMS data
  - Developed RG-CPO, a PPO-Lagrangian variant with risk gating, dual warmup, PID multiplier updates, augmented Lagrangian, and CVaR constraints; cut updates to feasibility from 65 to 30
  - Under scarce capacity, RG-CPO was feasible in all 5 seeds while optimized greedy, myopic, and threshold rules all failed; a capacity sweep located the threshold below which RL is needed
- **Course Scheduling via Mixed Integer Programming** UC Berkeley
  *Course Project, IEOR 164 Optimization Modeling* *Apr 2024 – May 2024*
  - Formulated a binary MIP in Python/Pyomo assigning 11 IEOR courses to rooms and time slots under capacity, no-overlap, and noon-blackout constraints, with course sizes from 5 years of enrollment data
  - Linearized a building-distance penalty over back-to-back course pairs alongside early-slot and room-size penalties; the optimal conflict-free schedule has a single building change across both day patterns

## Industry Experience

- **Deloitte Touche Tohmatsu Co., Ltd.** Shanghai, China
  *Data Analyst Intern, iBond* *Oct 2024 – Nov 2024*
  - Built a bond default risk scoring model integrating 53+ indicators across sentiment, fundamentals, volume–price, and issuance-rate dimensions (85%+ out-of-sample accuracy)
  - Designed a 10-tier early warning system based on historical percentiles, enabling preemptive flagging of bonds with default probabilities above 90%
- **Bank of China Investment Management Co., Ltd.** Shanghai, China
  *Quantitative Research Intern, Overseas and Quantitative Index Department* *Jul 2024 – Aug 2024*
  - Developed factor models for Fund of Funds selection over roughly 120 million records of returns and holdings data, reaching an Information Coefficient of 0.1
  - Improved volume–price factors through genetic programming to reduce cross-factor correlation and applied KAN-based nonlinear modeling, achieving 6% annualized excess return against the CSI 500 benchmark

## Honors & Awards

- **Outstanding Graduate** (School Level), Soochow University 2025
- **Jiangsu Government Scholarship for Overseas Study** 2023
- **First Prize** (Jiangsu Region), "CP Cup" National College Student Market Research & Analysis Competition 2022
- **Innovation and Entrepreneurship Scholarship** (Top Prize), Soochow University 2021–2022
- **Special Scholarship for Civic Virtue**, Jingwen College, Soochow University 2021–2022

## Skills Summary

- **Languages**: Python (PyTorch, Pyomo, Gurobi, NumPy, Pandas, scikit-learn), R, SQL, LaTeX, Tableau
- **Spoken**: Mandarin (native), English (fluent), Japanese
- **Interests**: Chess, Calligraphy, Classical Guitar