Chia-Hao Chang

✉ cc4626@columbia.edu
https://chia-hao-chang.github.io/

Education

Columbia University — **New York City, NY** — **Sep 2020-present**
- **Ph.D. in Operations Research** — **GPA: 4.08/4.00**
- **Advisor**: Vineet Goyal and Carri Chan
- **Graduate Coursework:** Optimization (I) and (II), Stochastic Modeling (I) and (II), Analysis and Probability♠, Probability (II)♠, Theoretical Statistics (I)♢, Theoretical Statistics (II)♡, Stochastic Simulation, Convex Optimization, High-Dimensional Probability with Applications, Matching Markets and Algorithms, Analysis of Algorithms (I), Game Theory (♠: Math. Ph.D. cores: A+; ♢: Stats. Ph.D. core: A+; ♡: Stats. Ph.D. core: A)
- Tang's family fellowship.

The University of Texas at Austin (UT Austin) — **Austin, TX** — **Aug 2018 – May 2020**
- **M.S. in Decision, Info. and Commun. Engr. (DICE), Electrical and Computer Engineering (ECE)** — **GPA: 4.0/4.0**
- **Advisor**: Prof. John Hasenbein
- **Thesis:** Effects of Patient Heterogeneity in a First-Come-First-Serve Kidney Transplant Model

National Taiwan University (NTU) — **Taipei, Taiwan** — **Sept 2013 – Jan 2018**
- **B.S. in Electrical Engineering (EE) with minor in Physics (Phys)** — **GPA:4.15/4.30**
- **NTU Presidential Award for 3 semesters**: Awarded to students ranked within the top 5% in each semester.

Research Interest

My research interest lies in the intersection of optimization under uncertainty, dynamic decision making, and game theory.

Dynamic Decision Making
- Stochastic Optimal Control and Stochastic Dynamic Programming
- Approximation of large scale Markov decision processes (MDP)

Game Theory
- Learning in Games
- Inference in strategic settings

Publication

- *Rapid Response Teams for Proactive Sepsis Treatment*, major revision at *Operations Research*.
  SSRN preprint:https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5205758

Research Experience

Large Scale MDP — **Profs. Vineet Goyal & Carri Chan** — **June 2021-Jan 2025**
- Large Scale MDP model for stochastically scheduling proactive treatment in hospital. Characterize the *structural properties* of the optimal policy in the associated fluid optimization problem.
- Design an algorithm coordinating the current resource and future demand; Prove the algorithm is *asymptotically long-run optimal*.
- Calibrate the model from Columbia University Irving Medical Center data; Good Performance on the real-world data.
- Major revision at *Operations Research* (see Publication section).

Causal Estimation — **Profs. Vineet Goyal & Carri Chan** — **Dec 2024-present**
- Causal inference to evaluate the impact of a clinical screening system at NYP.
- Difference-in-Differences (DiD) methodology to estimate causal treatment effects.
- Performed large-scale data cleaning, transformation, and validation comprising over *one million* patient records.

Strategic Queues — **with Prof. John Hasenbein** — **Jan 2019 – Dec 2019**
- Game-theoretic queueing models for kideny transplantation; proved the parameter sensitivity in the MDP.

Talks

INFORMS Annual Conference 2019 **Seattle, WA** **Oct 2019**
- Session: WB11 - Queueing Approximations and Strategic Queues.

INFORMS Annual Conference 2022 **Indianapolis, IN** **Oct 2022**
- Session: SA45 - Topics in Sequential Models Under Uncertainty

INFORMS Healthcare 2023 **Toronto, Canada** **July 2023**
- Session: FA05 - Innovative Models in Healthcare

INFORMS 2023 **Phoenix, AZ** **Oct 2023**
- Session: SE27 - Recent Advancement of Stochastic Modeling for Service Systems

INFORMS MSOM 2024 **Minneapolis, MN** **July 2024**
- Session: MD14 - Healthcare Analytics and Modeling

INFORMS 2024 **Seattle, WA** **Oct 2024**
- Session: TE48 - Public Health Analytics and Operations

Honors

High School Physics Contest **Kaohsiung, Taiwan** **Oct 2012**
Winner
- First prize and representative of Kaohsiung City.

Selection Test for International **Taiwan** **Nov 2012**
Physics Olympiad
- Second round

Teaching Experience

Teaching Assistant **Columbia University**
- IEOR 4102: Stochastic Modeling for MSE — Spring 2021
- IEOR 4106: Stochastic Models — Spring 2021
- IEOR 4106: Stochastic Models — Fall 2021
- IEOR 3609: Advanced Optimization — Spring 2022
- IEOR 6711: Stochastic Modeling (I) (Ph.D. core) — Fall 2022
- IEOR 3658: Probability for Engineers — Spring 2023
- IEOR 4101: Probability, Statistics and Simulation — Fall 2023
- IEOR 4106: Stochastic Models — Fall 2023
- IEOR 4102: Stochastic Modeling for MSE — Spring 2024
- IEOR 4150: Probability, Statistics and Simulation — Fall 2024
- IEOR 4106: Stochastic Models — Spring 2025

Teaching Assistant **NTU** **Sept 2016 – Jan 2017**
- Volunteered-Service Learning Class

Employment

Mandatory Military Service **Tainan, Taiwan** **Feb 2018 – June 2018**
- Private, Taiwan Army.

Leadership and Extracurricular Activities

Club Leader **NTU Kind-kids Club** **Feb 2016 – June 2016**
- Leader of a seventy-four person voluntary club which I participated from freshman to senior.

Technical Skills

Programming Languages
- Python, C++, LaTeX, MATLAB

Spoken Languages

- English(fluent), Mandarin(native), Taiwanese(native)