YUWEI CHENG

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EDUCATION

PhD **University of Chicago** | Department of Statistics GPA 3.8/4.0, May 2026 (Expected)
Midwest ML Symposium Poster Award (Top 10%, 500$ cash price)
Spring Quarter Consulting Cup Winner (Best team in the Statistical Consulting Program)

BS **National University of Singapore** | Department of Statistics GPA 4.9/5.0, June 2020

BA **National University of Singapore** | Department of Economics GPA 4.9/5.0, June 2020
Dean's List Recipient (GPA ranked in the top 5% for 4 consecutive years in both departments)
Science and Technology Scholarship (Full scholarship covering tuition and living expenses for 4 years)

SKILLS & SERVICES

Programming: Python, shell scripting, R
Data Analysis: Bayesian hierarchical modelling, Generalized linear models, Gradient boosting, SVM, principal component analysis, neural network, reinforcement learning, sentiment analysis
Teaching: TA for Applied Regression Analysis (2024) and Introduction to Data Science (2021-2024)
Services: Reviewer for The American Statistician (2024) and BMJ Global Health (2023)

RESEARCH EXPERIENCE

Dept. of Computer Science, University of Chicago | Supervisor Dr. Haifeng Xu December 2023 – Present

Linear Contextual Reinforcement Learning with Delayed Poisson Reward

- Formulated autonomous ad bidding as an episodic Markov Decision Process with contextual information
- Modeled the product conversion as a delayed Poisson Reward
- Developed two-stage estimators and proved their optimality for efficiency as an online estimation oracle
- Validating the estimator's performance using real-world ad data using Python with *Gym, Torch, Optuna*

Single-Agent Poisoning Attacks Suffice to Ruin Multi-Agent Learning August 2023 – Present

- Evaluated the robustness of multi-agent learning algorithms by introducing adversarial attacks on utility observations and theoretically demonstrated the principle: The easier it is to learn, the easier it is to attack
- Proposed a theoretically guaranteed method to tune state-of-the-art gradient-based multi-agent learning algorithms, enhancing their robustness against adversarial attacks
- Simulated multi-agent interactions and implemented learning algorithms to validate the correctness of proposed theorems using Python with *Matplotlib, Numpy, Scikit-learn, Scipy, Pandas*
- Manuscripts currently under review

Learning from Imperfect Human Feedback: a Tale from Corruption Robust Dueling March 2023 – October 24

- Studied learning from imperfect human comparative feedback by modeling the potential irrationality or imperfect perception of human preferences as adversarial corruption
- Designed an algorithm, named Robustified Stochastic Mirror Descent for Imperfect Dueling, to learn from imperfect human feedback and proved its optimality in both robustness and learning efficiency
- Evaluated the algorithm's performance on Spotify recommendation data, showing its superiority
- Manuscripts currently under review and available at https://arxiv.org/abs/2405.11204

PUBLICATIONS

Quaye, S. E. D., Cheng, Y., Tan, R. K. J., Koo, J. R., Prem, K., Teo, A. K. J., & Cook, A. R. (2023). Application of the network scale-up method to estimate the sizes of key populations for HIV in Singapore using online surveys. *African Journal of Reproduction and Gynaecological Endoscopy, 26(3)*, e25973.

Cheng, Y., et al. (2022). Estimates of Japanese encephalitis mortality and morbidity: a systematic review and modeling analysis. *PLOS Neglected Tropical Diseases, 16(5),* e0010361.