YUWEI CHENG

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EDUCATION

PhD **University of Chicago** | Department of Statistics GPA 3.8/4.0, 2021-2026 (Expected)
Best Poster Award (15 out of 116) at Midwest Machine Learning Symposium 2024
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, 2016-2020

BA **National University of Singapore** | Department of Economics GPA 4.9/5.0, 2016-2020
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)

RESEARCH INTEREST

AI for Social Good, Recommendation System, Auction Theory, LLM Preference Alignment, Online Learning, Reinforcement Learning, and Algorithmic Game Theory

PUBLICATIONS

*indicates co-first author

[W1] **Cheng, Y.**, Zhao, Z., & Xu, H. (2025+). Personalized Ad Impact with Contextual Markov Decision Processes: Long-Term Poisson Rewards and Near-Optimal Bidding Algorithms. under review

[P4] Yao, F.*, **Cheng, Y.***, Wei, Er., & Xu, H. (2025). Single-Agent Poisoning Attacks Suffice to Ruin Multi-Agent Learning. ICLR 2025: Proc. 13th International Conference on Learning Representations, 2025.

[P3] **Cheng, Y.**, Yao, F., Liu, X., & Xu, H. (2025). Learning from Imperfect Human Feedback: a Tale from Corruption-Robust Dueling. ICLR 2025: Proc. 13th International Conference on Learning Representations, 2025.

[P2] 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.

[P1] **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.

RESEARCH EXPERIENCE

Dept. of Computer Science, University of Chicago | Supervisor Dr. Haifeng Xu

Human Verifiers Strictly Improve Synthetic Retraining Nov 2024 – Present

- Developed a mathematical framework for human verification, applying data filtering on synthetic data generated by large language models to optimize model retraining
- Theoretically validated that integrating human expert knowledge via targeted data filtering significantly enhances model fitting, as measured by smaller generation error.
- Running experiments using large language models to empirically validate theoretical findings.

Optimal Label Attack on Active Learning for Binary Classification Nov 2024 – Present

- Investigating optimal binary label flipping strategies to intentionally undermine the accuracy of active learning algorithms to understand model vulnerabilities and robustness challenges.

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, large language models
Teaching Experience:

- Instructor for Elementary Statistics with 45+ students — Winter 2025
- Teaching assistant for Applied Regression Analysis — Fall 2024
- Teaching assistant for Introduction to Data Science — Fall, Winter 2021-2024

Professional Services:

- Reviewer for The American Statistician — 2024
- Reviewer for BMJ Global Health — 2023

INDUSTRIAL EXPERIENCE

*Stock Return Prediction Data Challenge Organized by Qube*RT — Dec 9, 2024 – Dec 19, 2024

- Participated in a 10-day stock return prediction challenge involving a dataset with 450,000 rows and 20 features. The task was to predict whether a stock's return ranked in the top 50% on a given day.
- Implemented data preprocessing, including imputing missing values and transforming features using StandardScaler. Conducted feature engineering to create 200 derived features.
- Applied Recursive Feature Elimination with three tree-based models—Random Forest, CatBoost, and LightGBM—to select the most predictive features. Used BayesSearchCV for hyperparameter tuning and GroupKFold cross-validation to mitigate data leakage.
- Improved baseline accuracy from 51.08% to 52.02%, achieving a rank of top 10% out of 709 participants.