

GUANLIN LI

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Quantitative Research, Decision and Data Science, Complex Systems

EDUCATION

Georgia Institute of Technology, Atlanta, GA

Aug 2016 - May 2021

- Ph.D. in Quantitative Biosciences, School of Physics
 - Dissertation Topic: ‘Optimization and Control of Complex Biological and Physical Systems’
 - Minor in Machine Learning
- M.S.(s) in Mathematics | Electrical and Computer Engineering | Statistics

Arizona State University, Tempe, AZ

Aug 2013 - May 2016

- B.S. in Mathematics
 - Honors: *summa cum laude* (GPA 3.96/4)
 - Minor in Physics

WORK EXPERIENCE

China Securities Co., Ltd, Beijing, China

Quantitative Researcher - Options and Futures Market Making

June 2022 - Present

- Optimized systematic trading strategy modules, e.g. volatility surface model, order book data collecting and preprocessing pipelines.
- Researched on several volatility trading signals, e.g. statistical arbitrage of volatility surface, and build the corresponding backtest experiments.

CTC Trading Group, LLC, Chicago, IL

Quantitative Researcher - FICC Options Systematic Trading

June 2021 - Mar 2022

- Researched on several quantitative options trading strategies (e.g., volatility smile related signals): data acquisition, strategy implementation and validation, and parameter tuning to achieve the best performance from backtest experiments.
- Supported desk traders with quantitative analytical tools to make trading decisions and visualize risk and performance metrics.

Georgia Institute of Technology, Atlanta, GA

Graduate Research Assistant - School of Physics & Biology

June 2017 - May 2021

- Proposed an unified theoretical framework to understand the viral fitness and evolution using the theories from epidemiological- and adaptive evolutionary dynamics.
- Developed a computational infrastructure for control theoretic approach to optimize phage therapy.
- Implemented a multi-stage computational inference framework to extract the network of ecological interactions from species *in silico* populations time-series data.

China Galaxy Securities Co., Ltd, Beijing, China (Remote)

Quantitative Researcher Intern - Department of Information Technology

Jan 2021 - Feb 2021

- Trained a predictive model (a convolutional neural networks model, i.e., CNN) to forecast market movements using real-world high-frequency limit order book data (level-10 bid-ask spreads). Several new trading signals will be generated based on reliable predictions from model.

UCB Pharmaceuticals, Smyrna, GA

Data Scientist Intern - Department of Business Analytics and Insights

May 2020 - Aug 2020

- Assessed the COVID-19 impact on subnational *cimzia* in-office injections using counterfactual analysis: forecasted drug sales with an ensemble model of light gradient boosting machines (GBMs) and exponential smoothing, clustered subnational impacts into three profiled economic recovery archetypes using dynamic time warping (DTW) fuzzy K-means, and projected the final results on Tableau map.

Academy for Advanced Interdisciplinary Studies at Peking University, Beijing, China

Summer Research Assistant Intern - Center of Quantitative Biology

May 2017 - July 2017

- Proposed a mathematical model for unfolded protein response (UPR) networks and conducted *in silico* experiments to evaluate the stability and sensitivity of the networks.

China Investment Corporation, Beijing, China

Quantitative Researcher Intern - Department of Public Equity

May 2016 - July 2016

- Trained an AdaBoost stock return classification model to predict equities performances with fundamental financial data. The selected machine learning model slightly outperformed a baseline factor model.

Arizona State University, Tempe, AZ

Teaching Assistant - Department of Physics, School of Mathematics

Aug 2014 - May 2016

- Instructed recitation classes MAT 267 (Calculus II) and PHY 121 (Intro to Mechanics). The role includes teaching recitation materials, holding lab sessions, and grading homework and tests.

JOURNAL PUBLICATIONS

Spatial Models, Pattern Formation and Nonlinear Dynamics

- **Li, G.**, & Yao, Y. (2022). Two-species competition model with chemotaxis: well-posedness, stability and dynamics. *Nonlinearity*, 35(3), 1329.
- **Li, G.**, Motsch, S., & Weber, D. (2020). Bounded confidence dynamics and graph control: enforcing consensus. *Networks & Heterogeneous Media*, 15(3), 489.
- **Li, G.**, Steinbach, G., Yao, Y., and Weitz, J.S. Phase separation in spatial coordination games. preprint (manuscript available upon request).

Optimization and Control of Complex Systems

- **Li, G.**[†], Shivam, S.[†], Hochberg, M. E., Wardi, Y., & Weitz, J. S. (2021). Disease-dependent interaction policies to support health and economic outcomes during the COVID-19 epidemic. *iScience*, p.102710.
- **Li, G.**, Leung, C. Y., Wardi, Y., Debarbieux, L., & Weitz, J. S. (2020). Optimizing the timing and composition of therapeutic phage cocktails: a control-theoretic approach. *Bulletin of Mathematical Biology*, 82(6), 1-29.
- Weitz, J. S., Beckett, S. J., Coenen, A. R., Demory, D., Dominguez-Mirazo, M., Dushoff, J., Leung, C.Y., **Li, G.**, Magalie, A., Park, S. W., Rodriguez-Gonzalez, R., Shivam, S., & Zhao, C. Y. (2020). Modeling shield immunity to reduce COVID-19 epidemic spread. *Nature Medicine*, 1-6.

Evolutionary Dynamics and Adaptive Systems

- Shivam, S., **Li, G.**, Lucia-Sanz, A., & Weitz, J. S. (2022). Time-scales modulate optimal lysis-lysogeny decision switches and near-term phage fitness. *Virus Evolution*, 8(1), veac037.
- **Li, G.**, Cortez, M. H., Dushoff, J., & Weitz, J. S. (2020). When to be temperate: on the fitness benefits of lysis vs. lysogeny. *Virus Evolution*, 6(2), veaa042.
- Weitz, J. S., **Li, G.**, Gulbudak, H., Cortez, M. H., Whitaker, R. J. (2019). Viral invasion fitness across a continuum from lysis to latency. *Virus Evolution*, 5(1), vez006.

SKILLS

Scientific Computing/Data Science

Design and Simulation

Programming Tools/Packages

Python, R, SQL, C/C++, Java

MATLAB, Simulink, Mathematica

PyTorch, TensorFlow, Git, LaTeX and MS Office.