Dr. Qing Yao

Contact Information

Environmental Health Sciences
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Research Interests

Infectious Disease Modelling, Extreme Events, Complex System, Economic Networks, Network Theory, Scaling Phenomena, Statistical Mechanics, Machine Learning

Academic Positions

Associate research scientist, Mar 2025 - Present
Mailman School of Public Health, Columbia University
Advisors: Sen Pei

Postdoctoral research scientist, Mar 2023 - Feb 2025
Mailman School of Public Health, Columbia University
Advisors: Sen Pei

Liyun postdoctoral fellowship, Sep 2020 - Dec 2022
School of Systems Science, Beijing Normal University
Advisors: Xiaosong Chen and Jingfang Fan

Data scientist, Jul 2020 - Aug 2020
Sichuan Energy Internet Research Institute Tsinghua University

Visiting researcher, Dec 2019 - Present
Imperial College London

Education

Ph.D. in Physics, Nov 2015 - Nov 2019
Imperial College London
Supervisors: Kim Christensen and Tim Evans
Thesis: The different roles of nodes in networks

MSc in Financial Statistics, Oct 2012 - Dec 2013
London School of Economics and Political Science
Project: The framework of model uncertainty in Moore-Spiegel system

Bachelor of Physics, Xiamen University, Sep 2008 - Jun 2012
Exchange student, National Tsing Hua University, Sep 2010 - Jan 2011

Publications

Published

Zhang, Renquan, Jilei Tai, **Qing Yao**, Wan Yang, Kai Ruggeri, Jeffrey Shaman, and Sen Pei. "Behavior-driven forecasts of neighborhood-level COVID-19 spread in New York City." *PLOS Computational Biology* 21, no. 4 (2025): e1012979.

Yao, Qing, Shaodong Ma, Jing Liang, Kim Christensen, Wanru Jing, and Ruiqi Li. "Syndication network associates with specialisation and performance of venture capital firms." *Journal of Physics: Complexity* 4, no. 2 (2023): 025016.

Cao, Mengqiu, **Qing Yao**, Bingsheng Chen, Yantao Ling, Yuping Hu, and Guangxi Xu. "Development of a composite regional vulnerability index and its relationship with the impacts of the COVID-19 pandemic." *Computational Urban Science* 3, no. 1 (2023): 1.

Sun, Yu, Jun Meng, **Qing Yao**, Abbas Ali Saberi, Xiaosong Chen, Jingfang Fan, and Jürgen Kurths. "Percolation analysis of the atmospheric structure." *Physical Review E* 104, no. 6 (2021): 064139.

Yao, Qing, Bingsheng Chen, Tim S. Evans, and Kim Christensen. "Higher-order temporal network effects through triplet evolution." *Scientific Reports* 11, no. 1 (2021): 1-17.

Li, Ruiqi, Shuai Gao, Ankang Luo, **Qing Yao**, Bingsheng Chen, Fan Shang, Rui Jiang, and H. Eugene Stanley. "Gravity model in dockless bike-sharing systems within cities." *Physical Review E* 103, no. 1 (2021): 012312.

Yao, Qing, Tim S. Evans, and Kim Christensen. "How the network properties of shareholders vary with investor type and country." Plos one 14, no. 8 (2019): e0220965.

Under review

Adaptive mobility responses during Hurricanes Helene and Milton in 2024,*Environmental Research Letters*

Person, place, or preference? Combining subjective and objective decision agency with choice preferences predicts behavior during major shifts in human mobility, *Humanities and Social Sciences Communications*

Preprint

Universal scalings of extreme events of weather Variability *arXiv:2209.02292*

Emergence of community structures through biased random walks rewiring *arXiv:2207.03651* (2022)

In preparation

Behavioral characteristics in decision-making impact human mobility in pandemic times

Superspreading shapes the early spatial spread of emerging infectious diseases

TALKS

- NetSci 2024, Québec City, Jun 2024
  Superspreading shapes the early spatial spread of emerging infectious diseases

- 2023 MIDAS Network Annual Meeting, Atlanta, Nov 2023
  Superspreading shapes the early spatial spread of emerging infectious diseases

- 17th Granada Seminar: Machine learning and Physics: Quantum, Classical and Applications, Granada, Sep 2023
  Inference of Disease Dispersion Rates of a Branching Model with Spatial and Temporal Information using GNN

- Conference on Complex System, Singapore, Oct 2019
  Understanding the dynamics of triplet structure in temporal networks: Insight from Turkey shareholder network

- Conference on Complex System Satellite Economic Fitness, Thessaloniki, Sept 2018
  Modelling Shareholder Networks by random walks

- NetsicX, Hangzhou, Jan 2018
  Concentration of Shareholder Networks

- Centre for Complexity Science Group Seminar, Imperial College London, Nov 2017
  Causal Inference on Graph

- Condensed Matter Theory Group Seminar, Imperial College London, June 2017
  Centrality of Shareholders in Corporate Networks

- Centre for Complexity Science Group Seminar, Imperial College London, Dec 2015
  Application of Complexity Science in Mergers and Acquisitions

TEACHING

- Guest Lecture for Data-driven Insights into Sustainable Consumer Behaviour, University College London (Business School), Autumn 2022,

- Teaching Assistant for Physics and Mathematics of Climate Variability and Climate Change (Systems Science), Beijing Normal University, Spring 2022,

- Lab Demonstrator for Complexity and Networks (Physics), Imperial College London, Spring 2017, Spring 2018

- Rapid Feedback for Quantum Theory of Matter (Physics), Imperial College London, Spring 2017

- Teaching Assistant for Big Data in Finance (Business School), Imperial College London, Spring 2017, Spring 2018, Spring 2019

- Teaching Assistant for Statistics and Econometrics (Business School), Imperial College London, Autumn 2016

FUNDINGS

- National Natural Science Foundation of China, Phase transitions and critical phenomena of complex systems (No.12135003, 3.14million RMB), Participant, Jan 2022 - Dec 2026

- National Natural Science Foundation of China, Experimental and empirical data driven analysis for human cooperation and competition (No.72131003, 2.03million RMB), Participant, Jan 2022 - Dec 2026

SCHOOLS

- Student, Oxford Summer School in Economic Networks, June 2018

- Student, Bocconi Summer School in Advanced Statistics and Probability, July 2018

WORKING EXPERIENCE

- Data Analyst & Product Manager & Founding Member, Feb 2014 - Sep 2015
  DealGlobe Ltd (London based startup, an online platform for cross-border Mergers and Acquisitions (M&A), Shanghai, China & Minsk, Belarus & London, UK

- Intern, Risk Department & Administration Department, Dec 2013 - Feb 2014
  Agricultural Bank of China (UK), London, UK

- Intern, Chengdu Branch, Dec 2011 - Feb 2012
  Industrial Securities, Chengdu, China

- Intern, Fixed Income Markets, Jul 2011 - Sep 2011
  Crédit Agricole CIB, Shanghai, China

SKILLS

Programming and computing skills: Python, R, Adobe Illustrator
Languages: Mandarin (Native), English (Fluent), French (Beginner), Japanese (Beginner)