QIANYING LIN

Postdoctoral researcher, Theoretical Biology and Biophysics
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RESEARCH INTERESTS

My research interests focus on epidemiological stochastic process, including mathematical modelling for infectious diseases and statistical inference for phylodynamics.

PROFESSIONAL APPOINTMENTS

Los Alamos National Laboratory, Los Alamos, United States *Apr 2022–Present*
Postdoctoral researcher at Theoretical Biology and Biophysics (T-6)
- Mentors: Drs. Ethan O. Romero-Severson, Carmen Polina-Paris, Thomas Leitner
- Project: Novel phylogenetic methods to quantify the evolutionary and epidemiological implications of reassortment or Crimean-Congo hemorrhagic fever virus

University of Michigan, Ann Arbor, United States *Oct 2019–Apr 2022*
Data Science Fellow at Michigan Institute for Data Science (MIDAS)
- Mentors: Profs. Aaron A. King, Edwards L. Ionides
- Project: Integration of Epidemic Time Series and Genetic Sequences

EDUCATION

Hong Kong Polytechnic University, Hong Kong *Dec 2016–Aug 2019*
Ph.D. in Applied Mathematics
Supervisor: Dr. Daihai He
Dissertation: Modelling and Statistical Inference for Infectious Diseases

Hong Kong Polytechnic University, Hong Kong *Jul 2015–Nov 2016*
M.Phil. in Applied Mathematics
Supervisor: Dr. Daihai He
Dissertation: Modelling and Data Analysis of the Transmission of Avian Influenza, Ebola Virus Disease and Middle East Respiratory Syndrome Coronavirus.

Zhongnan University of Economics and Law, Wuhan, China *Sept 2010–Jul 2014*
BSc. in Information and Computing Science

PUBLICATIONS

Peer reviewed

24. **Lin Q**, Shrestha S, Zhao S, Chiu APY, Liu Y, Yu C, Tao N, Li Y, Shao Y, He D, Li H. (2022) *Changing epidemiology of TB in Shandong, China driven by demographic changes.* Front. Med. 9. 810382. DOI: https://doi.org/10.3389/fmed.2022.810382

23. King AA, **Lin Q**, Ionides EL. (2022) *Markov Genealogy Processes.* Theor. Popul. Biol. 143. 77–91. DOI: https://doi.org/10.1016/j.tpb.2021.11.003.

22. He D, Zhao S, Xu X, **Lin Q**, Zhuang Z, Cao P, Wang MH, Lou Y, Xiao L, Wu Y, Yang L. (2020) *Low dispersion in the infectiousness of COVID-19 cases implies difficulty in control.* BMC Public Health. 20:1558. DOI: https://doi.org/10.1186/s12889-020-09624-2.

21. Li C, Zhang X, Zhu Y, **Lin Q**, Zhao S, Yang L, Li X, He D, Stone L. (2020) *Excess pneumonia and influenza death as herald wave of COVID-19 in England and Wales, United Kingdom.* J. Infect. 82(2):282–327. DOI: https://doi.org/10.1016/j.jinf.2020.09.019

20. Fan G, Yang Z, **Lin Q**, Zhao S, Yang L, He D. (2020) *Decreased case fatality rate of COVID-19 in the second wave: a study in 53 countries or regions.* Transbound. Emerg. Dis. 00:1–3. DOI: https://doi.org/10.1111/tbed.13819. **(Highly cited paper in 2020)**.

19. **Lin Q**, Musa SS, Zhao S, He D. (2020) *Modeling the 2014–2015 Ebola Virus Disease oubtreaks in Sierra Leone, Guinea, and Liberia with effect of high- and low-risk susceptible individuals.* Bull. Math. Biol. 82(8):1–23. DOI: https://doi.org/10.1007/s11538-020-00779-y

18. Zhuang Z, Zhao S, **Lin Q**, Cao P, Lou Y, Yang L, and He D. (2020) *Preliminary estimation of the novel coronavirus disease (COVID-19) cases in Iran: a modelling analysis based on overseas cases and air travel data.* Int. J. Infect. Dis. 94:29–31. DOI: https://doi.org/10.1016/j.ijid.2020.03.019

17. He D, Zhao S, **Lin Q**, Musa SS, Stone L. (2020) *New estimates of the Zika virus epidemic attack rate in Northeastern Brazil from 2015 to 2016: A modelling analysis based on Guillain-Barr Syndrome (GBS) surveillance data.* PLOS Neglect Trop D. 14(4):e0007502. DOI: https://doi.org/10.1371/journal.pntd.0007502

16. Zhuang Z, Zhao S, **Lin Q**, Cao P, Lou Y, Yang L, Yang S, He D, Xiao L. (2020) *Preliminary estimates of the reproduction number of the coronavirus disease (COVID-19) outbreak in Republic of Korea and Italy by 5 March 2020.* Int. J. Infect. Dis. 95:308–310. DOI: https://doi.org/10.1016/j.ijid.2020.04.044

15. He D, Zhao S, **Lin Q**, Zhuang Z, Cao P, Wang MH, and Yang L (2020). *The relative transmissibility of asymptomatic cases among close contacts.* Int. J. Infect. Dis. 94:145–147. DOI: https://doi.org/10.1016/j.ijid.2020.04.034

14. **Lin Q**, Zhao S, Gao D, Lou Y, Yang S, Musa SS, Wang MH, Cai Y, Wang W, Yang L, He D. (2020) *A conceptual model for the outbreak of coronavirus disease 2019 (COVID-19) in Wuhan, China with individual reaction and governmental action.* Int. J. Infect. Dis. 93:211-216. DOI: https://doi.org/10.1016/j.ijid.2020.02.058. **(Highly cited paper in 2020)**.

13. Zhao S, **Lin Q**, Ran J, Musa SS, Yang G, Wang W, Lou Y, Gao D, Yang L, He D, and Wang MH.(2020) *Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak.* Int. J. Infect. Dis. 92:214–217. DOI: https://doi.org/10.1016/j.ijid.2020.01.050. **(Highly cited paper in 2020)**.

12. Musa SS, Zhao S, Gao D, **Lin Q**, Chowell G, and He D.(2020) *Mechanistic modelling of the large-scale Lassa fever epidemics in Nigeria from 2016 to 2019.* J. Theor. Biol. 493:110209. DOI: https://doi.org/10.1016/j.jtbi.2020.110209

11. Zhao S, Musa SS, **Lin Q**, Ran J, Yang G, Wang W, Lou Y, Yang L, Gao D, He D, and Wang MH.(2020) *Estimating of the unreported number of novel coronavirus (2019-nCoV) cases in China in the first half of January 2020: A data-driven modelling analysis of the early outbreak.* J. Clinic. Med. 9(2):388. DOI: https://doi.org/10.3390/jcm9020388. **(Highly cited paper in 2020)**.

10. **Lin Q**, Chui APY, Zhao S, He D. (2018) *Modeling the spread of Middle East respiratory syndrome coronavirus in Saudi Arabia.* Stat. Methods. Med. Res. 27(7):1968–1978. DOI: https://doi.org/10.1177/0962280217746442

9. Tang X, Fang S, Chiu A, **Lin Q**, Tang E, Wang X, and He D.(2018) *Unsynchronized influenza epidemics between two neighboring subtropical cities.* Int. J. Infect. Dis., 69:85–87. DOI: https://doi.org/10.1016/j.ijid.2018.02.019

8. Zhao S, **Lin Q**, He D, and Stone L.(2018) *Meningitis Epidemics Shift in sub-Saharan Belt.* Int. J. Infect. Dis., 68: 79–82. DOI: https://doi.org/10.1016/j.ijid.2018.01.020

7. Yang S, Chiu A, **Lin Q**, Zeng Z, Li Y, Zhang Y, Yang Z, Yang L, and He D.(2018) *HIV Epidemics in Chongqing and Shenzhen, China.* PLOS ONE., 13(2): e0192849. DOI: https://doi.org/10.1371/journal.pone.0192849

6. Chiu A, **Lin Q**, Tang E and He D.(2018) *Anti-phase Synchronization of Influenza A/H1N1 and A/H3N2 in Hong Kong and Countries in the North Temperate Zone.* Int. J. Infect. Dis., 66: 42. DOI: https://doi.org/10.1016/j.ijid.2017.11.006

5. Chiu A, **Lin Q** and He D.(2017) *News Trends and Web Search Query of HIV/AIDS in Hong Kong.* PLOS ONE., 12(9): e0185004. DOI: https://doi.org/10.1371/journal.pone.0185004

4. Yu D*, **Lin Q***, Chiu A, and He D.(2017) *Effects of Reactive Social Distancing on the 1918 Influenza Pandemic.* PLOS ONE., 12(7):e0180545. (* equally contributed) DOI: https://doi.org/10.1371/journal.pone.0180545

3. He D, Chiu A, **Lin Q**, Yu D.(2017) *Spatio-temporal patterns of proportions of influenza B cases.* Sci. Rep., 7: 40085. DOI: https://doi.org/10.1038/srep40085

2. **Lin Q**, Lin Z, Chiu A and He D.(2016) *Seasonality of Influenza A(H7N9) Virus in China - Fitting Simple Epidemic Models to Human Cases.* PLOS ONE, 11(3): e0151333. DOI: https://doi.org/10.1371/journal.pone.0151333

1. He D, Chiu A, **Lin Q**, and Cowling B.(2016) *Differences in the seasonality of MERS-CoV and influenza in the Middle East.* Int. J. Infect. Dis., 40: 15–16. DOI: https://doi.org/10.1016/j.ijid.2015.09.012

Not peer reviewed

1. King AA, **Lin Q**, Ionides EL. (2020) *The Sampled Moran Genealogy Process.* arxiv: https://arxiv.org/abs/2002.11184

TEACHING

13th Annual Summer Institute in Statistics and Modeling in Infectious Diseases *Jul 2021*
Teaching Assistant
- Module 7: Simulation-Based Inference for Epidemiological Dynamics

University of Michigan, Ann Arbor, United States *May 2021–Jun 2021*
Instructor at Dept. of Mathematics
- MATH/STAT 425: Introduction to Probability

Hong Kong Polytechnic University, Hong Kong *Nov 2015–Jan 2018*
Teaching Assistant at Dept. of Applied Mathematics
- AMA1110: Basic Mathematics I - Calculus and Probability & Statistics
- AMA1130: Calculus for Engineers

RESEARCH EXPERIENCE

University of Michigan, Ann Arbor, United States *Sept 2018–Feb 2019*
Visiting Scholar at Dept. of Ecology and Evolutionary of Biology
- Advisor: Prof. Aaron A. King
- Project: *Inference for Genealogies and Time Series*

Student in "Introduction to Bioinformatics & Computational Biology" (BIOINF 527)
- Instructor: Dr. Stephen Guest
- Project: *Differential Expression in Single-cell RNA-Seq of Psoriasis*

Esquel Group, Hong Kong *Mar 2018–Sept 2018*
Research Assistant
- Project: Prediction of Fabric Grade Rate

- Applied penalized linear regression to predict fabric grade rate
- Achieved automatic interaction between SQL and R
- Led to a saving of cost of 2.2 million RMB (about 0.3 million USD) annually

Avalon Genomics, Ltd., Hong Kong *Feb 2017–Jan 2018*
Research Assistant
- Project: Population-Wide Genetic Risk Prediction of Complex Disease
- Mathematical modeling, data analysis and data visualization

AIDS Concern (NGO), Hong Kong *Jan 2017–Jan 2018*
Research Assistant
- Project: Cost-effectiveness Modelling of Pre-exposure Prophylaxis for HIV Prevention among MSM in Hong Kong
- Web Application: HIV epidemics in Hong Kong and other Chinese populations

SupStat Inc., Beijing & New York *Jun 2014–Jun 2015*
Data Scientist
- Built mathematical models and implemented statistical methods to categorize the activity of clients for China Telecom, Hubei.
- Produced online course-wares for R, Python, Data Mining and Machine Learning for NYC Data Science Academy

Dept. of Political Science, MIT, United States *Mar 2014–Apr 2014*
Part-time Research Assistant
- Advisor: Dr. Yiqing Xu (Now Assistant Professor at Stanford)
- Project: Sources of Authoritarian Responsiveness: A Field Experiment in China
- Collected data from official websites of district government and implemented data cleaning

PRESENTATION

Department of Mathematics and Statistical Science, University of Idaho *March 2022*
Moscow, United States
Topic: A unified approach to phylodynamics

Society of Mathamtical Biology Annual Meeting 2021 *Jun 2021*
Virtual
Topic: Viral Phylodynamics and A Class of Markov Genealogy Processes.

Michigan Institute for Data Science, University of Michigan, Ann Arbor *Mar 2020*
Ann Arbor, United States
Topic: COVID-19 Outbreak in Wuhan, China: in Retrospect and In Prospect.

Center for Tuberculosis Research, Johns Hopkins University *Dec 2018*
Baltimore, United States
Topic: Heterogeneities in epidemiology of TB and drug-resistant TB in Shandong Province, China

Society of Mathamtical Biology Annual Meeting 2018 *Jul 2018*
Sydney, Australia
Topic: Modeling the spread of Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

International Conference on Big Data and Information Analytics 2016 *Oct 2016*
Changsha, China
Topic: Modeling the spread of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in Saudi Arabia

SERVICES

Journal article review: American Journal of Preventive Medicine, Bioinformatics, Bulletin of Mathematical Biology, Chaos, Solitons & Fractals, Computer Methods and Programs in Biomedicine, Frontiers Digital Health, Infectious Diseases of Poverty, International Journal of Infectious Diseases, Mathematical Biosciences and Engineering, Nature Communications, PLOS Computational Biology, PLOS ONE, Scientific Reports, Transboundary and Emeging Diseases.

Departmental service: Judge for Sport Data Madness Challenge, Junior reviewer for Microsoft Azure credits proposal, Interviewee for Women in Science and Engineering Residence Program (WISE RP), Abstract reviewer and poster reviewer for U-M Data Science Annual Symposium 2020.

PROFESSIONAL AFFILIATIONS

Member, Institute of Mathematical Statistics 2020–2021
Student Member, Society for Industrial and Applied Mathematics 2018
Student Member, Society of Mathematical Biology 2018