Jiaqi Chen
Hong Kong
Master of Science

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Education

•PhD - Infectious disease modeling & AI for health *2025 - 2028 (expected)*
The University of Hong Kong (HKU) - Hong Kong Supervisor :Sheikh Taslim Ali and Ben Cowling

•M.Sc - System Science (Research focus: Infectious Disease Modeling) *2021 - 2024*
University of Shanghai for Science and Technology - Shanghai (China) Outstanding Graduates (TOP 1%)

•B.Eng. - Information Systems and Technology *2017 - 2021*
Shandong Technology and Business University - Shandong (China) Honours Degree

PUBLICATIONS AND WORKS IN PROGRESS

•[2023] Competition of SARS-CoV-2 Variants on the Pandemic Transmission Dynamics
First author *[Accepted and Published, Chaos, Solitons and Fractals, IF=* ***9.9****, Citation:* ***30****, rank* ***1/81****, Mathematical Physics]*

- Mathematical modeling and quantification of competition among COVID-19 variants.
- A comparison of our model's predictions with traditional deep learning time series approaches shows significant improvements.
- Technology Used: Python, Mathematical modeling (ODE based), deep learning.

•[2024] Unraveling the impact of non-pharmaceutical interventions on pathogen mutation
First author *[Under Submitted, Nature communications, IF=****16.6****, rank* ***8/135****, Multidisciplinary Sciences]*

- Develop a new Bayesian machine learning framework to examine the impact of macroscopic policies on microscopic pathogen dynamics.
- Technology Used : Mathematical modeling (ODE and statistics), R, Python, Linux, Bayesian inference, Machine learning, Bootstrap.

•[2023] Modeling and analysis of COVID-19 spreading dynamics based on complex network theory
*Other author [Submitted to journal, Europhysics Letters, IF=****1.8****, rank* ***49/110****, Phsics, multidisciplinary]*

- Review of Network Modeling for COVID-19.
- Technology Used: Python, Mathematical modeling (Network based)

Personal Projects

•Immunological Drivers Reshapes Transmission Trajectories of Pandemic Co-Circulation
Unravel how population immunity and viral co-circulation influence each other to predict future pandemics and viral evolution.

- Integrating serological, genetic, and syndromic surveillance data, and human behaviour data (mobility data/NPIs data.
- Unraveling how population immunity and viral co-circulation mutually shape each other,—for example, how co-circulation modifies immunity and how immunity, in turn, shapes co-circulation—to help predict future pandemics and viral evolution.
- Technology Used : Semi-mechanistic model, Bayesian machine learning, pymc3, numpyro, stan, ODE model, statistical model, github.

•Inferring the population immunity to influenza in Hong Kong from 2010 to 2025
Estimate population immunity by incorporating multiple immunological components.

- Model the effects of various types of immunity, including natural immunity, cross-immunity, and vaccine-induced immunity.
- Estimate the population immunity curve from 2010 to 2025 and forecast future population immunity.
- Technology Used: Pymc3, Stan, No-U-Turn Sampler, Deep learning.

•Inferring the true epidemic curve
Infer the true epidemic curves of COVID-19 and influenza in Hong Kong.

- Inferring onset delay using social media data (Google Trends).
- Reconstructing the true epidemic curve.
- Technology Used: EpiNow2, Bayesian statistics, MCMC.

•Interactive platform for infectious disease modeling

An interactive system for beginners or non-professionals to simulate using simple models.

- Model your own ODE (Ordinary Differential Equation) model.
- Simulate and predict pandemic trends (no programming required).
- Technology Used: Python, Bootstrap, MCMC.

•Evaluate the effectiveness of NPIs on pandemics

Evaluate the effectiveness of various NPIs based on real-world datasets.

- Evaluate NPI effectiveness based on high-dimensional data.
- Evaluate the impact of social, economic, and environmental data on pandemics.
- Technology Used : Pymc3, NumPyro, Jax, Rstan, Python, Linux, Bayesian inference, Machine learning, Bootstrap.

•AI-based model for simulating the complex transmission of diseases in the real world.

AI-based model for simulating complex social interactions and disease spread.

- Each node is an AI node (intelligent node) that can follow complex real-world rules.
- Technology Used: Deep learning, reinforcement learning, Python, API

Research Experience

•Senior Research Assistant at the University of Hong Kong *Jul 2024 - Ongoing*

Big Data Center, Faculty of Medicine (Prof. Ben Cowling)

- Modeling and quantifying the interactions between influenza and COVID-19.
- Evaluating and quantifying the impact of NPIs on pandemic transmission dynamics.

•Summer research at Kyoto University *Jul - Aug 2024*

School of Medicine (Prof. Hiroshi Nishiura)

- Employing mathematical modeling to evaluate the epidemiological burden of measles in various regions of Pakistan.

•Research Assistant at Fudan university *Jul - Dec 2023*

Faculty of Medicine (Prof. Hongjie Yu)

- Using Python as the main interface with the Stan language for simulating and predicting public health data.
- Using the JAX framework to process high-dimensional data, including genomic, policy, and epidemiological data.

•Research Associate and Teaching Assistant at East China Normal University *Dec 2021 - Jun 2023*

School of Physics and Electronic Science (Focus on Complex Networks and Disease Transmission)

- Modeling the interaction mechanisms among COVID-19 variants
- Assisting in the supervision of undergraduate thesis projects
- Guiding master's students in research competitions.

Awards

•Outstanding College Students in Shanghai (TOP 1%) *Oct 2023*

•National scholarship (TOP 1%) *Sep 2023*

•Second Stage Academic Scholarship *May 2023*

•Research Scholarship *Mar 2023*

•Featured on the official website of University of Shanghai for Science and Technology *Feb 2023*

- Featured on the **official website**, as well as the official and departmental **social media platforms** of University of Shanghai for Science and Technology, for the publication of a high-quality research paper.

•Outstanding Research Team of University of Shanghai for Science and Technology *Dec 2022*

•First Stage Academic Scholarship *Oct 2022*

Skills and Interests

Mathematical / Statistical modeling: ODE model, Network model, Agent based model, Stochastic Models, Bayesian statistics
Theoretical analysis: Basic/effective reproduction number, (disease-free) equilibrium, phase transition point
Languages: C, R, Stan, Python, Linux, Javascript, HTML+CSS
Meachine learning: Deep learning, Reinforcement learning, Bayesian inference
Tools: Pycharm, R studio, Jupyter notebook, VScode, Git, Github
Cloud/Databases: Database (mySql)
Relevent Coursework: Data Structures & Algorithms, Operating Systems, Object Oriented Programming, Database Management System, Software Engineering.
Areas of Interest: Infectious Disease Modeling, Bayesian Statistics, Meachine Learning
Soft Skills: Problem Solving, Self-learning, Presentation, Adaptability, Communication Skills, Collaboration Skills.