CHENG CHENG

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Education

University of Malaya Mar. 2024 - Present
Master of Science in Mathematics and Statistics *Kuala Lumpur, Malaysia*

- Data-driven modeling and analysis of infectious diseases
- **Research Interests:** Computational Epidemiology, Deep Learning, Bayesian Inference

Yuncheng University Sep. 2019 - May. 2023
Bachelor of Science in Mathematics and Applied Mathematics *Yuncheng City, China*

- **Relevant Coursework:** Mathematical Modeling (97%)Mathematical Analysis II(93%) Advanced Algebra(91%)

Projects

Dynamics-Informed Neural Networks (DINNs) for COVID-19 Forecasting Dec. 2023 – Jan. 2025

- Integrated a SEIRV compartmental model into a deep neural network, enforcing both data fit and ODE residuals.
- Learned time-varying transmission rate $\beta(t)$ and vaccination rate $\epsilon(t)$, and quantified prediction uncertainty via an ensemble of models.

Enhancing Cardiac Electrophysiology Modeling: Arrhythmia Prediction & Drug Safety Feb 2025 – Present

- Developed a parallel computing framework for large-scale parameter sweeps on a rabbit ventricular action potential model.
- Incorporated ion-channel block dynamics to assess anti-arrhythmic drug safety and improved model accuracy in predicting proarrhythmic risk.

Publications

Cheng Cheng, Elayaraja Aruchunan, Muhamad Hifzhudin Noor Aziz*. (2025). Leveraging dynamics informed neural networks for predictive modeling of COVID-19 spread: A hybrid SEIRV-DNNs approach. *Scientific Reports*, *15*(1), 2043. doi: 10.1038/s41598-025-85440-1

Chunjuan Zhu†, **Cheng Cheng†**, Jing Guo, Xiaomei Feng*, Qiang Sun*. (2025). Retrospective analysis of estimated serial interval and reproductive number of SARS-CoV-2 Omicron variant in Korea. *Advances in Continuous and Discrete Models*, *2025*(1), 43. doi: 10.1186/s13662-025-03906-y

Cong Pang, **Cheng Cheng***, Zhejun Liu, Wenbin Huang, Yong Jiang, Tao Wu, Yuhong Li. (2023). Prediction of world temperature based on PSO optimized LSTM neural network. In *Proceedings of the IEEE 3rd International Conference on Information Technology, Big Data and Artificial Intelligence (ICIBA)*, Vol. 3, pp. 125–130. IEEE. doi: 10.1109/ICIBA56860.2023.10165253

Pang Cong, Ding Wei, **Cheng Cheng**, Wu Tao, Jiang Yong, Ma WuGang*, Liao ChengWang. (2022). Research on seismic discrimination based on particle swarm optimization generalized regression neural network and HHT sample entropy. *Progress in Geophysics*, *37*(4), 1457–1463. doi: 10.6038/pg2022FF0438

PANG Cong, WANG Lei, MA WuGang*, **Cheng Cheng**, JIANG Yong, WU Tao, LIAO Chengwang. (2022). Decision-making platform for mine microseismic monitoring network layout plan based on TOPSIS and ZedGraph graphic controls. *Journal of Shaoyang University (Natural Science Edition)*, *03*, 1–8. shorturl.at/Rnc97

Rui Hu†, **Cheng Cheng†**, Elayaraja Aruchunan*. Application of a media influence integrated physics-informed neural networks based SEIHR model for COVID-19 dynamics in Malaysia. *Ain Shams Engineering Journal (under review)*.

Rui Hu, Elayaraja Aruchunan*, Muhamad Hifzhudin Noor Aziz, **Cheng Cheng**, Benchawan Wiwatanapataphee. Dynamic analysis and optimal control of a fractional-order epidemic model with nucleic acid detection and individual protective awareness: A Malaysian case study. *AIMS Mathematics (under review)*.

Cheng Cheng, Rui Hu, Xiaomei Feng*. Modeling dengue transmission dynamics in Guangdong Province: A mosquito-mediated model with population mobility. *working paper*.

Awards

University of Malaya Scholarship	02/2025
Nomination for the Mathematical Modeling Competition in Shanxi Province	04/2022
National Third Prize in the National Student Market Research and Analysis Competition	05/2022
National Second Prize in the National Student Mathematical Modeling Competition	11/2021

Internships

Research Volunteer Dec 2024 – Present
Mosquito-Borne Diseases in the Americas *Computational Epidemiology DVRN*

Research Assistant Feb 2025 – Present
Enhancing cardiac electrophysiology model: Improving arrhythmia prediction and drug safety evaluation *University of Malaya*

Skills

Software: Python, Matlab, R, Latex
Language: Chinese(native), English(fluent)