Zixuan Zhou (Shelly)

zzhoubh@connect.ust.hk | Google Scholar | LinkedIn | Homepage

Summary

I am a climate and energy systems researcher specializing in the nexus between climate change and renewable energy infrastructure. I utilize high-resolution regional climate modeling to quantify impacts of compound extremes (heat-drought events) on power supply and demand. Using advanced computational methods, my work contributes to developing adaptation strategies of renewable energy systems under climate change.

Education

The Hong Kong University of Science and Technology *Sep 2022-Jun 2026 (Expected)*

PhD in Environmental Science, Policy, and Management – CGA: 4.3/4.3

- Supervisor: Professor Eun-Soon Im, Co-Supervisor: Professor Xiaoming Shi
- Awarded Fund: Hong Kong PhD Fellowship Scheme (Top 300 Among All Hong Kong Postgraduates)

The Hong Kong University of Science and Technology *Sep 2018-Jun 2022*

BSc in Environmental Management and Technology – CGA: 3.94/4.3

Minor in Business Management & Minor in Information Technology

- Achievements: First Class Honor, Academic Achievement Medal (University Top 1% Graduates)

Skills

- **Modeling Skills**: Weather Research and Forecasting Model (WRF, Advanced), Regional Climate Model (RegCM, Advanced)
- **Programming Languages**: Python (Advanced); MATLAB, C++ (Intermediate); R, Stata (Basic)
- **Languages**: Mandarin (Native), English (Proficient, TOEFL 111/120), Cantonese (Intermediate)
- **Graphic Design**: Canva (Advanced)

Awards

HKUST Redbird Academic Excellence Award for Continuing PhD Students 2024-2025	*Apr 2025*
HKUST Redbird Academic Excellence Award for Continuing PhD Students 2023-2024	*Apr 2024*
Outstanding Student Presentation Award (OSPA) at AGU23	*Apr 2024*
Hong Kong PhD Fellowship Scheme	*Sep 2022*
HKUST Redbird Recruitment Award for New PhD Students	*Sep 2022*

Publications (*Equal Contributions)

1. **Zhou, Z.**, Zhang, L., & Im, E.-S. Vulnerability of Urban Agglomerations' Power System to Hot Extremes Under Different Shared Socioeconomic Pathways. In preparation for submission to ***npj Urban Sustainability***.
2. Nguyen-Xuan, T., **Zhou, Z.**, Nguyen-Duy, T., Nguyen-Le, D., & Ngo-Duc, T. Optimizing Configurations for the Regional Climate Model (RegCM5) Using a Micro-GA Approach: A Case Study over Vietnam. Under review at ***Scientific Online Letters on the Atmosphere (SOLA)***.
3. **Zhou, Z.***, Yoon, J. W., Nguyen-Xuan, T.*, Hur, J., Park, S. K., & Im, E.-S. Coupling a micro-genetic algorithm with RegCM5 for improving extreme precipitation simulations over Southeast Asia. Under review at ***Environmental***

Modeling and Software.

4. He, Y.*, **Zhou, Z.***, Im, E.-S., & Kwon, H.-H. (2025). Wildfire risk in a changing climate: Evaluating fire weather indices and their global patterns with CMIP6 multi-model projections. ***Weather and Climate Extremes***, 48, 100751. [Link]
5. Wang, W.*, **Zhou, Z.***, & Lu, Z. (2022). Data-driven assessment of room air conditioner efficiency for saving energy. ***Journal of Cleaner Production***, 338, 130615. [Link]
6. Ha, S., **Zhou, Z.**, Im, E.-S., & Lee, Y.-M. (2023). Comparative assessment of future solar power potential based on CMIP5 and CMIP6 multi-model ensembles. ***Renewable Energy***, 206, 324–335. [Link]
7. Qiu, L., Zhu, Z., **Zhou, Z.**, Im, E.-S., Min, S.-K., Kim, Y.-H., Kim, Y., Cha, D.-H., Ahn, J.-B., & Byun, Y.-H. (2024). Amplification of the discrepancy between simplified and physics-based wet-bulb globe temperatures in a warmer climate. ***Weather and Climate Extremes***, 44, 100677. [Link]
8. Wang, W.*, **Zhou, Z.***, Derrible, S., Song, Y., & Lu, Z. (2024). Deep learning analysis of smart meter data from a small sample of room air conditioners facilitates routine assessment of their operational efficiency. ***Energy and AI***, 16, 100338. [Link]
9. **Zhou, Z.***, Nguyen-Xuan, T.*, Liao, H., Qiu, L., & Im, E.-S. (2024). Characterization of temperature and humidity effects on extreme heat stress under global warming and urban growth in the Pearl and Yangtze River Deltas of China. ***Weather and Climate Extremes***, 44, 100659. [Link]
10. **Zhou, Z.***, Kim, Y.*, Im, E., & Kwon, H. (2024). Impact of Anthropogenic Warming on Future Unprecedented Droughts in California: Insights From Multiple Indices and Multi-Model Projections. ***Earth's Future***, 12(1), e2023EF003856. [Link]

Conference Presentations

1. **Zhou, Z.** et al. Added Value of High-Resolution Climate Data in Assessing Energy Vulnerability to Compound Hot-Dry Extremes. *(Upcoming Poster Presentation in **Energy Summer School: Navigating the Energy Transition in an Insecure World, Ascona, Switzerland**).*
2. **Zhou, Z.** et al. Do Convection-Permitting Simulations Offer Added Value in Assessing Energy Vulnerability to Compound Hot-Dry Extremes? *(Upcoming Poster Presentation in **Swiss Climate Summer School 2025: Sustainable Pathways to Net Zero, Ascona, Switzerland**).*
3. **Zhou, Z.** et al. Added Value of High-resolution Climate Simulations in Estimating the Impact of Hot Extremes on Power Demand. *(Poster Presentation in **AOGS 2025**).*
4. **Zhou, Z.** et al. Combinatorial Optimization of Cumulus Convection Scheme Parameters in RegCM5 Using a Micro-Genetic Algorithm for Extreme Precipitation Event Simulations in Southeast Asia. *(Poster Presentation in **EGU 2025**).* [Link]
5. **Zhou, Z** et al. Impacts of Hot Extremes on Power Demand in Highly Urbanized Areas Measured by Convection-Permitting Projections. *(Poster Presentation in **AGU 2024**).* [Link]
6. **Zhou, Z.** et al. Impacts of Concurrent Hot and Dry Extremes on Hydropower Demand and Supply in the Pearl River Delta Realized by Convection-permitting Projections. *(Poster Presentation in **AOGS 2024**).*
7. **Zhou, Z.** et al. Changes in concurrent hot and dry extremes based on convection-permitting projections under the SSP5-8.5 scenario. *(Oral Presentation in **EGU 2024**).* [Link]
8. **Zhou, Z.** et al. Combinatorial optimization of dynamics and physics in RegCM5 using a micro-genetic algorithm for precipitation and temperature simulations in Southeastern China. *(Poster Presentation in **EGU 2024**).* [Link]
9. **Zhou, Z.** et al. Changes in Hot and Dry Extremes Based on Convection-Permitting Projections Under the SSP5-8.5 Scenario. *(Poster presentation in **AGU 2023**)* [Link]
10. **Zhou, Z.** et al. Comparative Assessment of the Time-Varying Return Period of Severe Droughts Based on Multiple Climate Projections with Different Warming Sensitivity. *(Poster presentation in **AMS 2023**)*

Professional Experience & Leadership

Reviewer for Journal of Cleaner Production *May 2025*

- Reviewed manuscripts and provided feedbacks.

Divisional Teaching Assistant Coordinator, Hong Kong University of Science and Technology *Sep 2024-Present*

- Led student professional development/networking programs and recreational activities.
- Authored Teaching Assistant Handbooks and procedural guidelines for operational standards.

Course Teaching Assistant, Hong Kong University of Science and Technology *Sep 2022-Present*

- Global Warming and Air Pollution Meteorology (with Instructor Prof. Eun-Soon Im)
- Corporate Environmental Strategy (with Instructor Prof. Quentin Moreau)
- Climate Change Impacts and Extreme Weather Events (with Instructor Prof. Eun-Soon Im)
- Climate Modeling and Risk Assessment (with Instructor Prof. Eun-Soon Im)
- Postgraduate Seminar (with Instructor Prof. Fei Chen)