Zhiyi Zhu

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Summary

My research interest lies in Geo-Informatics, encompassing three interconnected fields: Reproducibility, Geostatistics, and Geographical Modeling and Simulation. Over the last few years, I have refined and enriched the concept of reproducibility in geo-simulation experiments (GSEs) to address scientific challenges. This includes enhancing information sharing among researchers to promote research's reproducibility, evaluating reproducibility using both qualitative index analysis and quantitative statistical methods to increase the reliability of GSEs, and creating practical tools that allow scholars to investigate domain knowledge in GeoScience, building on the specific expertise of previous research.

- Assistant editor, *Environmental Modelling & Software* | 2023 – Present
- Committee, *Open Modeling Foundation Early Career Scholars* | 2022 – Present

Education

Nanjing Normal University 09/2019 – Present
Ph.D. candidate in GIScience | Supervisor: Prof. Dr. Min Chen (OpenGMS group) *Nanjing, China*

Nanjing University of Information Science and Technology 09/2015 – 06/2019
B.S in GIScience (awarded National Scholarship and President's Scholarship) *Nanjing, China*

Research Interests

Reproducibility; FAIR; Model sharing and reuse; Workflow management; Geostatistics; Geographical modeling and simulation

Research Outputs

Citation metrics (as Aug 2024, statistics by Google Scholar)
Citations: 174; h-index: 7; i10-index: 7

Publications (Note: "#" indicates equal contribution, "*" indicates correspondence)

9. **Zhu, Z.**, Chen, M.*, Sun, L., Qian, Z., He, Y., Ma, Z., Zhang, F., Wen, Y., Yue, S., and LLv, G. (2023). Reproducing computational processes in service-based geo-simulation experiments. *International Journal of Applied Earth Observation and Geoinformation*, 124 (2023) 103520. (IF 7.6, JCR Q1) [DOI]
8. **Zhu, Z.**, Chen, M.*, Qian, Z., Li, H., Wu, K., Ma, Z., Wen, Y., Yue, S., and Lv, G., 2023. Documentation strategy for facilitating the reproducibility of geo-simulation experiments. *Environmental Modelling & Software*, 163, 105687. (IF 4.8, JCR Q1) [DOI]
7. Chen, M. # *, Qian, Z. #, Boers, N., Jakeman, A.J., Kettner, A.J., Brandt, M., Kwan, M.P., Batty, M., Li, W., Zhu, R., Luo, W., Ames, D.P., Barton, M.C., Cuddy, S.M., Koirala, S., Zhang, F., Ratti, C., Liu, J., Zhong, T., Liu, J., Wen, Y., Yue, S., **Zhu, Z.**, Zhang, Z., Sun, Z., Lin, J., Ma, Z., He, Y., Xu, K., Zhang, C., Lin, H., and Lv, G. *, 2023. Iterative integration of deep learning in hybrid Earth surface system modelling. *Nature Reviews Earth & Environment*, 4(8), 568-581. (IF 49.7, JCR Q1) [DOI]
6. Ma, Z., Chen, M.*, Zheng, Z., Yue, S., **Zhu, Z.**, Zhang, B., Wang, J., Zhang, F., Wen, Y., and Lv, G. 2022. Customizable process design for collaborative geographic analysis. *GIScience & Remote Sensing*, 59(1), 914–935. (IF 6.0, JCR Q1) [DOI]
5. Huang, R.*, Malik, A., Lenzen, M., Jin, Y., Wang, Y., Faturay, F., and **Zhu, Z.**. 2022. Supply-chain impacts of Sichuan earthquake: a case study using disaster input–output analysis. *Natural Hazards*, 110(3), 2227–2248. (IF 3.3, JCR Q1) [DOI]
4. Chen, M., Lv, G., Zhou, C., Lin, H., Ma, Z., Yue, S., Wen, Y., Zhang, F., Wang, J., **Zhu, Z.**, Xu K. and He Y. 2021. Geographic modeling and simulation systems for geographic research in the new era: Some thoughts on their development and construction. *Science China Earth Sciences*, 64(8), 1207–1223. (IF 6.0, JCR Q1) [DOI]
3. Chen, M.*, **Zhu, Z.**, Yue, S., Wang, Z., and Ma, Z. 2021. An action-based conceptual framework for the reproduction of geographic simulation processes[C]//AGU Fall Meeting Abstracts.2021: IN55E-0286.
2. Huang, R., Lv, G.*, Chen, M., and **Zhu, Z.**. 2019. CO2 emissions embodied in trade: Evidence for Hong Kong SAR. *Journal of Cleaner Production*, 239, 117918. (IF 9.7, JCR Q1) [DOI]
1. Ma, Z., Chen, M.*, Yue, S., Zhang, B., **Zhu, Z.**, Wen, Y., Lv, G., and Lu, M. 2019. Activity-based process construction for participatory geo-analysis. *GIScience & Remote Sensing*, 58(2), 180–198. (IF 6.0, JCR Q1) [DOI]

Working papers (Note: "*" indicates correspondence)

4. **Zhu, Z.**, Chen M.*, Ren G., He Y., Qian Z., Sun L., Wen Y., Yue S., Lv G. A framework for assessing the computational reproducibility of geo-simulation experiments. Reliability Engineering & System Safety. Submitted
3. He Y., Wen Y.*, Tao R., **Zhu, Z.**, Li W., Zhang J., Yue S., Duan Q., Lv G., Chen M.*. Advancing river flood forecasting with a collaborative integrated modeling method. Journal of Environmental Management. Submitted
2. **Zhu, Z.**, Chen, M.,···. Reproducibility probability in GeoScience. Preparing
1. **Zhu, Z.**, Ma, P.,···. DocumentBot: using Large Language Model to promote reproducibility of geo-simulation experiments. Preparing

Patents (Note: "*" indicates sponsor)

7. Chen, M.* **Zhu, Z.**, Yue, S., Wen, Y.. 2021. A recording method for the reproduction-oriented geographic simulation scenario. *Invention patent* | Publication CN113608988A
6. Wang, X.* **Zhu, Z.**, Li, J., Du, X.. 2018. An anti-mask system and method based on Beidou. *Patent for Invention* | Issuance CN107028251B
5. Wang, X.* **Zhu, Z.**, Du, X. Li, J.,. 2017. A mask system and mask based on Beidou. *Patent for Utility Model* | Issuance ZL201720540454.7
4. **Zhu, Z.**, Li M., Zhang, S, Yue, S.*. 2020. Interactive Online Data Scraping System. *Computer Software Copyright* 2020SR0819364
3. **Zhu, Z.**, Zhang. S, Li, M., Chen, M.*. 2020.Multi-user Collaboration Tool Integration System. *Computer Software Copyright* 2020SR0817671
2. Wang, Z. **Zhu, Z.**, Li, M., Chen, M.*. 2020. Collaboration and Communication System Based on a Hydrological Conceptual Library. *Computer Software Copyright* 2020SR0817664
1. Zhang, S. Wang, Z., **Zhu, Z.**, Yue, S.*. 2020. Geographical Model Integrated Operating System. *Computer Software Copyright* 2020SR0817842

Research projects

Study on reproducibility method for geographic simulation reproducibility method for geographic simulation | National Natural Science Foundation of China (General Program) — 2021 – Present
Core member

Reproducible method for computational processes of GSEs | — 2022 – 2023
Provincial Research and Practice Innovation Program
Principal investigator — Funding amount: 15k ¥

Smart "cloud" mask systems | — 2018 – 2019
Provincial Research and Practice Innovation Program
Principal investigator — Funding amount: 1k ¥

Intelligent anti-haze monitoring system based on Beidou | — 2017 – 2018
National College Students Internet of Things Technology and Application Program
Principal investigator — Funding amount: 5k ¥

A mathematical model for evaluating public environmental awareness | — 2017 – 2018
Provincial Research and Practice Innovation Program
Principal investigator — Funding amount: 3k ¥

Selected Awards & Honors

Awards

Excellent Paper Award of The 2nd Workshop of Asian Young Geographers	2022
Provincial Outstanding Graduates	2018
Provincial Excellent Student Cadre for Undergraduates	2018
Person of the year in NUIST	2018

Scholarships

First Prize Scholarship in University for Postgraduates | Ranked Top 10%	2019, 2020, 2021, 2022
Second Prize Scholarship in University for Postgraduates | Ranked Top 20%	2023
President's Scholarship for Postgraduates | Ranked Top 0.1%	2017

National Scholarship for Undergraduates | Ranked Top 0.1% 2017
First Prize Scholarship in University for Undergraduates | Ranked Top 0.1% 2016, 2017, 2018

Contests

Meritorious Winner in COMAP's Mathematical Modeling Contest | Team leader 2018
Second Prize in National GIS Application Skills Contest | Team leader 2018
First Prize in the 3rd National College Students Internet of Things Technology and Application Competition | Team leader 2017
Second Prize in The 7th Network Driginality Competition | Team leader 2017
Third Prize in National Graduate Mathematical Modeling Contest | Team leader 2017

Academic Presentations

EGU Fall Meeting 04/2024
Title: Reference description for recording a geographic simulation-based experiment *Vienna*

The Ninth Conference on Virtual Geographic Environment 08/2023
Title: Research on the reproducible method of the calculation process of the geographic simulation experiment based on service *Yanji*

The 2nd Workshop of Asian Young Geographers 12/2022
Title: Reproducing computational processes in service-based geo-simulation experiments *Online*

The 10th National Geographic Information Science Doctoral Student Forum 12/2022
Title: Research on reproducible methods of activity-based geographic simulation *Online*

The 2022 Annual Conference of Geographical Model and Geographic Information Analysis Committee of the Geographical Society of China 09/2022
Title: Research on reproducible methods of activity-based geographic simulation *Nanjing*

24th International Congress on Modelling and Simulation 07/2022
Title: An approach for reproducing geographic simulation research with consideration of pre-and intermediate procedures *Online*

AGU Fall meeting 12/2021
Title: An action-based conceptual framework for the reproduction of geographic simulation processes *Online*

Areas of Expertise & Skills

Resource Engineering
Metadata standards; Model service; Model encapsulation; Model integration; Workflows management; Data Management

Geostatistics
Statistical modeling and analysis

Computing & Programming
Python; Java, HTML/CSS; Javascript; Development framework (Vue3, Springboot); DevOps (Docker); LATEX