Lele Shu

PhD of Water Resources Engineering and Computational Science
320 Donggang West Rd
Lanzhou, Gansu 730000, China

https://www.shud.xyz
shulele@lzb.ac.cn

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About Me Dr. Shu is a Researcher at Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, and a joint-professor of Lanzhou University. His major interests are numerical hydrologic model, coupled Land-Hydrology modeling and hydrologic data mining.

Research Interests

Numerical methods on geosciences;

Hydrological response under stress of climate and landuse change from watershed to continental scale;

Coupled Land-Hydrological Models;

Spatial heterogeneity and homogeneity in runoff, evaporation, subsurface fluxes and in their sensitivity to their controls (e.g. snow fall regime, aridity, reaction c oefficients);

High-performance/parallel computing in hydrologic models;

Coupled Nature-Human system modeling.

Professional Preparation

2012-2017	Pennsylvania State University	Water Resource Engineering Computational Science (Ph.D minor)	Ph.D.
2006-2009	University of Chinese Academy of Sciences	Geography Information System	M.S.
2001-2005	Lanzhou University	Geography Information System	B.S.

Appointments

2025 -	**Professor**	**Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences**	**Lanzhou, Gansu, China**
2025 -	**Joint Professor**	**Lanzhou University**	**Lanzhou, Gansu, China**
2020-2025	Associate Professor	Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences	Lanzhou, Gansu, China
2017-2020	Postdoctoral	University of California, Davis	Davis, CA, USA
2012-2017	Research Assistant	Pennsylvania State University	University Park, PA, USA

Publications

Lead:

1. **舒乐乐**, 陈昊, 孟宪红, 常燕, 胡立堂, 王文科, et al. (2024). 地表-地下过程耦合的数值水文模型综述. 中国科学：地球科学, 67. https://doi.org/10.1360/SSTe-2022-0420
2. **舒乐乐**, 常燕, 王建, 陈昊, 李照国, 赵林, & 孟宪红. (2022). SHUD数值方法分布式水文模型介绍. 地球科学进展, 37(7), 680–691. https://doi.org/10.11867/j.issn.1001-8166.2022.025
3. **舒乐乐**, 南卓铜, 基于类Twitter服务的低成本近实时野外监测数据获取系统, 冰川冻土, 2010, 32(5): 976-981
4. **Shu, L.**, Ullrich, P. A., & Duffy, C. J. (2020). Simulator for Hydrologic Unstructured Domains (SHUD v1.0): numerical modeling of watershed hydrology with the finite volume method. Geoscientific Model Development, 13(6), 2743–2762. https://doi.org/10.5194/gmd-13-2743-2020
5. **Shu, L.**, Chen, H., Meng, X., Chang, Y., Hu, L., Wang, W., et al. (2024). A review of integrated surface-subsurface numerical hydrological models. SCIENTIA SINICA Terrae. https://doi.org/10.1007/s11430-022-1312-7
6. **Shu, L.**, Ullrich, P., Meng, X., Duffy, C., Chen, H., & Li, Z. (2024). rSHUD v2.0: advancing the Simulator for Hydrologic Unstructured Domains and unstructured hydrological modeling in the R environment. Geoscientific Model Development, 17(2), 497–527. https://doi.org/10.5194/gmd-17-497-2024
7. **Shu, L.**, Li, X., Chang, Y., Meng, X., Chen, H., Qi, Y., et al. (2024). Advancing understanding of lake–watershed hydrology: a fully coupled numerical model illustrated by Qinghai Lake. Hydrology and Earth System Sciences, 28(7), 1477–1491. https://doi.org/10.5194/hess-28-1477-2024
8. **Shu, L.** (2020). Avoid stigmatizing names for 2019 novel coronavirus. Nature, 578(7795), 363–363. https://doi.org/10.1038/d41586-020-00458-x
9. **Shu, L.**, & Xu, Z. (2020). China's different shades of greening. Nature, 577(7788), 29–29. https://doi.org/10.1038/d41586-019-03940-3

Co-Authored:

10. Lin, J., Bryan, B. A., Zhou, X., Lin, P., Do, H. X., Gao, L., et al. (2023). Making China's water data accessible, usable and shareable. Nature Water, 1(4), 328–335. https://doi.org/10.1038/s44221-023-00039-y
11. Deng, M., Meng, X., Lu, Y., **Shu, L.**, Li, Z., Zhao, L., et al. (2023). Impact of climatic and vegetation dynamic change on runoff over the Three Rivers Source Region based on the Community Land Model. Climate Dynamics, 61(3–4), 1193–1208. https://doi.org/10.1007/s00382-022-06619-0
12. 谭晓晴, 罗斯琼, **舒乐乐**, 李晓旭, 王景元, 曾礼, et al. (2022). 基于机器学习的土壤温度预估研究综述. 高原气象, 41(2), 268–281. https://doi.org/10.7522/j.issn.1000-0534.2022.00024
13. Li, G., Meng, X., Blyth, E., Chen, H., **Shu, L.**, Li, Z., … Ma, Y. (2021). Impact of fully coupled hydrology-atmosphere processes on atmosphere conditions: Investigating the performance of the wrf-hydro model in the three river source region on the tibetan plateau, china. Water (Switzerland), 13(23). https://doi.org/10.3390/w13233409

14. Zhang, B., Yuan, Y., **Shu, L**., Grosholz, E., Guo, Y., Hastings, A., Cuda, J.P., Zhang, J., Zhai, L. and Qiu, J. (2021), Scaling up experimental stress responses of grass invasion to predictions of continental-level range suitability. Ecology. https://doi.org/10.1002/ecy.3417.

15. Yu, X., Xu, Z., Moraetis D., Nikolaidis N., Schwartz F., Zhang Y., **Shu L.**, Duffy C., Liu B., Capturing hotspots of fresh submarine groundwater discharge using a coupled surface–subsurface model. Journal of Hydrology. 598, 2021, https://doi.org/10.1016/j.jhydrol.2021.126356

16. Ladwig, R., Hanson P., Dugan H., Carey C., Zhang Y., **Shu, L.,** Duffy C., Cobourn, K.(2020). Disentangling the drivers of inter-annual variability in summer hypolimnetic anoxia in a eutrophic lake. Hydrology and Earth System Sciences. https://doi.org/10.5194/hess-2020-349

17. Duan, S., Ullrich, P., **Shu, L.**(2020). Using Convolutional Neural Networks for Streamflow Projection in California. Frontiers in Water. https://10.3389/frwa.2020.00028

18. Garijo, D., Khider, D., Ratnakar, V., Gil, Y., Deelman, E., da Silva, R. F., **Shu**, L., … et al. (2019). An Intelligent Interface for Integrating Climate, Hydrology, Agriculture, and Socioeconomic Models. In Proceedings of the 24th International Conference on Intelligent User Interfaces: Companion (pp. 111–112). New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/3308557.3308711

19. Yu, X., Lamačová, A., **Shu**, L., Duffy, C., Krám, P., Hruška, J., … Lin, K. (2019). Data rescue in manuscripts: a hydrological modelling study example. Hydrological Sciences Journal, 1–7. https://doi.org/10.1080/02626667.2019.1614593

20. Ward, N. K., Fitchett, L., Hart, J. A., **Shu**, L., Stachelek, J., Weng, W., … Weathers, K. C. (2019). Integrating fast and slow processes is essential for simulating human–freshwater interactions. Ambio, 48(10), 1169–1182. https://doi.org/10.1007/s13280-018-1136-6

21. Cobourn, K. M., Carey, C. C., Boyle, K. J., Duffy, C.,…, **Shu**, L., … Zhang, Y. (2018). From concept to practice to policy: modeling coupled natural and human systems in lake catchments. Ecosphere, 9(5), e02209. https://doi.org/10.1002/ecs2.2209

22. 南卓铜，舒乐乐，赵彦博，李新, 丁永建. 集成建模环境研究及其在黑河流域的初步应用. 中国科学E. 2011, 41(8): 1043—1054..

Research Projects

2024 Chinese Academy of Sciences Talent Program (Selected); 3 million CNY; PI.

2023 Chinese Academy of Sciences "West Light" Talent Plan; 2 million CNY; Co-PI.

2022 Open Fund of National Cryosphere Desert Data Center; 50 thousand CNY; PI.

2020 Chinese Academy of Sciences Talent Program; 3 million CNY; PI.

2019 Knowledge-Guided Machine Learning: A Framework to Accelerate Scientific Discovery

2018 Model Integration through Knowledge-Rich Data and Process Composition

2017 An Integrated Evaluation of the Simulated Hydroclimate System of the Continental US

2017 Advanced Statistical-Dynamical Downscaling Methods and Products for California Electrical System Climate Planning

2015 CNH-L: Linking Landuse Decision Making, Water Quality, and Lake Associations to Understand Human-Natural Feedbacks in Lake Catchments

2013 Land, Water, and Territory: A 3,000-Year Study of Niche Construction and Cultural Evolution in the Tikal National Park, Guatemala

2012 NSF Hydrologic and Water Quality Modeling for Green Infrastructure

2008 Simultaneous Remote Sensing and Ground-based Experiment in the Heihe River Basin: Scientific Objectives and Experiment Design

2008 Heihe Watershed Allied Telemetry Experimental Research (HiWATER)

2006 Land and Water Resources in Heihe River Basin Decision Support System for Sustainable Development Based on Scientific Models and Three-dimensional Gaming Experience

2006 GIS-based Hydrology and Water Resources Integrated Modeling Environment Research in Heihe River Basin