Shuo Lv

Email · Beijing, China · Homepage · GitHub · Scholar · ORCID

Education

- **Beijing Institute of Technology** — Beijing, China
  M.Eng. in Electronic Information — *Sep. 2024 – Present*
  Ranked **8/119**; received the **National Scholarship** and the Top-Tier Scholarship.
- **Southwest University** — Chongqing, China
  B.Eng. in Data Science and Big Data Technology — *Sep. 2020 – Jun. 2024*
  Ranked **2/103**; received the **National Scholarship twice**, the Gratitude to Modern Chinese Scientists Scholarship, and the Top-Tier Scholarship.

Major Courses: Machine Learning; Mathematical Modeling; Optimization; Matrix Theory; Discrete Mathematics; Big Data Applications

Selected Publications

- **Lv, S.**, Li, J., Yang, R. *et al.* Three parsimonious spatiotemporal patterns in cerebellum reveal individual traits in function and behavior. *Nat Commun* **17**, 6232 (2026).
- **Lv, S.**, Wang, Y., Guo, C. & Zhang, L. Effects of experts on the coupling dynamics of complex contagion of awareness and epidemic spreading. *Nonlinear Dyn* **112**, 2367–2380 (2024).
- Yang, R., Wu, X., **Lv, S.** *et al.* Alterations in functional brain network topography in autism revealed by normative models. *Transl Psychiatry* (accepted Oct. 2026).
- Zhu, W., Zhang, Y., Yang, R., **Lv, S.** *et al.* Atypical functional hierarchy of the human cerebellum in autism. *Manuscript under review* (Sep. 2026).
- Gao, T., Xue, M., Zheng, H., **Lv, S.** *et al.* BrainLMM: A Label-Free Framework for Mapping Multi-Semantic Representation in the Human Visual Cortex. *Proc. AAAI Conf. Artif. Intell.* **40**, 4176–4184 (2026).
- Guo, C., Wang, Y., **Lv, S.** *et al.* Impact of Sampling Disease Detection and Collective Intervention Measures in Epidemic Transmission. In *Proc. 20th Chinese Conf. on Computer Supported Cooperative Work and Social Computing (ChineseCSCW 2025)* (2025).
- Li, J., Zhang, Y., Wu, X. *et al.* Development of areal-level individualized homologous functional parcellations in youth. *Commun Biol* **8**, 1083 (2025).

Research Internship

ByteDance, Seed Foundation Model – AI4Math – *Research Intern, AI Agent Development* — *Nov. 2025 – May 2026*
Built a test-time-scaling multi-agent system on the Seed 2.0 model family for olympiad mathematics, designing Planner, Solver, and Verifier roles for strategy generation, parallel solving, proof verification, and backtracking; completed **5 iterations** over **100+ problems** and averaged **6.4/7** on an IMO problem set. Led an automated Lean 4 proof-QA workflow that produced **600+ formalized data items** and improved expert review efficiency by **70%+**. Standardized evaluation-data SOPs, delivering **2,000+ data items** and **11** production and quality specifications.

Research Experience

General-Purpose Cybersecurity Agent – *Lead Researcher* — *Jun. 2026 – Present*
Advisor: Libo Zhang, Southwest University. Built **5 specialized agents** and a **16-node bounded state machine** with LangGraph, separating LLM interpretation, planning, and reflection from explicit permissions, routing, and termination. Designed R0–R3 risk levels, Finding–Evidence validation, human approval for high-risk actions, and a two-layer state/domain blackboard for traceable decisions across code audit, penetration testing, incident response, and reverse engineering.

Low-Dimensional Spatiotemporal Dynamics of the Human Brain – *Lead Researcher* — *Dec. 2023 – Present*
Advisor: Guoyuan Yang, Beijing Institute of Technology. Applied complex principal component analysis to resting-state cerebellar fMRI and identified three dominant sparse patterns spanning zero-lag spatial structure and time-lag dynamics. Used sCCA and linear SVMs to associate individualized cerebellar activity with age, sex, cognition, and emotion, resulting in **2 articles**: a first-author *Nature Communications* article and one accepted by *Translational Psychiatry*.

Complex Social Awareness Modeling – *Lead Researcher* — *Apr. 2022 – Nov. 2024*
Advisor: Libo Zhang, Southwest University. Modeled expert influence and isolation behavior in epidemic prevention using prospect and regret theories. Random-network simulations quantified intervention benefits and revealed phase transitions in social awareness, resulting in **2 papers**: a first-author *Nonlinear Dynamics* article and a CCF Class C conference paper.

Intelligent Factory Security – *Lead Researcher* — *Apr. 2022 – Sep. 2023*
Advisor: Mingyang Zhong, Southwest University. Developed adaptive multimodal identity recognition for faces under abnormal illumination or occlusion and voices in noisy environments; used three-way decisions (accept, reject, defer) to exploit uncertainty estimates from visual and audio modalities.

Large Language Model for Early Childhood Education – *Researcher* — *Dec. 2023 – Oct. 2024*
Advisor: Libo Zhang, Southwest University. Built a personalized multimodal teaching-material generation system on vivo's BlueLM, integrating content generation, interactive dialogue, and AI-assisted drawing.

Xiangqi Game-Playing System – *Lead Developer* — *Apr. 2021 – Aug. 2021*
Advisor: Shenglin Li, Southwest University. Implemented a Java Chinese chess engine using pruned α–β search, custom search and evaluation functions, human-vs-computer play, and game-record storage.

Awards and Honors

Jun. 2023	China Robot and Artificial Intelligence Competition	**National First Prize**
Oct. 2024	China Collegiate Computing Contest – AIGC Innovation Track	**National First Prize**
Oct. 2023	Contemporary Undergraduate Mathematical Contest in Modeling	**National Second Prize**
Aug. 2022	Chinese Computer Game Championship	**National Second Prize**
Sep. 2024	China International College Students' Innovation Competition	**National Third Prize**

Academic Service

Teaching Assistant: Algorithm Design and Analysis; Introduction to Algorithms; Big Data Analytics (SWU).
Reviewer: *Nonlinear Dynamics*; *Brain Structure and Function*.