Shiqian Li

Cognitive Reasoning, AI for Science
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Education

•Peking University *Sept. 22 - Jun. 27 (expected)*
Ph.D. Student, School of Intelligence Science and Technology Advisor: **Yixin Zhu**

•University of Electronic Science and Technology of China *Sept. 18 - Jun. 22*
Bachelor of Engineering, School of Computer Science and Engineering **GPA: 3.99/4.00 Rank: 1/38**

Experience

•Research Intern at Beijing Institute for General Artificial Intelligence *Feb. 22 - Jul. 25*
Research Field: Physical reasoning. Collaborators: ***Chi Zhang*** *and* ***Prof. Songchun Zhu*** Beijing

•Research Intern at Tencent (Qingyun) *Feb. 26 - Now*
Research Field: Motion-control Video generation. Mentor: Zhiguang Liu Beijing

Projects

•AI for Intuitive Physics: Physical Reasoning and Physically Plausible Video Generation *Jan. 22 - Now*

Build human-like intelligent agents that can understand, predict, and interact with the physical world.

- Mechanism: Systematically analyze the learning mechanisms of **solving complex physical puzzles** inspired by cognitive science. A paper was accepted in NeurIPS 2022 (spotlight). Give an invited talk at VALSE.
- Benchmark: Propose the challenge of **interactive physical reasoning** and build a benchmark to explore the core principles of interactivity and bottlenecks of effective interactive agents. A paper was accepted in ICLR 2024.
- Psychology: Uncover **how humans understand and reason** in the physical world by exploring the switching of two cognitive systems in intuitive physics. The paper was accepted in CogSci 2025.
- Model: Develop physics-grounded predictive models capable of forecasting future physical states and generating **physically realistic 4D videos** that enable planning and interactive reasoning. Two papers were accepted in ICLR 2026. Training **motion-conditioned video generation foundation model** with 240 H20 GPUs on 1M videos.

•AI for Geophysics: Waveform Inversion through Physics-informed Operator Learning *Jul. 23 - Now*

Find solutions for wave propagation and structure inversion based on PINN and operator learning.

- Dataset: Build the first 3D global-scale dataset for wavefield prediction and earth structure inversion.
- Model: Train neural operators with physics-informed models to achieve forward modeling 60,000 times faster than the traditional solver. Achieve efficient inversion that is intractable in traditional FWI.
- A paper was accepted by NeurIPS 2025. Invited to AGU 2025 as an oral talk.

Selected Publications

- **Shiqian Li***, Kewen Wu*, Chi Zhang, Yixin Zhu. On the Learning Mechanisms in Physical Reasoning. **NeurIPS 2022 (spotlight)**.
- **Shiqian Li**, Kewen Wu, Chi Zhang, Yixin Zhu. I-PHYRE: Interactive Physical Reasoning. **ICLR 2024**.
- **Shiqian Li***, Yuxi Ma*, Jiajun Yan*, Bo Dai, Yujia Peng, Chi Zhang, Yixin Zhu. A simulation-heuristics dual-process model for intuitive physics, **CogSci 2025**.
- **Shiqian Li***, Zhi Li*, Zhancun Mu, Shiji Xin, Zhixiang Dai, Kuangdai Leng, Ruihua Zhang, Xiaodong Song, Yixin Zhu. GlobalTomo: A global dataset for physics-ML seismic wavefield modeling and FWI, **NeurIPS 2025**.
- **Shiqian Li***, Zhi Li*, Zhancun Mu, Shiji Xin, Zhixiang Dai, Kuangdai Leng, Ruihua Zhang, Yixin Zhu, Xiaodong Song. Towards Physics-based Machine Learning Framework of Seismic Wavefield Modeling and Full-waveform Inversion, **AGU 2025 Invited Talk**.
- **Shiqian Li***, Ruihong Shen*, Chi Zhang, Yixin Zhu. Neural Force Field: Few-shot Learning of Generalized Physical Reasoning. **ICLR 2026**.
- **Shiqian Li***, Ruihong Shen*, Junfeng Ni, Chang Pan, Chi Zhang, Yixin Zhu. Learning Physics-Grounded 4D Dynamics with Neural Gaussian Force Fields. **ICLR 2026**.

Achievements

•Featured on CCTV News and Peking University's official microblogs, 10w+ reads *2021*
•Excellent Student Award (10 / 3500) and National Scholarship (1 / 334), UESTC *2019-2021*
•Scholar Award, NeurIPS 2022 *2022*
•Excellent Intern Award, BIGAI *2023*