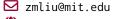
Ziming Liu



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https://kindxiaoming.github.io/



Education

2020 - present

PhD student in physics, Massachusetts Institute of Technology, MA, USA Conduct research in the intersection of artificial intelligence (AI) and physics.

2016 - 2020

B.S. in Physics, Peking University, Beijing, China

Research Publications

- Z. Liu, O. Kitouni, N. Nolte, E. J. Michaud, M. Tegmark, and M. Williams, "Towards understanding grokking: An effective theory of representation learning," *NeurIPS Oral*, 2023.
- Z. Liu, E. J. Michaud, and M. Tegmark, "Omnigrok: Grokking beyond algorithmic data," *ICLR Spotlight*, 2023.
- E. J. Michaud, Z. Liu, and M. Tegmark, "Precision machine learning," Entropy, vol. 25, no. 1, p. 175, 2023.
- 4 Y. Xu, Z. Liu, Y. Tian, S. Tong, M. Tegmark, and T. Jaakkola, "Pfgm++: Unlocking the potential of physics-inspired generative models," arXiv:2302.04265, 2023.
- Z. Liu, V. Madhavan, and M. Tegmark, "Machine learning conservation laws from differential equations," *Physical Review E*, vol. 106, no. 4, p. 045 307, 2022.
- Z. Liu, A. M. Stuart, and Y. Wang, "Second order ensemble langevin method for sampling and inverse problems," *arXiv* preprint *arXiv*:2208.04506, 2022.
- 7 Y. Xu, Z. Liu, M. Tegmark, and T. Jaakkola, "Poisson flow generative models," NeurIPS (spotlight), 2022.
- H. Huang, B. Xiao, Z. Liu, Z. Wu, Y. Mu, and H. Song, "Applications of deep learning to relativistic hydrodynamics," *Physical Review Research*, vol. 3, no. 2, p. 023 256, 2021.
- 2. Liu, Y. Chen, Y. Du, and M. Tegmark, "Physics-augmented learning: A new paradigm beyond physics-informed learning," *arXiv* preprint *arXiv*:2109.13901, 2021.
- Z. Liu, S. Qian, Y. Wang, Y. Yan, and T. Yang, "Schrödinger principal-component analysis: On the duality between principal-component analysis and the schrödinger equation," *Physical Review E*, vol. 104, no. 2, p. 025 307, 2021.
- Z. Liu, B. Wang, Q. Meng, W. Chen, M. Tegmark, and T.-Y. Liu, "Machine-learning nonconservative dynamics for new-physics detection," *Physical Review E*, vol. 104, no. 5, p. 055 302, 2021.
- Z. Liu, A. Behera, H. Song, and J. Jia, "Robustness of principal component analysis of harmonic flow in heavy ion collisions," *Physical Review C*, vol. 102, no. 2, p. 024 911, 2020.
- Z. Liu and Z. Zhang, "Quantum-inspired hamiltonian monte carlo for bayesian sampling," arXiv preprint arXiv:1912.01937, 2019.
- Z. Liu, W. Zhao, and H. Song, "Principal component analysis of collective flow in relativistic heavy-ion collisions," *The European Physical Journal C*, vol. 79, no. 10, p. 870, 2019.

Miscellaneous

Research Interests

- Building AI scientists that act like human scientists
- Using artificial intelligence to boost scientific discoveries and designs
- Understanding deep learning from the perspective of physics and information
- Physics-inspired generative models
- AI safety: mechanistic interpretability, emeregent behavior and phase transitions

Responsibilities and Duties

- 2022 Oraganizer of the ICML 2022 "AI for Science" workshop.
- - Reviewer of IEEE Transactions on Emerging Topics in Computational Intelligence