Shaorong Zhang

Ph.D. Candidate, Electrical and Computer Engineering

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Research Interests

- Diffusion (bridge) models, diffusion large language models
- Diffusion posterior sampling, guidance and alignment
- Inverse problems and optimization with diffusion priors
- Information-theoretic analysis of generative modeling
- Generation order, parallel decoding strategies in masked diffusion models
- Applications in medical imaging, scientific machine learning, and energy systems

Education

- **University of California, Riverside**
  Ph.D., Electrical and Computer Engineering — Sep 2022 – Present
- **University of California, Riverside**
  M.S., Electrical and Computer Engineering — Jun 2024
- **Xi'an Jiaotong University**
  M.S., Control Science and Engineering — Jun 2022
- **Xi'an Jiaotong University**
  B.S., Automation — Jun 2019

Publications

1. **Shaorong Zhang**, Yuanbin Cheng, and Greg Ver Steeg,
   "Exploring the Design Space of Diffusion Bridge Models",
   Advances in Neural Information Processing Systems (NeurIPS), 2025.
2. **Shaorong Zhang**, Tamoghna Chattopadhyay, Sophia I. Thomopoulos, Jose-Luis Ambite, Paul M. Thompson, Greg Ver Steeg,
   "Diffusion Bridge Models for 3D Medical Image Translation",
   IEEE Engineering in Medicine and Biology Society (EMBC), 2025.
3. **Shaorong Zhang**, Yuanbin Cheng, and Nanpeng Yu,
   "Generating Synthetic Net Load Data with Physics-informed Diffusion Models",
   IEEE Transactions on Smart Grid, 2025.
4. Nanpeng Yu, **Shaorong Zhang**, Jingtao Qin, et al.,
   "Data-Driven Control, Optimization, and Decision-Making in Active Power Distribution Networks",
   Applied Energy, Vol. 397, 126253, 2025.
5. **Shaorong Zhang**, Koji Yamashita, and Nanpeng Yu,
   "Learning Power System Dynamics with Neural Ordinary Differential Equations",
   IEEE PES General Meeting, 2024.
6. **Shaorong Zhang** and Nanpeng Yu,
   "Learning Power System Dynamics with Nearly-Hamiltonian Neural Networks",
   IEEE PES General Meeting, 2023.

Manuscripts Under Review / Preprints

- **Shaorong Zhang**, Longxuan Yu, Rob Brekelmans, Luhan Tang, Salman Asif, Greg Ver Steeg,
  "Generation Order and Parallel Decoding in Masked Diffusion Models: An Information-Theoretic Perspective".
- Longxuan Yu, Yu Fu, **Shaorong Zhang**, Hui Liu, Mukund Varma T, Greg Ver Steeg, Yue Dong,
  "Thinking Out of Order: When Output Order Stops Reflecting Reasoning Order in Diffusion Language Models".
- **Shaorong Zhang**, Rob Brekelmans, Greg Ver Steeg,
  "Local MAP Sampling for Diffusion Models".
- **Shaorong Zhang**, Rob Brekelmans, Yunshu Wu, Greg Ver Steeg,
  "Measurement-Aligned Flow for Inverse Problems".

Research Experience

- Developed diffusion bridge models for controllable generation and inverse problems
- Proposed optimization-based sampling methods for MAP inference in diffusion models
- Analyzed generation order and decoding strategies using information-theoretic tools
- Applied diffusion-based methods to 3D medical image translation and power system modeling

Technical Skills

- Programming: Python, C++, MATLAB
- Machine Learning: generative models, inverse problems, scientific machine learning
- Research Practice: experimental design, ablation studies, reproducible research

Honors and Awards

- Outstanding Graduate Student (Top 10%) 2022
- Special Scholarship for M.S. Candidate (Top 30%) 2021
- Outstanding Graduate (Top 20%) 2021
- Gold Award, China International College Students' "Internet+" Innovation and Entrepreneurship Competition 2020
- Gold Award, "Internet+" Innovation and Entrepreneurship Competition (Shaanxi Province) 2020