

Cong Fu

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Research Interests and Highlights

- My research interests are **deep learning** and **machine learning**. I am currently working on specific topics including **AI for science**, **geometric deep learning**, and **generative modeling**.
- In general, my research aims to advance deep learning techniques within scientific fields like **biology** and **physics**. Within these domains, I have designed deep learning models tailored for **protein generation**, **partial differential equations**, and **quantum many-body problems**.
- Our team won the **runner-up award at KDD Cup 2021**, where I made the main contribution.

Education

Texas A&M University , College Station, TX, USA Ph.D., Department of Computer Science & Engineering GPA: 4.0/4.0 Advisor: Prof. Shuiwang Ji	Jan 2021 - Present
University of Michigan , Ann Arbor, MI, USA M.S., Department of Mechanical Engineering GPA: 3.92/4.0	Aug 2016 – Apr 2018
Harbin Institute of Technology , Harbin, CHINA B.S., Department of Mechanical Engineering GPA: 3.88/4.0	Aug 2012 – Jul 2016

Professional Experiences

Fujitsu Research of America , Sunnyvale, CA, USA Research Intern Work on developing SE(3) latent diffusion model for protein backbone generation Manager: Kanji Uchino	Jul 2022 – Dec 2022
DMAI , Los Angeles, CA, USA Robotics Engineer Work on developing mobile robot autonomous navigation systems and building bipedal robotics system Manager: Yixin Zhu , Hangxin Liu	Jun 2018 – Mar 2020

Selected Publications [[Google Scholar](#)]

* indicates equal contribution.

[LoG 2023]	A Latent Diffusion Model for Protein Structure Generation Cong Fu* , Keqiang Yan*, Limei Wang, Wing Yee Au, Michael McThrow, Tao Komikado, Koji Maruhashi, Kanji Uchino, Xiaoning Qian, Shuiwang Ji <i>Learning on Graphs Conference (LoG), 2023</i>
[LoG 2023]	Semi-Supervised Learning for High-Fidelity Fluid Flow Reconstruction Cong Fu , Jacob Helwig, Shuiwang Ji <i>Learning on Graphs Conference (LoG), 2023</i>
[ICML 2023]	Group Equivariant Fourier Neural Operators for Partial Differential Equations Jacob Helwig*, Xuan Zhang*, Cong Fu , Jerry Kurtin, Stephan Wojtowytsch, Shuiwang Ji <i>International Conference on Machine Learning (ICML), 2023</i>
[NeurIPS-W 2021]	Fast Quantum Property Prediction via Deeper 2D and 3D Graph Networks Meng Liu*, Cong Fu* , Xuan Zhang, Limei Wang, Yaochen Xie, Hao Yuan, Youzhi Luo, Zhao Xu, Shenglong Xu, and Shuiwang Ji

AI4Science Workshop at NeurIPS, 2021
Awardee of KDD Cup 2021 on OGB-LSC

- [JMLR] **DIG: A Turnkey Library for Diving into Graph Deep Learning Research**
Meng Liu*, Youzhi Luo*, Limei Wang*, Yaochen Xie*, Hao Yuan*, Shurui Gui*, Haiyang Yu*, Zhao Xu, Jingtun Zhang, Yi Liu, Keqiang Yan, Haoran Liu, **Cong Fu**, Bora Oztekin, Xuan Zhang, and Shuiwang Ji
Journal of Machine Learning Research (JMLR), 2021
- [Under review] **Lattice Convolutional Networks for Learning Ground States of Quantum Many-body Systems**
Cong Fu*, Xuan Zhang*, Huixin Zhang, Hongyi Ling, Shenglong Xu, Shuiwang Ji
- [Under review] **Complete and Efficient Graph Transformers for Crystal Material Property Prediction**
Keqiang Yan, **Cong Fu**, Xiaofeng Qian, Xiaoning Qian, Shuiwang Ji
- [Under review] **SineNet: Learning Temporal Dynamics in Time-Dependent Partial Differential Equations**
Xuan Zhang, Jacob Helwig, Yuchao Lin, Yaochen Xie, **Cong Fu**, Stephan Wojtowytsch, Shuiwang Ji
- [Preprint] **Artificial Intelligence for Science in Quantum, Atomistic, and Continuum Systems**
Xuan Zhang*, Limei Wang*, Jacob Helwig*, Youzhi Luo*, **Cong Fu***, Yaochen Xie*, Meng Liu, Yuchao Lin, Zhao Xu, Keqiang Yan, Keir Adams, Maurice Weiler, Xiner Li, Tianfan Fu, Yucheng Wang, Haiyang Yu, Yuqing Xie, Xiang Fu, Alex Strasser, Shenglong Xu, Yi Liu, Yuanqi Du, Alexandra Saxton, Hongyi Ling, Hannah Lawrence, Hannes Stärk, Shurui Gui, Carl Edwards, Nicholas Gao, Adriana Ladera, Tailin Wu, Elyssa F. Hofgard, Aria Mansouri Tehrani, Rui Wang, Ameya Daigavane, Montgomery Bohde, Jerry Kurtin, Qian Huang, Tuong Phung, Minkai Xu, Chaitanya K. Joshi, Simon V. Mathis, Kamyar Azizzadenesheli, Ada Fang, Alán Aspuru-Guzik, Erik Bekkers, Michael Bronstein, Marinka Zitnik, Anima Anandkumar, Stefano Ermon, Pietro Liò, Rose Yu, Stephan Günnemann, Jure Leskovec, Heng Ji, Jimeng Sun, Regina Barzilay, Tommi Jaakkola, Connor W. Coley, Xiaoning Qian, Xiaofeng Qian, Tess Smidt, Shuiwang Ji

Professional Services

Program Committee Member | Reviewer

International Conference on Machine Learning (ICML)	2022, 2023
Annual Conference on Neural Information Processing Systems (NeurIPS)	2022, 2023
NeurIPS Track Datasets and Benchmarks	2023
International Conference on Learning Representations (ICLR)	2023
ACM International Conference on Information and Knowledge Management (CIKM)	2023
Structured Probabilistic Inference & Generative Modeling Workshop @ ICML2023	2023
New Frontiers of AI for Drug Discovery and Development Workshop @ NeurIPS2023	2023
Generative AI and Biology Workshop @ NeurIPS2023	2023
AI4Science Workshop @ NeurIPS2022, @ NeurIPS2023	2022, 2023
ACM Transactions on Knowledge Discovery from Data	

Teaching Assistant

Machine Learning	CSCE 421, TAMU, 2023
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Scholarships, Awards, & Honors

Travel Grant , CSE@TAMU	2023
Travel Award , AI4Science Workshop @ NeurIPS	2021
Runner-up Award , KDD Cup on Open Graph Benchmark Large-Scale Challenge (OGB-LSC)	2021
National Scholarship , China	2014

News Coverage

Ji and his team earn top showing at premier data mining competition	TAMU News
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