

# Zhang Zhang

School of Systems Science, Beijing Normal University

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## Scholarly and Educational Experience

### Beijing Normal University

MA and PhD in Complex Systems Analysis

Beijing, China

Sep 2019 - Present

### University of California, San Diego

Visiting PhD Student

San Diego, U.S.

Dec 2023 - Feb 2024

### University of Padua

Visiting PhD Student

Padua, Italy

Sep 2022 - Nov 2023

### Beijing Normal University

Research Assistant

Beijing, China

Apr 2018 - Sep 2019

### Hangzhou Dianzi University

BA in Information Security

Hangzhou, China

Sep 2013 - Jun 2017

## Research Interests

Machine Learning for Complex Systems, Complex Networks, Complexity Inspired AI

## Primary Authorship Papers

Network Information Dynamics Renormalization Group

Zhang Zhang, Arsham Ghavasieh, Jiang Zhang, Manlio De Domenico

PREPRINT (Version 1) available at Research Square <https://doi.org/10.21203/rs.3.rs-3503708/v1>(Under Revision for NComms). 2023

Graph Completion Through Local Pattern Generalization

Zhang Zhang, Ruyi Tao, Yongzai Tao, Mingze Qi, Jiang Zhang

International Conference on Complex Networks and Their Applications, 2023

Neural Network Pruning by Gradient Descent

Zhang Zhang, Ruyi Tao, Jiang Zhang

arXiv preprint arXiv:2311.12526(Under Review at ICML). 2023

A general deep learning framework for network reconstruction and dynamics learning

Zhang Zhang, Yi Zhao, Jing Liu, Shuo Wang, Ruyi Tao, Ruyue Xin, Jiang Zhang

Applied Network Science pp. 1–17. SpringerOpen, 2019

## Books

深度学习原理与 Pytorch 实战 This is a co-authored book and has been reprinted. As the second author, I wrote 3 chapters.

## Teaching Experience

### From Python Programming to Machine Learning

2022-2023

Equip undergraduates with sufficient knowledge to undertake research projects related to machine learning.

### Deep Learning Principles Series

2019-2020

A series of online courses designed for beginners in deep learning, available for viewing on Bilibili, has already received over 1k likes and 5k favorites.

## Awards & Honors

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2023	<b>First-Class Scholarship</b> , Annual Scholarship Selection Process in Beijing Normal University	China
2022	<b>Best Team Award</b> , Mediterranean School of Complex Networks	Italy
2022	<b>First-Class Scholarship</b> , Annual Scholarship Selection Process in Beijing Normal University	China
2022	<b>China Scholarship Council (CSC) Scholarship</b> , National High-Level Joint Doctoral Training Program	China
2020	<b>First-Class Scholarship</b> , Annual Scholarship Selection Process in Beijing Normal University	China

## Conference Presentations

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2023	<b>The 12th International Conference on Complex Networks and their Applications: Machine Learning &amp; Networks</b> , Graph Completion through Local Pattern Generalization	France
2022	<b>Mediterranean School of Complex Networks</b> , Network Information Dynamics Renormalization Group	Italy
2022	<b>Swarma-Kaifeng Workshop: Causality and Complex Systems</b> , From Entropy to Partial Information Decomposition	China
2020	<b>Swarma-Kaifeng Workshop: Artificial Intelligence for Complex Systems</b> , Computational Economy based on Deep Learning: a New Approach to Financial Market Modeling	China
2019	<b>The 15th China Conference on Complex Networks: Complex Networks and Big Data Analysis and Computing</b> , A General Deeplearning Framework for Network Reconstruction and Dynamics Learning	China
2018	<b>Swarma-Kaifeng Workshop: Network, Geometry and Machine Learning</b> , Machine Learning for Network Reconstruction	China

## Services

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**Journal Reviewer** Information Science | Neural Computing and Applications

**Teaching Assistant** Matlab Fundamentals and Applications | Complexity Thinking

## All Papers

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**All Citations: 197 h-index: 6**

A deep generative framework with embedded vector arithmetic and classifier for sample generation, label transfer, and clustering of single-cell data

Lifei Wang, Rui Nie, Zhang Zhang, Weiwei Gu, Shuo Wang, Anqi Wang, Jiang Zhang, Jun Cai

*Cell Reports Methods*. Elsevier, 2023

Network Information Dynamics Renormalization Group

Zhang Zhang, Arsham Ghavasieh, Jiang Zhang, Manlio De Domenico

PREPRINT (Version 1) available at Research Square <https://doi.org/10.21203/rs.3.rs-3503708/v1>(Under Revision for NComms). 2023

Graph Completion Through Local Pattern Generalization

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Neural Network Pruning by Gradient Descent

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*arXiv preprint arXiv:2311.12526*(Under Review at ICML). 2023

Inferring network structure with unobservable nodes from time series data

Mengyuan Chen, Yan Zhang, Zhang Zhang, Lun Du, Shuo Wang, Jiang Zhang

*Chaos: An Interdisciplinary Journal of Nonlinear Science*. AIP Publishing, 2022

The structure inference of flocking systems based on the trajectories

Jingjie Liang, Mingze Qi, Kongjing Gu, Yuan Liang, Zhang Zhang, Xiaojun Duan

*Chaos: An Interdisciplinary Journal of Nonlinear Science*. AIP Publishing, 2022

**MultiCapsNet: a general framework for data integration and interpretable classification**

Lifei Wang, Xuexia Miao, Rui Nie, Zhang Zhang, Jiang Zhang, Jun Cai

*Frontiers in genetics* p. 767602. Frontiers, 2022

**Universal framework for reconstructing complex networks and node dynamics from discrete or continuous dynamics data**

Yan Zhang, Yu Guo, Zhang Zhang, Mengyuan Chen, Shuo Wang, Jiang Zhang

*Physical Review E* p. 034315. APS, 2022

**An interpretable deep-learning architecture of capsule networks for identifying cell-type gene expression programs from single-cell RNA-sequencing data**

Lifei Wang, Rui Nie, Zeyang Yu, Ruyue Xin, Caihong Zheng, Zhang Zhang, Jiang Zhang, Jun Cai

*Nature Machine Intelligence* pp. 693–703. Nature Publishing Group UK London, 2020

**Research on Intrusion Detection Based on Semantic Re-encoding and Multi-space Projection**

Jingjing Wang, Zhendong Wu, Zhang Zhang

*Cyberspace Safety and Security: 11th International Symposium, CSS 2019, Guangzhou, China, December 1–3, 2019, Proceedings, Part II 11*, 2019

**The Cinderella Complex: Word embeddings reveal gender stereotypes in movies and books**

Huimin Xu, Zhang Zhang, Lingfei Wu, Cheng-Jun Wang

*PloS one* e0225385. Public Library of Science San Francisco, CA USA, 2019

**Neural gene network constructor: A neural based model for reconstructing gene regulatory network**

Zhang Zhang, Lifei Wang, Shuo Wang, Ruyi Tao, Jingshu Xiao, Muyun Mou, Jun Cai, Jiang Zhang

*bioRxiv* p. 842369. Cold Spring Harbor Laboratory, 2019

**A general deep learning framework for network reconstruction and dynamics learning**

Zhang Zhang, Yi Zhao, Jing Liu, Shuo Wang, Ruyi Tao, Ruyue Xin, Jiang Zhang

*Applied Network Science* pp. 1–17. SpringerOpen, 2019

## **Skills**

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Experienced in Python, Pytorch, Pytorch-Geometric, Matplotlib

Familiar with Javascript, PHP, Matlab, MySQL, HTML, Linux