Xiangnan Feng

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RESEARCH INTERESTS

Computational Social Science, Complex Network, Machine Learning, Data Mining, Statistical Physics

BACKGROUNDS & EXPERIENCES

Postdoc in **Complexity Science Hub**, Vienna 04/2023 - 03/2025 (Expected)
- **Research Topic**: Science of Cities, Computational Social Science
- **Advisors**: Frank Neffke

Postdoc in **Max Planck Institute for Human Development**, Berlin 01/2021 - 12/2022
- **Research Topic**: Future of Work, Computational Social Science
- **Advisors**: Iyad Rahwan (Professor), Alex Rutherford (Senior Research Scientist)

Visiting Ph.D. Student in Mathematics, **City, University of London**, London 04/2019 - 08/2020
- **Research Topic**: Temporal Networks, Spatial Networks, Human Mobility
- **Advisors**: Andrea Baronchelli (Reader)

Ph.D. in Mathematics, **Beihang University (BUAA)**, Beijing 09/2014 - 01/2021
- **Thesis Topic**: Complex Systems, Statistics
- **Advisors**: Zhiming Zheng (Academician of Chinese Academy of Sciences), Wei Wei (Associate Professor)

B.S. in Mathematics, **Beihang University (BUAA)**, Beijing 09/2010 - 07/2014
- **Hua Luogeng Class**: Found by Beihang University and Chinese Academy of Sciences jointly
- GPA: **3.6/4.0**

ACADEMIC TOPICS

Future of Work 2020 - Present
- Research on occupation data by statistical learning and complex networks
- Predict the evolution of occupations in the future

Modelling and Optimising Share Bicycle Systems 2019 - Present
- Research on London sharing bicycle system to model and predict the flows
- Model geo-information data by spatial-temporal networks

Graph Neural Networks 2019 - Present
- Research on graph neural networks for tasks like link prediction and classification
- Combine graph neural networks with Motifs for optimization

Minimum Vertex Cover Problem 2018 - 2020
- Research on minimum vertex cover problem, one of the NP-hard problems in graph theory
- Build Core Influence method based on statistical physics
- Build König-Egérvary Layer-Subgraph method for minimum vertex-cover optimization

Game Theory on Networks 2019 - Present
- Research on game theory on networks with dynamic strategies

Structure Heterogeneity on Networks 2017 - 2018

- Research on network heterogeneity by information theory
- Design centrality for Motifs

Neuron Network with Stochastic Weight 2017 - 2018

- Research on neural network based framework with stochastic weights (SWNNs)
- Use SWNNs for parameters estimation in Stochastic

Multi-Solution Problem in Particle Physics 2015

- Fit BESIII data by $e^+e^- \to h_c\pi^+\pi^-$ and $\chi_{c0}\omega$
- Derive the formula mathematically for multi-solution situation in Breit-Wigner function fitting

Kernel Density Estimation 2014

Graduation Project

- Research bandwidth selection algorithms for kernel density estimation

PUBLICATIONS & MANUSCRIPTS

A representation-learning-based approach to predict stock price trend via dynamic spatiotemporal feature embedding 2023
Bowen Pang, Wei Wei, Xing Li, **Xiangnan Feng**, Chao Li
Engineering Applications of Artificial Intelligence, Volume 126, Part A, 2023, 106849, ISSN 0952-1976

Graphical representation and hierarchical decomposition mechanism for vertex-cover solution space 2023
Wei Wei, **Xiangnan Feng**
Applied Mathematics and Computation, Volume 458, 2023, 128264, ISSN 0096-3003

The dynamic resilience of urban labour networks 2023
Xiangnan Feng, Alex Rutherford
Royal Society Open Science 10 (7), 230214

Representation learning of enhanced graphs using random walk graph convolutional network 2023
Xing Li, Wei Wei, Ruizhi Zhang, Zhenyu Shi, Zhiming Zheng, **Xiangnan Feng**
ACM Transactions on Intelligent Systems and Technology 2023 Feb 10

Enhance ambiguous community structure via multi-strategy community related link prediction method with evolutionary process Under Review
Qiming Yang, Wei Wei, Ruizhi Zhang, Bowen Pang, **Xiangnan Feng**
arXiv:2204.13301

Abstract: Shaping and Predicting the Urban Labor Markets 2021
Xiangnan Feng, Manuel Cebrian, Alex Rutherford
the 10th International Conference on Complex Networks and Their Applications, Madrid, Spain

Representation learning of graphs using graph convolutional multilayer networks based on Motifs 2021
Xing Li, Wei Wei, **Xiangnan Feng**, Xue Liu, Zhiming Zheng
Neurocomputing, 2021, ISSN 0925-2312

Effects of dynamic-Win-Stay-Lose-Learn model with voluntary participation in social dilemma 2021
Zhenyu Shi, Wei Wei, **Xiangnan Feng**, Ruizhi Zhang, Zhiming Zheng
Chaos, Solitons & Fractals, Volume 151, 2021, 111269, ISSN 0960-0779

Graph classification based on skeleton and component features 2021
Xue Liu, Wei Wei, **Xiangnan Feng**, Xiaobo Cao, Dan Sun

Knowledge-Based Systems, Volume 228, 2021, 107301, ISSN 0950-7051

Research of Motif-based similarity for link prediction problem 2021
Chao Li, Wei Wei, **Xiangnan Feng**, Jiaomin Liu
IEEE Access, vol. 9, pp. 66636-66645, 2021

Dynamic aspiration based on Win-Stay-Lose-Learn rule in spatial prisoner's dilemma game 2021
Zhenyu Shi, Wei Wei, **Xiangnan Feng**, Xing Li, Zhiming Zheng
Plos one, 16(1), e0244814.

A vertex-cover algorithm of edge-adding process by solution space evolution On Draft
Wei Wei, **Xiangnan Feng**, Jiannan Wang, Yanmei Jiang, Yunge Bai, Zhiming Zheng

Neural network based stochastic generator: a primary exploration On Draft
Xiangnan Feng, Xueshuang Xiang, Xuejiao Liu, Yang Ming, Wei Wei

Core influence mechanism on vertex-cover problem through leaf-removal-core breaking 2019
Xiangnan Feng, Wei Wei, Xing Li, Zhiming Zheng
Journal of Statistical Mechanics: Theory and Experiment, 2019.7 (2019): 073401

Research on centralities based on von Neumann entropy for motifs 2019
Xiangnan Feng, Wei Wei, Zhiming Zheng
2019 International Conference on Artificial Intelligence and Computing Science

Exploring the heterogeneity for node importance by von Neumann entropy 2018
Xiangnan Feng, Wei Wei, Renquan Zhang, Jiannan Wang, Ying Shi, Zhiming Zheng
Physica A: Statistical Mechanics and its Applications, Volume 517, 1 March 2019, Pages 53-65

Optimal stabilization of boolean networks through collective influence 2018
Jiannan Wang, Sen Pei, Wei Wei, **Xiangnan Feng**, Zhiming Zheng
Physical Review E, 97, 032305 – Published 13 March 2018

Correlation research of centralities on complex network by statistical learning 2018
Ying Shi, Wei Wei, **Xiangnan Feng**, Zhiming Zheng
2018 2nd International Conference on Artificial Intelligence and Software Engineering

Identifying influential vertices in boolean networks through dynamical voter rank 2017
Jiannan Wang, **Xiangnan Feng**, Zhilong Mi, Ziqiao Yin, Zhiming Zheng
2017 IEEE 2nd Information Technology, Networking, Electronic and Automation Control Conference

Combined fit to BESIII data on $e^+e^- \to h_c\pi^+\pi^-$ and $\chi_{c0}\omega$ 2015
Xiangnan Feng, Xuyang Gao, Chengping Shen
International Journal of Modern Physics A, 30, 1550142 (2015)

Optimization model for malfunction detection in automatic lathe 2015
Zhenfu Wang, Menglun Wang, Sen Chen, **Xiangnan Feng**
Modular Machine Tool & Automatic Manufacturing Technique, 2015, ISSN: 1001-2265 CN: 21-1132/TG

Photovoltaic hut design based on the greedy algorithm 2013
Zhenfu Wang, Menglun Wang, Sen Chen, **Xiangnan Feng**
Acta Energiae Solaris Sinica, 2013 Vol. 34 (10): 1775-1780

ACTIVITIES

Conference Talk: The Dynamic Resilience of Urban Labour Networks, Palma de Mallorca 2022
Conference on Complex Systems 2022

Conference Talk: Prediction the Future Labour Markets, Berlin 2021
CHM Symposium

Conference Talk: Shaping and Predicting the Urban Labor Markets, Madrid 2021
the 10th International Conference on Complex Networks and Their Applications

Seminar: Elements of Statistical Learning, Beihang University 2017-2018

- Organize the seminar of statistical learning as the group leader.

Overwatch Replay Analyzer (ORA) 2017-2018
Developer

- Develop the open-source software to extract a timeline of events from computer game Overwatch videos
- Used by professional Overwatch League E-Sports teams

Manager of Website: "Future Garden", the Official BBS of Beihang University 2016-2020

Internship in **China Academy of Information and Communications Technology** 07/2015-12/2015

Teaching Assistant in **Calculus**, Beihang University 09/2014-01/2015

HONORS & AWARDS

Outstanding Graduate of BUAA 2021
Sponsorship from Academic Excellence Foundation of BUAA for PhD Students (85 among 700) 2019-2020
Outstanding Academic Excellence Scholarship 2012, 2013, 2014, 2015
Meritorious Winner of Mathematical Contest in Modelling 2012

ADDITIONAL INFORMATION

Volunteer in NetSci 2023, Vienna, Austria 2023
Member of BUAA University Tennis Team 2018, 2020
Member of BUAA University Football Team 2016

REFEREES

Alex Rutherford Postdoc Supervisor, 08/2020 - Present
Senior Research Scientist and Principal Investigator at Max Planck Institute for Human Development
alexisadams@gmail.com

Andrea Baronchelli Visiting Ph.D. Supervisor, 04/2019 - 08/2020
Associate Professor in Mathematics at City, University of London; Token Economy theme lead at The Alan Turing Institute; Research Associate at the UCL Centre for Blockchain Technologies
a.baronchelli.work@gmail.com

Wei Wei Ph.D. Supervisor, 09/2014 - 12/2020
Associate Professor in School of Mathematical Sciences, Beihang University; Director of Department of Data and Information Sciences
weiw@buaa.edu.cn