

# FANCHEN BU

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## 🎓 EDUCATION

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**Korea Advanced Institute of Science and Technology (KAIST)**, South Korea 2022.03 – Present

*Ph.D. student* in Electrical Engineering

Supervisor: Prof. Kijung Shin

**Korea Advanced Institute of Science and Technology (KAIST)**, South Korea 2019.09 – 2021.08

*M.S.* in Electrical Engineering

Thesis: A Novel Optimization Algorithm with Orthogonality for Deep Neural Networks Inspired by Feedback Integrators

Supervisor: Prof. Dong Eui Chang

**University of Chinese Academy of Sciences (UCAS)**, China 2015.09 – 2019.08

*B.Eng.* in Computer Science and Technology

Thesis: Vehicle Trajectory Prediction Based on Deep Learning

Supervisor: Prof. Dongbin Zhao

## 👤 EXPERIENCE

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**CENTAI**, Italy 2025.03 – 2025.06

*Visiting scholar* Host: Dr. Francesco Bonchi | Collaborator: Dr. Atsushi Miyauchi

**Korea Advanced Institute of Science and Technology (KAIST)**, South Korea 2021.09 – 2022.02

*Research assistant* Supervisor: Prof. Kijung Shin

## 📖 PUBLICATIONS

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(**C**: Conference / **J**: Journal / **P**: Preprint / **W**: Workshop / **\***: Equal contribution)

- [C21] Geon Lee\*, Fanchen Bu\*, Soo Yong Lee\*, Sunwoo Kim, and Kijung Shin. “Toward a Science of AI Agent Societies.” *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2026. (Blue Sky Ideas Track)*
- [P1] Jaewan Chun\*, Fanchen Bu\*, Yeongho Kim, Atsushi Miyauchi, Francesco Bonchi, and Kijung Shin. “A Survey on Centrality and Importance Measures in Hypergraphs: Categorization and Empirical Insights.” *arXiv 2512.00107*.
- [C20] Fanchen Bu, Ruochen Yang, Paul Bogdan, and Kijung Shin. “Edge Probability Graph Models Beyond Edge Independency: Concepts, Analyses, and Algorithms.” *IEEE International Conference on Data Mining (ICDM) 2025*.
- [C19] Fanchen Bu, Geon Lee, Minyoung Choe, and Kijung Shin. “Identifying Group Anchors in Real-World Group Interactions Under Label Scarcity.” *IEEE International Conference on Data Mining (ICDM) 2025. (Short paper)*
- [C18] Hyunjin Choo, Fanchen Bu, Hyunjin Hwang, Young-Gyu Yoon, and Kijung Shin. “HyperSearch: Prediction of New Hyperedges through Unconstrained yet Efficient Search.” *IEEE International Conference on Data Mining (ICDM) 2025*.
- [C17] Fanchen Bu and Kijung Shin. “PyTorch-based Geometric Learning with Non-CUDA Processing Units: Experiences from Intel Gaudi-v2 HPUs.” *Korea Computer Congress (KCC) 2025*.
- [C16] Federico Berto\*, Chuanbo Hua\*, Junyoung Park\*, Laurin Luttmann\*, Yining Ma, Fanchen Bu, Jiarui Wang, Haoran Ye, and 22 Other Authors. “RL4CO: an Extensive Reinforcement Learning for Combinatorial Optimization Benchmark.” *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2025. (Oral)*

- [C15] Langzhang Liang, [Fanchen Bu](#), Zixing Song, Zenglin Xu, Shirui Pan, and Kijung Shin. “Mitigating Over-Squashing in Graph Neural Networks by Spectrum-Preserving Sparsification.” *International Conference on Machine Learning (ICML) 2025*.
- [C14] Hyeonsoo Jo, Jongha Lee, [Fanchen Bu](#), and Kijung Shin. “TiGer: Self-Supervised Purification for Time-evolving Graphs.” *Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD) 2025*.
- [C13] Junghun Lee, Hyunju Kim, [Fanchen Bu](#), Jihoon Ko, Kijung Shin. “DiffIM: Differentiable Influence Minimization with Surrogate Modeling and Continuous Relaxation.” *AAAI Conference on Artificial Intelligence (AAAI) 2025*.
- [C12] Hyeonsoo Jo\*, Hyunjin Hwang\*, [Fanchen Bu](#), Soo Yong Lee, Chanyoung Park, and Kijung Shin. “On Measuring Unnoticeability of Graph Adversarial Attacks: Observations, New Measure, and Applications.” *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2025*.
- [J5] Geon Lee, Kyungho Kim, [Fanchen Bu](#), Langzhang Liang, and Kijung Shin “Revisiting LightGCN: Unexpected Inflexibility, Inconsistency, and A Remedy Towards Improved Recommendation.” *ACM Transactions on Recommender Systems (TORS) 2025*.
- [J4] Geon Lee\*, [Fanchen Bu](#)\*, Tina Eliassi-Rad, and Kijung Shin. “A Survey on Hypergraph Mining: Patterns, Tools, and Generators.” *ACM Computing Surveys (CSUR) 2025*.
- [J3] Hyunju Kim\*, Heechan Moon\*, [Fanchen Bu](#), Jihoon Ko, and Kijung Shin. “Estimating Simplex Counts via Sampling.” *The VLDB Journal 2025*.
- [W1] [Fanchen Bu](#) and Kijung Shin. “On Training-Test (Mis)alignment in Unsupervised Combinatorial Optimization: Observation, Empirical Exploration, and Analysis.” *Workshop on Test-Time Adaptation @ International Conference on Machine Learning (ICML) 2025*.
- [C11] Sunwoo Kim, Soo Yong Lee, [Fanchen Bu](#), Shinhwan Kang, Kyungho Kim, Jaemin Yoo, and Kijung Shin. “Rethinking Reconstruction-based Graph-Level Anomaly Detection: Limitations and a Simple Remedy.” *Conference on Neural Information Processing Systems (NeurIPS) 2024*.
- [C10] [Fanchen Bu](#), Hyeonsoo Jo, Soo Yong Lee, Sungsoo Ahn, and Kijung Shin. “Tackling Prevalent Conditions in Unsupervised Combinatorial Optimization: Cardinality, Minimum, Covering, and More.” *International Conference on Machine Learning (ICML) 2024*.
- [C9] Soo Yong Lee, Sunwoo Kim, [Fanchen Bu](#), Jaemin Yoo, Jiliang Tang, and Kijung Shin. “Feature Distribution on Graph Topology Mediates the Effect of Graph Convolution: Homophily Perspective.” *International Conference on Machine Learning (ICML) 2024*.
- [C8] Sunwoo Kim, Shinhwan Kang, [Fanchen Bu](#), Soo Yong Lee, Jaemin Yoo, and Kijung Shin. “HypeBoy: Generative Self-Supervised Representation Learning on Hypergraphs.” *International Conference on Learning Representations (ICLR) 2024*.
- [C7] Hyeonsoo Jo, [Fanchen Bu](#), and Kijung Shin. “Robust Graph Clustering via Meta Weighting for Noisy Graphs.” *ACM International Conference on Information and Knowledge Management (CIKM) 2023*.
- [C6] [Fanchen Bu](#) and Kijung Shin. “On Improving the Cohesiveness of Graphs by Merging Nodes: Formulation, Analysis, and Algorithms.” *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2023*.
- [C5] Sunwoo Kim, [Fanchen Bu](#), Minyoung Choe, Jaemin Yoo, and Kijung Shin. “How Transitive Are Real-World Group Interactions? - Measurement and Reproduction.” *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2023*.
- [C4] Soo Yong Lee, [Fanchen Bu](#), Jaemin Yoo, and Kijung Shin. “Towards Deep Attention in Graph Neural Networks: Problems and Remedies.” *International Conference on Machine Learning (ICML) 2023*.
- [C3] Hyunju Kim, Jihoon Ko, [Fanchen Bu](#), and Kijung Shin. “Characterization of Simplicial Complexes by Counting Simplexes Beyond Four Nodes.” *ACM Web Conference (WWW) 2023*.
- [J2] [Fanchen Bu](#), Shinhwan Kang, and Kijung Shin. “Interplay between Topology and Edge Weights in Real-World Graphs: Concepts, Patterns, and an Algorithm.” *Data Mining and Knowledge Discovery (DAMI) 2023*.
- [J1] [Fanchen Bu](#), Geon Lee, and Kijung Shin. “Hypercore Decomposition for Non-Fragile Hyperedges: Concepts, Algorithms, Observations, and Applications.” *Data Mining and Knowledge Discovery (DAMI) 2023*.
- [C2] [Fanchen Bu](#) and Dong Eui Chang. “Feedback Gradient Descent: Efficient and Stable Optimization with Orthogonality for DNNs.” *AAAI Conference on Artificial Intelligence (AAAI) 2022*.

[C1] [Fanchen Bu](#) and Dong Eui Chang. “Double Prioritized State Recycled Experience Replay.” *IEEE International Conference on Consumer Electronics – Asia (ICCE-Asia) 2020*.

## ACADEMIC SERVICES

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### (C: Conference / J: Journal)

- [C11] International Conference on Learning Representations (ICLR):  
– Reviewer: 2026
- [C10] AAAI Conference on Artificial Intelligence (AAAI):  
– Reviewer: 2026
- [C9] ACM International Conference on Information and Knowledge Management (CIKM):  
– Reviewer: 2025 – 2026  
– Session Chair: 2025
- [C8] Conference on Neural Information Processing Systems (NeurIPS):  
– Reviewer: 2025 – 2026
- [C7] The International Conference on Machine Learning (ICML):  
– Reviewer: 2025 – 2026
- [C6] Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD):  
– Workshop organizer: 2025
- [C5] ACM Web Conference (WWW):  
– Reviewer: 2025 – 2026
- [C4] Learning on Graphs Conference (LoG):  
– Reviewer: 2024
- [C3] European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD):  
– Reviewer: 2024
- [C2] Asian Conference on Machine Learning (ACML):  
– Reviewer: 2024 – 2025
- [C1] ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD):  
– Reviewer: 2024 – 2026
- [J10] PLoS One:  
– Reviewer: 2026
- [J9] Neural Processing Letters:  
– Reviewer: 2025
- [J8] The VLDB Journal:  
– Reviewer: 2025
- [J7] Computational and Mathematical Organization Theory:  
– Reviewer: 2025
- [J6] Scientific Reports:  
– Reviewer: 2025
- [J5] IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI):  
– Reviewer: 2025

[J4] International Journal of Machine Learning and Cybernetics (IJMLC):

– Reviewer: 2024

[J3] IEEE Transactions on Network Science and Engineering (TNSE):

– Reviewer: 2024

[J2] The Journal of Supercomputing:

– Reviewer: 2024

[J1] Big Data Research:

– Reviewer: 2024

## ♡ HONORS AND AWARDS

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One of the top reviewers (top 200) in ICLR'26	2026
One of the Gold reviewers (top 25%) in ICML'26	2026
One of the outstanding reviewers (top 10%) in KDD'25 (both August and February Cycles)	2025
One of the top reviewers (top 32) in LoG'24	2024

## 🗣️ LANGUAGES

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- Chinese: Native
  - Native: Mandarin and Wu Chinese
  - Intermediate: Cantonese
  - Elementary: Hokkien
- English: Advanced
  - IELTS 7.5
  - GRE 333
- Korean: Intermediate
- Italian: Elementary