

FANCHEN BU

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🎓 EDUCATION

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

CENTAI, Italy

2025.03 – 2025.06

Visiting scholar Host: Dr. Francesco Bonchi

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

Research assistant Supervisor: Prof. Kijung Shin

📖 PUBLICATIONS

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

- [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 Oversquashing 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 Simplet Counts via Sampling.” *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 Simplices 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.

(C: Conference / J: Journal)

- [C10] AAAI Conference on Artificial Intelligence (AAAI):
– Reviewer: 2026
- [C9] ACM International Conference on Information and Knowledge Management (CIKM):
– Reviewer: 2025
- [C8] Conference on Neural Information Processing Systems (NeurIPS):
– Reviewer: 2025
- [C7] The International Conference on Machine Learning (ICML):
– Reviewer: 2025
- [C6] Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD):
– Workshop organizer: 2025
- [C5] ACM Web Conference (WWW):
– Reviewer: 2025
- [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 – 2025
- [J8] 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 outstanding reviewers (top 10%) in KDD'25 | 2025 |
| One of the top reviewers (32 in total) in LoG'24 | 2024 |

🗣️ LANGUAGES

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