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 / *: Equal contribution)

[C15] Langzhang Liang, <u>Fanchen Bu</u>, 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, <u>Fanchen Bu</u>, 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, <u>Fanchen Bu</u>, 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*, <u>Fanchen Bu</u>, 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.*

[J4] Geon Lee*, <u>Fanchen Bu</u>*, 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*, <u>Fanchen Bu</u>, Jihoon Ko, and Kijung Shin. "Estimating Simplet Counts via Sampling." *VLDB Journal 2025.*

[C11] Sunwoo Kim, Soo Yong Lee, <u>Fanchen Bu</u>, 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] <u>Fanchen Bu</u>, 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, <u>Fanchen Bu</u>, 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, <u>Fanchen Bu</u>, Soo Yong Lee, Jaemin Yoo, and Kijung Shin. "HypeBoy: Generative Self-Supervised Representation Learning on Hypergraphs." *International Conference on Learning Representations (ICLR) 2024.*

[P2] <u>Fanchen Bu</u>, Ruochen Yang, Paul Bogdan, and Kijung Shin. "Exploring Edge Probability Graph Models Beyond Edge Independency: Concepts, Analyses, and Algorithms." *arXiv 2405.16726.*

[C7] Hyeonsoo Jo, <u>Fanchen Bu</u>, and Kijung Shin. "Robust Graph Clustering via Meta Weighting for Noisy Graphs." *ACM International Conference on Information and Knowledge Management (CIKM) 2023.*

[C6] <u>Fanchen Bu</u> 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, <u>Fanchen Bu</u>, 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, <u>Fanchen Bu</u>, 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, <u>Fanchen Bu</u>, and Kijung Shin. "Characterization of Simplicial Complexes by Counting Simplets Beyond Four Nodes." *ACM Web Conference (WWW) 2023.*

[J2] <u>Fanchen Bu</u>, 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] <u>Fanchen Bu</u>, Geon Lee, and Kijung Shin. "Hypercore Decomposition for Non-Fragile Hyperedges: Concepts, Algorithms, Observations, and Applications." *Data Mining and Knowledge Discovery (DAMI) 2023.*

[P1] Federico Berto*, Chuanbo Hua*, Junyoung Park*, Laurin Luttmann*, Yining Ma, <u>Fanchen Bu</u>, Jiarui Wang, Haoran Ye, Minsu Kim, Sanghyeok Choi, Nayeli Gast Zepeda, André Hottung, Jianan Zhou, Jieyi Bi, Yu Hu, Fei Liu, Hyeonah Kim, Jiwoo Son, Haeyeon Kim, Davide Angioni, Wouter Kool, Zhiguang Cao, Qingfu Zhang, Joungho Kim, Jie Zhang, Kijung Shin, Cathy Wu, Sungsoo Ahn, Guojie Song, Changhyun Kwon, Kevin Tierney, Lin Xie, and Jinkyoo Park. "RL4CO: an Extensive Reinforcement Learning for Combinatorial Optimization Benchmark." *arXiv 2306.17100.*

[C2] <u>Fanchen Bu</u> and Dong Eui Chang. "Feedback Gradient Descent: Efficient and Stable Optimization with Orthogonality for DNNs." *AAAI Conference on Artificial Intelligence (AAAI) 2022.*

[C1] <u>Fanchen Bu</u> and Dong Eui Chang. "Double Prioritized State Recycled Experience Replay." *IEEE International Conference on Consumer Electronics - Asia (ICCE-Asia) 2020.*

✎ Academic Services

(C: Conference / J: Journal)

[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

[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

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