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

2025.03 - 2025.06

B.Eng. in Computer Science and Technology Thesis: Vehicle Trajectory Prediction Based on Deep Learning Supervisor: Prof. Dongbin Zhao

📽 Experience

CENTAI, Italy

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)

- [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.
- [C17] <u>Fanchen Bu</u> 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, <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 Timeevolving 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] 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, <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.*
- [P1] Fanchen Bu, 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, 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, <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, Fanchen Bu, 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] 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] <u>Fanchen Bu</u> and Dong Eui Chang. "Double Prioritized State Recycled Experience Replay." *IEEE International Conference on Consumer Electronics - Asia (ICCE-Asia) 2020.*

(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

\heartsuit Honors and Awards

One of the outstanding reviewers (top 10%) in KDD'25 One of the top reviewers (32 in total) in LoG'24 2025 2024

🔯 Languages

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