# Fanchen Bu

boqvezen97@kaist.ac.kr · (+82) 10-4359-1551 ·
LinkedIn: vezen-bu GitHub: bokveizen Personal homepage

## 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 | 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

**(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 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 Simplet 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 Simplets 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

**(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 – 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 – 2025

[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 outstanding reviewers (top 10%) in KDD'25 (both August and February Cycles) | 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