Tian Bai Ph.D. | UESTC

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Summary

I received my Ph.D. degree in computer science from the University of Electronic Science and Technology of China (UESTC) in June 2024 under the supervision of Prof. Mingyu Xiao, the Vice Dean of the School of Computer Science and Engineering.
My Ph.D. dissertation is entitled "Investigations Concerning Parameterized and Exact Algorithms for the Feedback Set and Related Problems". My research interests include graph algorithms, approximation and parameterized algorithms, and algorithmic game theory.

Education

UESTC, School of computer science and engineering, Computer Science, *Ph.D.* 2024.06
UESTC, Yingcai honors college, Fundamental Sciences (Mathematics and Physics), *B.Sc* 2016.06

Research Publications

Journal Articles

[1] **Tian Bai**, Mingyu Xiao: A Parameterized Algorithm for Subset Feedback Vertex Set in Tournaments. Theoretical Computer Science 975: 114139 (2023).
https://linkinghub.elsevier.com/retrieve/pii/S0304397523004528
Abstract: A novel dynamic programming algorithm for SFVS in tournaments utilizing a non-standard iterative compression technique and a polynomial-time algorithm for a special case of SFVS in tournaments.

[2] **Tian Bai**, Mingyu Xiao: Exact Algorithms for Restricted Subset Feedback Vertex Set in Chordal and Split Graphs. Theoretical Computer Science 984: 114326 (2024).
https://www.sciencedirect.com/science/article/abs/pii/S0304397523006394
Abstract: A fast exact algorithm for R-SFVS in chordal graphs and split graphs based on the dividing&conquer method and branching techniques.

[3] **Tian Bai**, Mingyu Xiao: Computational Complexity of Feedback Vertex Set and Subset Feedback Set Problems: A Survey. Journal of computer research and development (2024). (Accepted)
Abstract: A survey of algorithm and complexity of FVS and SFVS in general and important graph classes.

[4] **Tian Bai**, Yinxin Cao, Mingyu Xiao: Feedback Set Problems on (Planar) Graphs of Bounded Degrees. Theoretical Computer Science. (Under Submission)
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4525587
Abstract: Completely settle the computational complexity for FVS/FAS and the connected version of FVS on (planar) digraphs.

[5] **Tian Bai**, Mingyu Xiao: Exact Algorithms for Maximum Independent Set Problem on Hypergraphs. SCIENTIA SINICA Informationis. (Under Submission)
Abstract: Fast exact algorithms for MIS on Hypergraphs based on the dividing&conquer method and branching techniques. The first non-trivial exact algorithm for a price-collecting version of MIS on Hypergraphs, which breaks the 2^n-barrier.

[6] Mengfan Ma, Mingyu Xiao, **Tian Bai**, Bakh Khoussainov: Facility Location Games Beyond Single-Peakedness: the Entrance Fee Model. Mathematics of Operations Research (Under Submission)
https://arxiv.org/abs/2204.11282
Abstract: Upper and lower bounds about the (random) approximation ratios of the strategyproof mechanisms for a facility location game with an entrance fee.

[7] Yingying Huangfu, **Tian Bai**: Cooperative Abnormal Node Detection with Adversary Resistance: A Probabilistic Approach. (Under Submission)
https://arxiv.org/abs/2311.16661
Abstract: An abnormal node detection defending against adversarial attacks in cluster-tree networks is proposed to achieve perfect detection. This detection scheme is based on the LRT method and a modified Z-score method, and the optimal removal threshold of the modified Z-score method is derived.

Conference Proceedings

[1] **Tian Bai**, Mingyu Xiao: Exact and Parameterized Algorithms for Restricted Subset Feedback Vertex Set in Chordal Graphs. Theory and Applications of Models of Computation - 17th Annual Conference (TAMC) 2022: 249-261.
https://link.springer.com/chapter/10.1007/978-3-031-20350-3_20

Abstract: A dynamic programming algorithm for MIS problem parameterized by the minimum clique cover number and the fast parameterized and exact algorithms for R-SFVS in chordal graphs.

[2] Mengfan Ma, Mingyu Xiao, **Tian Bai**, Xin Chen: Facility Assignment with Fair Cost Sharing: Equilibrium and Mechanism Design. The 30th International Computing and Combinatorics Conference (COCOON) 2024. (Accept)
https://arxiv.org/abs/2404.08963
Abstract: The characterization of the strategyproof mechanisms for a facility location game with the entrance fee which shows that the approximation ratio of the strategyproof mechanisms is unbounded. I also designed unanimous and strategyproof mechanisms for this model.

[3] **Tian Bai**, Mingyu Xiao: Breaking the Barrier 2^k for Subset Feedback Vertex Set in Chordal Graphs. 49th International Symposium on Mathematical Foundations of Computer Science (MFCS) 2024. (Under Submission)
https://arxiv.org/abs/2212.04726
Abstract: An improving algorithm breaking running time bound 2^k and some improving exact algorithms for SFVS in chordal graphs.

[4] Mengfan Ma, Mingyu Xiao, **Tian Bai**, Bakh Khoussainov: Facility Location with Entrance Fees. Association for the Advancement of Artificial Intelligence (AAAI) 37(5), 5797-5804. 2023: 5797-5804.
https://ojs.aaai.org/index.php/AAAI/article/view/25719
Abstract: Upper and lower bounds about the approximation ratios of a facility location game with an entrance fee.

Volunteer Services

Peer Reviewer for Journals/Conferences

- **Reviewer:** Frontiers of Computer Science (FCS).
- **Subreviewer:** International Conference and Workshops on Algorithms and Computation (WALCOM).
- **Subreviewer:** International Symposium on Mathematical Foundations of Computer Science (MFCS).

Presentation / Attendance

- **Speaker:** National Conference of Theoretical Computer Science (NCTCS). Guangzhou, China, July 2023.
- **Assistant:** Algorithmic Game Theory and Computation Theory Forum. Chengdu, China, June 2022.
- **Speaker:** The 17th Annual Conference on Theory and Applications of Models of Computation (TAMC). Tianjin, China, September 2022.
- **Assistant and Host:** The 2nd Theoretical Computer Science Outstanding PhD Students Forum (TCSPhd2021). Chengdu, China, June 2021.

Professional Experiences

Student Leader: Parameterized and Exact Algorithm Reasearch Team	2021-present
Visiting Scholar: Department of Computer Science and Technology, Nanjing University	2023.11
Teaching Assistant for graduate students: Advanced Algorithm Analysis and Design	2022-2023
Teaching Assistant for undergraduate students: Frontiers of Theory of Computation	2022-2023
Teaching Assistant for undergraduate students: Frontiers of Theory of Computation	2021-2022
Teaching Assistant for undergraduate students: Advanced Algebra	2017-2018
Teaching Assistant for undergraduate students: Linear Algebra	2016-2017