

# Yiming Qiao

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I am a Phd student at Tsinghua University. My research interest is in database management systems. I have particular interests in vectorized execution, query optimization, and data compression.

## EDUCATION

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<b>Tsinghua University</b> Ph.D. in Computer Science (Institute for Interdisciplinary Information Sciences, IIIS) GPA: 3.76/4.00, Advisor: Huanchen Zhang (huanchen@tsinghua.edu.cn)	Sept. 2021 - Jun. 2026 <i>Beijing, China</i>
<b>Nanjing University of Posts and Telecommunications</b> B.Eng. in Information Security, with Honors Degree (Top 3%) GPA: 92.9/100	Sept. 2017 - Jun. 2021 <i>Nanjing, China</i>

## EXPERIENCE

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<b>Software Engineering Intern</b> eBay	Sept. 2020 - Nov. 2020 <i>Shanghai, China</i>
<b>Software Engineering Intern</b> Oracle	Nov. 2019 - May 2020 <i>Nanjing, China</i>
<b>Exchange Student</b> Nanjing University	Sept. 2018 - Jun. 2019 <i>Nanjing, China</i>

## RESEARCH PROJECTS

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<b>Data Chunk Compaction</b> Advisor: Huanchen Zhang	Aug. 2023 - Nov. 2024
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Revealed the small chunk problem in vectorized execution, where filters and hash joins can reduce the valid tuples in a data chunk, leading to performance degradation. Addressed this issue by modeling the chunk compaction problem and designing various strategies. Implemented in DuckDB, our solution achieved up to a 63% speedup on standard benchmarks.

*This work is accepted by SIGMOD'24.*

<b>Relational Table Compression</b> Advisor: Yihan Gao, Huanchen Zhang	Feb. 2021 - May 2024
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Developed Blitzcrank, a high-speed compressor for OLTP databases, reducing memory usage by 85% with only a 19% performance impact. Addressed challenges in compressing dynamic row-stores by introducing novel semantic models and a fast encoding technique named "Delayed Coding", improving both speed and efficiency for large datasets.

*This work is published in VLDB'24.*

<b>Neural Network-Based Spectrum Deblurring</b> Advisor: Hu Zhu	Jul. 2018 - Dec. 2019
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Developed an end-to-end neural network framework for spectrum deconvolution in infrared spectrometers, addressing issues of band overlap and noise in aging instruments. The method, using dilated convolutions and self-paced learning, outperformed traditional partial differential equation (PDE) approaches, improving spectral reconstruction.

*This work is published in IEEE Transactions on Industrial Informatics.*

## PUBLICATIONS

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- [1] **Yiming Qiao**, Huanchen Zhang, "Data Chunk Compaction in Vectorized Execution," **SIGMOD'25**, Accepted.
- [2] **Yiming Qiao**, Yihan Gao, Huanchen Zhang, "Blitzcrank: Fast Semantic Compression for In-memory Online Transaction Processing," In: *Proceedings of the VLDB Endowment (VLDB'24)* 17, no. 10, pp. 2528 - 2540.

- [3] Hu Zhu\*, **Yiming Qiao\***, Guoxia Xu, Lizhen Deng, and Yu-Feng Yu. “DSPNet: A Lightweight Dilated Convolution Neural Networks for Spectral Deconvolution with Self-paced Learning.” In: *IEEE Transactions on Industrial Informatics (TII)* 16, no. 12 (2019): 7392-7401. (\*Equal Contribution)
- [4] Huihui Wang, Shunmei Meng, **Yiming Qiao**, and Jing Zhang. “Fast Classification Algorithms via Distributed Accelerated Alternating Direction Method of Multipliers.” In: *Proceedings of 2019 IEEE International Conference on Data Mining (ICDM'19)*, Nov. 2019, pp. 1354 - 1359.

#### Patents

- [1] Xingguo Chen, **Yiming Qiao**, Wei Liu, Jie Zhu, “A User-Oriented Method for Enhancing Custom Sports Commentary.” Patent CN202010284204.8, China, Filed Apr. 2020, Granted Sept. 2023.
- [2] Zhiqiang Zou, linrui Li, Shuyu Chang, **Yiming Qiao**, “A Classification Method for Outlier Celestial Objects Based on Astronomical Spectral Data.” Patent CN202010983397.6, China, Filed Sept. 2020.

#### **OTHERS**

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##### Awards

- Mitacs Globalink Research Internship, 2020.
- Bell Honors School Graduate Gold Medal, Nanjing University of Posts and Telecommunications, 2020.

##### Teaching

- Teaching Assistant - Quantitative Investment and Financial Optimization (Tsinghua 80470273) - Fall 2023
- Teaching Assistant - Data Mining (Tsinghua 40470333) - Fall 2021