




# Guanduo Chen

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## Education

**Master of Science in Computer Science and Technology, Fudan University** September 2022 – June 2025 (Expected)

- Research Interests: MLSys, AI4DB

**B.Eng in Computer Science and Technology, Fudan University**

September 2018 – July 2022

## Work Experience

**Meituan, Ltd.**

January 2025 – Present

Large Multi-modality Model Architecture Intern

Shanghai, China

- **Vision Encoder Long Context Training Support:** Designed and developed a context-parallelism mechanism for the vision encoder of a large multi-modality model.

**ByteDance, Ltd.**

December 2023 – April 2024

Database System R&D Intern, ByteHouse Runtime Team

Shanghai, China

- **Geographic Data Aggregation Query Benchmark:** Developed and benchmarked geospatial aggregation queries on the NYC Taxi dataset, identifying performance disparities across major database platforms (StarRocks, ClickHouse, PostGIS, DuckDB, and ByteHouse-CE). This analysis led to actionable insights for optimizing geospatial query execution.
- **Geospatial Data Support for CNCH:** Integrated geometry data types into ByteHouse-CNCH (Cloud Native ClickHouse) via geos library, expanding its capabilities and improving data representation efficiency.
- **Geospatial Index Design:** Spearheaded the design and implementation of multi-level indexing (disk and memory cache) for geospatial data, cutting query latency by nearly 50% compared to the base ClickHouse implementation.

## Research Experience

**Computation Efficient LoRA [Paper]**

March 2024 – January 2025

Advisor: Prof. Binhang Yuan

HKUST Relaxed System Lab

- **Algorithm Development:** Developed CE-LoRA, a high-efficiency algorithm for parameter-efficient fine-tuning (PEFT), which significantly reduced backpropagation costs in large language model training. By leveraging structured sparsity and low-rank approximation techniques, the model achieved a  $3.39\times$  improvement in training efficiency without sacrificing accuracy.
- **Theoretical Analysis:** Provided rigorous convergence analysis, proving that CE-LoRA maintains the same convergence rate as LoRA, but with reduced computational overhead.

**Learned Range Filter [Paper, Code]**

February 2023 – December 2023

Advisor: Prof. Siquang Luo

NTU Data Management Research Group

- **Oasis:** Developed OASIS, a learned range filter that segments the key space into non-overlapping intervals and maps data into a bitmap using a linear model-simulated CDF as the hash function. The filter utilizes block-based Elias-Fano compression to reduce space overhead without compromising query efficiency.
- **Oasis+:** Created Oasis+, a hybrid range filter that combines learning-based and hash-based methods to enhance filter applicability and robustness across various workloads.
- **Integration into RocksDB:** Integrated OASIS and Oasis+ into RocksDB and tested their performance, achieving up to  $6.2\times$  improvement in query response times.

**Text2SQL [Paper, Code]**

July 2021 – February 2022

Advisor: Prof. X. Sean Wang

Fudan DASLab

- **Text2SQL Framework Development:** Developed the GAR framework for Text2SQL translation, using a unique “Generate-and-Rank” approach that leverages parsing, generation, and ranking strategies for high-accuracy SQL generation from natural language queries.
- **Benchmarking:** Built and tested a complex benchmark with self-joins, analyzing GAR’s performance against other end-to-end models, providing crucial insights into its strengths in complex query generation.

## Publication

1. CE-LoRA: Computation-Efficient LoRA Fine-Tuning for Language Models [preprint.]  
**Guanduo Chen\***, Yutong He\*, Yipeng Hu, KunYuan, Binhang Yuan.
2. OASIS: An Optimal Disjoint Segmented Learned Range Filter [VLDB 2024]  
**Guanduo Chen**, Zhenying He, Meng Li, Siquang Luo.
3. GAR: A Generate-and-Rank Approach for Natural Language to SQL Translation [ICDE 2023]  
Y Fan, Z He, T Ren, D Guo, L Chen, R Zhu, **G Chen**, Y Jing, K Zhang, XS Wang