

Boao (James) Chen

boaochen@brandeis.edu | [Google Scholar](#) | 415 South St, Waltham, MA 02453 | (+1) 607-882-4258

Research Interests

Databases, Data Systems, Storage Engines, Machine Learning for Systems

Education

Doctor of Philosophy, Computer Science

Sep 2024 – Present

Brandeis University, Waltham, MA

Advisor: Subhadeep Sarkar

Bachelor of Arts, Computer Science

Aug 2020 – May 2024

Cornell University, Ithaca, NY

Washington University, St. Louis, MO

Publications

- **Boao Chen**, Shubham Kaushik, and Subhadeep Sarkar, “[Mind the Buffer: Dissecting the LSM-Buffer Design Space](#)”, *in Review*, 2026
- Alexander H. Ott, Shubham Kaushik, **Boao Chen**, and Subhadeep Sarkar, “[Tectonic: Bridging Synthetic and Real-World Workloads for Key-Value Benchmarking](#)”, *Performance Evaluation and Benchmarking TPC Technology Conference*, 2025
- Ke Li, Ruidong Zhang, **Boao Chen**, Siyuan Chen, Sicheng Yin, Saif Mahmud, Francois Guimbretiere, and Cheng Zhang, “[GazeTrak: Exploring Acoustic-based Eye Tracking on a Glass Frame](#)”, *International Conference on Mobile Computing and Networking*, 2024
- Ke Li, Ruidong Zhang, Siyuan Chen, **Boao Chen**, Mose Sakashita, Francois Guimbretiere, and Cheng Zhang, “[EyeEcho: Continuous Facial Expression Tracking on Glasses with Minimally-obtrusive Acoustic Sensing](#)”, *ACM Computer Human Interaction conference*, 2024
- Ke Li, Devansh Agarwal, Ruidong Zhang, Vipin Gunda, Tianjun Mo, Saif Mahmud, **Boao Chen**, Francois Guimbretiere, and Cheng Zhang, “[SonicID: User Identification on Smart Glasses with Acoustic Sensing](#)”, *The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, 2024

Key Projects

- **Mind the Buffer** (*Under Review*, 2026): Conducted a comprehensive analysis of the LSM-tree in-memory buffer design space—the critical component through which every read and write operation must pass—evaluating how buffer implementation, sizing, and tuning bottleneck NoSQL storage engine performance across shifting workloads and hardware. Benchmarked 11 distinct buffer designs—including three hash-hybrid variants—and distilled the empirical tradeoffs into a practitioner handbook of 10 actionable guidelines for buffer selection and tuning. Designed and evaluated an adaptive buffer that dynamically switches implementations on-the-fly to sustain peak performance across workload shifts.
- **Tectonic+** (*Ongoing*): Extending Tectonic into a next-generation benchmarking suite intended to replace YCSB and other static workload generators for key-value stores. Tectonic+ builds on Tectonic’s workload-modeling core while adding support for concurrency and multiple storage backends (RocksDB, Cassandra, Redis, ScyllaDB) through a unified database abstraction layer.
- **Tectonic** (*Published, TPCTC 2025*): Co-developed a configurable, resource-efficient Rust-based key-value workload generator to model the temporal, structural, and dynamic properties of production workloads missing in benchmarks like YCSB and KV Bench. Implemented fine-grained control over multi-operation access patterns (point/range queries, merges, and deletes), prefix-distributed composite key generation, and user-specified data sortedness, achieving 2× higher throughput and up to an 84% lower main memory footprint compared to state-of-the-art generators.

Poster

- Shubham Kaushik, Steven Yang, **Boao Chen**, and Subhadeep Sarkar, "[FluidLSM: A Fluid Log-Structured Merge Tree for Shifting Workloads](#)", 2026 North East Database Day.
- Alexander Ott, Shubham Kaushik, **Boao Chen**, and Subhadeep Sarkar, "[Tectonic: Bridging Synthetic and Real-World Workloads for Key-Value Benchmarking](#)", 2026 North East Database Day.
- Alexander Ott, **Boao Chen**, Arpita Saha, and Subhadeep Sarkar, "[Self-Designing LSM Memory Buffer](#)", 2025 North East Database Day.

Teaching Assistantship

- **Spring 2026:** *Introduction to Problem Solving in Python* [COSI 10a](#), Brandeis University.
- **Fall 2025:** *Capstone Project for Software Engineering* [COSI 166B](#), Brandeis University.
- **Spring 2025:** *Database Management Systems* [COSI 127B](#), Brandeis University.
- **Fall 2024:** *Algorithms* [COSI 180A](#), Brandeis University.
- **Spring 2024:** *Applied High-Performance and Parallel Computing* [CS 5520](#), Cornell University.
- **Fall 2023:** *Foundations of Artificial Intelligence* [CS 4700](#), Cornell University.
- **Spring 2023:** *Operating Systems* [CS 4410](#), Cornell University.

Certification

- **June 2025:** *Oracle Certified Professional, MySQL 8.0 Database Administrator* — [\[link\]](#)
- **June 2025:** *Oracle Certified Associate, MySQL Implementation* — [\[link\]](#)

Technical Skills

- **Programming Languages:** Python, C/C++, Java, SQL, R, MATLAB
- **Databases:** RocksDB, MariaDB, Postgres, Cassandra
- **Tools:** PyTorch, TensorFlow, OpenCV

Society Member

Member, Association for Computing Machinery (ACM)

Member, Institute of Electrical and Electronics Engineers (IEEE)