Geoffrey X. Yu

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Research Interests	Databases, Systems, Cloud-Native Databases, Instance-Optimized Data Systems

Education

Massachusetts Institute of Technology   2020 – Present
Doctor of Philosophy Student in Computer Science (PhD)   Cambridge, MA

- *Advisor:* Tim Kraska, Data Systems Group

University of Toronto   2018 – 2020
Master of Science in Computer Science (MSc)   Toronto, ON

- *Advisor:* Gennady Pekhimenko, EcoSystem Group (Computer Systems and Networks)
- *Thesis:* Habitat: Prediction-guided Hardware Selection for Deep Neural Network Training

University of Waterloo   2013 – 2018
Bachelor of Software Engineering (BSE)   Waterloo, ON

- 94.65% Cumulative Average, Graduated with Distinction and on the Dean's Honors List

Publications

Blueprinting the Cloud: Unifying and Automatically Optimizing Cloud Data Infrastructures with BRAD
Geoffrey X. Yu, Ziniu Wu, Ferdi Kossmann, Tianyu Li, Markos Markakis, Amadou Ngom, Samuel Madden, Tim Kraska
Proceedings of the VLDB Endowment (VLDB), Vol. 17, No. 11., 2024

Check Out the Big Brain on BRAD: Simplifying Cloud Data Processing with Learned Automated Data Meshes
Tim Kraska*, Tianyu Li*, Samuel Madden*, Markos Markakis*, Amadou Ngom*, Ziniu Wu*, Geoffrey X. Yu*
Proceedings of the VLDB Endowment (VLDB), Vol. 16, No. 11, 2023. Vision Paper

TreeLine: An Update-In-Place Key-Value Store for Modern Storage
Geoffrey X. Yu*, Markos Markakis*, Andreas Kipf*, Per-Åke Larson, Umar Farooq Minhas, Tim Kraska
Proceedings of the VLDB Endowment (VLDB), Vol. 16, No. 1, 2022

Habitat: A Runtime-Based Computational Performance Predictor for Deep Neural Network Training
Geoffrey X. Yu, Yubo Gao, Pavel Golikov, Gennady Pekhimenko
USENIX Annual Technical Conference (USENIX ATC), 2021

Skyline: Interactive In-Editor Computational Performance Profiling for Deep Neural Network Training
Geoffrey X. Yu, Tovi Grossman, Gennady Pekhimenko
ACM Symposium on User Interface Software and Technology (UIST), 2020

* Denotes equal contribution.

Demonstrations

Skyline: Interactive In-Editor Performance Visualizations and Debugging for DNN Training
Geoffrey X. Yu, Tovi Grossman, Gennady Pekhimenko
Conference on Machine Learning and Systems (MLSys), 2020

TBD Suite: Benchmarking and Profiling Tools for DNNs
Geoffrey X. Yu, Hongyu Zhu, Anand Jayarajan, Bojian Zheng, Abhishek Tiwari, Gennady Pekhimenko
Conference on Machine Learning and Systems (MLSys), 2019

Teaching Experience

Teaching Assistant   Massachusetts Institute of Technology
6.5830 / 6.5831 – Database Systems   Fall 2022

- *Instructors:* Samuel Madden and Michael Cafarella

Teaching Assistant   University of Toronto
CSC 209 – Software Tools and Systems Programming   Fall 2018, Winter 2019

Professional Experience

Amazon Web Services   Applied Scientist Intern
Boston, MA   May – August 2024

- *Mentor:* Vikram Nathan
- Led research on adding support for per-query configurable cost-performance trade-offs in Redshift Server-less' intelligent scaling mode.

Intel Corporation   Research Graduate Intern
North America – Remote   May – August 2021

- *Mentors:* Nesime Tatbul and David Cohen
- Led research on developing new designs for concurrent learned indexes that support database transactions.

Facebook   Software Engineering Intern
Menlo Park, CA   September – December 2017

- Utilized C++ to develop a new queuing service for the Async Tier—Facebook's asynchronous job execution platform, responsible for handling tens of millions of jobs per minute.
- Designed and implemented a mechanism to reschedule failed jobs, requiring development across new and legacy infrastructure services on the Async Tier.
- Improved operational efficiency by implementing scripts to facilitate database shard management.

Facebook   Software Engineering Intern
Menlo Park, CA   January – April 2017

- Implemented robust Java code diagnostics for Nuclide, enabling Java editing support for massive projects with over 60,000 source files.
- Engineered and developed Nuclide's Java type resolution mechanism, which was capable of handling source code files with more than 10,000 transitive dependencies.
- Added partial rendering to the Nuclide console, increasing the number of entries that could be retained in the user interface by 20 times.

Apple   Software Engineering Intern
Sunnyvale, CA   May – August 2016

- Contributed to Apache Cassandra to improve disaster recovery across data centers.
- Prototyped a Cassandra partition blocking mechanism in Java to support nodes in production.
- Improved Cassandra timeout enforcement and introduced custom per-query timeouts
- Enhanced Cassandra error handling to enable error propagation from replica nodes to clients.

Coursera   Software Engineering Intern
Mountain View, CA   September – December 2015

- Developed a near real-time course tracking tool by leveraging Scala, Kafka, and JavaScript with React—providing an aggregate view of over 1700 courses on Coursera.
- Wrote a scheduled job in Scala to validate user role invariants across multiple data stores.
- Utilized Scala and JavaScript with React to build a suite of administrative course editing tools end-to-end, replacing legacy tools that lacked comprehensive validations.

Coursera   Software Engineering Intern
Mountain View, CA   January – April 2015

- Engineered robust course authoring tools using React and Flux that were made available to over 100 Coursera partner institutions.
- Built the front end for an instructor to learner mass email communication tool. This tool has been used to send out over 800,000 emails.

Milq (now Layer 6, acquired by TD Bank Group) — Full Stack Software Engineering Intern
Toronto, ON — May – August 2014

- Developed the tag page—an aggregation of content about a specific hashtag.
- Engineered scalable data API endpoints in Node.js using Redis and MongoDB to deliver matched content to the tag page.
- Developed functionality that fetched, resized, and stored video thumbnails into an Amazon S3 bucket for new and existing content added to Milq.

Awards and Honors

- **NSERC Postgraduate Scholarship – Doctoral (PGS D)** — 2020 – 2023
  Merit-based doctoral research scholarship awarded by the Government of Canada (63,000 CAD).
- **NSERC Alexander Graham Bell Canada Graduate Scholarship (CGS D)** — 2020 – 2023 (declined)
  Merit-based doctoral research scholarship awarded by the Government of Canada (105,000 CAD).
- **NSERC Canada Graduate Scholarship – Master's (CGS M)** — 2019 – 2020
  Merit-based master's research scholarship awarded by the Government of Canada (17,500 CAD).
- **Snap Research Scholarship** — January 2019
  Awarded by Snap Inc. for research quality, technical skills, and communication skills (10,000 USD).
- **Vector Institute Scholarship in Artificial Intelligence** — 2018 – 2019
  Awarded to top students pursuing AI-related master's studies in Ontario (17,500 CAD).
- **Queen Elizabeth II Graduate Scholarship in Science and Technology** — 2018 – 2019
  Merit-based scholarship awarded to students pursuing graduate studies in Ontario (15,000 CAD).
- **Wolfond Fellowship, University of Toronto** — 2018 – 2019
  Awarded at the University of Toronto for academic achievements (10,000 CAD).
- **Sandford Fleming Foundation Award for Academic Excellence** — June 2018
  Best graduating academic record in the Software Engineering program at the University of Waterloo.
- **University of Waterloo Faculty of Engineering First in Class Award** — May 2017
  Highest term average in the Software Engineering program at the University of Waterloo (Fall 2016).
- **Wish Scholarship, University of Waterloo** — January 2016
  Awarded by the University of Waterloo based on academic merit.
- **University of Waterloo Faculty of Engineering Upper Year Scholarship** — May 2015
  Awarded by the Faculty of Engineering at the University of Waterloo based on academic merit.
- **Software Engineering Entrance Scholarship, University of Waterloo** — September 2013
  Awarded to first year Software Engineering students based on academic and extracurricular achievements.
- **University of Waterloo President's Scholarship of Distinction** — September 2013
  Awarded to undergraduate students with an admissions average of 95% or greater.
- **Toronto District School Board Top Scholar** — June 2013
  Highest high school graduating average in the Toronto District School Board (Toronto, ON).

Talks

- **Blueprinting the Cloud: Unifying and Automatically Optimizing Cloud Data Infrastructures with BRAD** — August 29, 2024
  VLDB 2024 — Guangzhou, China
- **Virtualizing Cloud Data Infrastructures with BRAD** — May 23, 2024
  North East Database Day 2024 — Boston, MA
- **Check Out the Big Brain on BRAD: Simplifying Cloud Data Processing with Learned Automated Data Meshes** — September 15, 2023
  Cockroach Labs — Virtual
- **TreeLine: An Update-In-Place Key-Value Store for Modern Storage** — August 31, 2023
  VLDB 2023 — Vancouver, BC

- **Check Out the Big Brain on BRAD: Simplifying Cloud Data Processing with Learned Automated Data Meshes**   August 29, 2023
  VLDB 2023   Vancouver, BC

- **Learning-Based Creation of Data Mesh Architectures**   March 10, 2023
  North East Database Day 2023   Boston, MA

- **Habitat: A Runtime-Based Computational Performance Predictor for Deep Neural Network Training**   July 15, 2021
  USENIX ATC 2021   Virtual

- **Skyline: Interactive In-Editor Computational Performance Profiling for Deep Neural Network Training**   October 21, 2020
  UIST 2020   Virtual