

# Kai Sun

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🌐 github.com/KaiSun314

🌐 kaisun.me

## SKILLS

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**Languages:** C++, Python, Java, JavaScript, SQL, HTML/CSS

**Technologies:** PyTorch, Node.js, Express, MongoDB, AWS, Redis, Socket.IO, Android Studio, Git, Linux

## EDUCATION

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**University of Waterloo**

Waterloo, ON

Bachelor of Computer Science (Co-op) - 97.3% Cumulative Average

September 2018 - April 2023

- **Michael and Ophelia Lazaridis Olympiad Scholarship:** Full-ride scholarship to the University of Waterloo, granted to four Faculty of Mathematics students
- **Wish Scholarship:** Awarded to the top student enrolled in Computer Science, Combinatorics and Optimization, or Pure Mathematics in 1B

## WORK EXPERIENCE

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**Uber Advanced Technologies Group (ATG)**

Toronto, ON

Research Intern

September 2020 - Present

- (NDA) Improving perception and prediction in vehicle fleets with cooperative self-driving

**MemSQL**

Seattle, WA

Software Engineering Intern, Query Optimization

May 2020 - August 2020

- Implemented pruning methods on the join plan search space, achieving 16-40x speedups in the distributed optimizer for large customer joins of 18+ tables while still finding the same optimal plan
- Designed a data structure for the distributed optimizer cache to efficiently store and access sparse data, reducing its memory usage by over 80% for large customer joins
- Developed a heuristic search algorithm with a fast join cost estimator for 25-40 table joins that finds a backup join plan in 2-5 seconds with up to 90% lower estimated cost than previous backup plans

**BlackBerry**

Ottawa, ON

Android Software Development Student

May 2019 - August 2019

- Implemented the syncing of email drafts between mobile devices and the Microsoft Exchange Server to expand support for Exchange Web Services (EWS) for the BlackBerry Hub+ Inbox app
- Improved user experience by enhancing the search interface for emails

## AWARDS

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**International Mathematical Olympiad, Silver Medal**

2016

**ACM-ICPC East Central North America Regional Contest, 4th Place (out of 135 teams)**

2018

**William Lowell Putnam Mathematical Competition, Honorable Mention**

2018, 2019

**Canadian Mathematical Olympiad, 1st Place in Canada**

2016

**Canadian Computing Olympiad, Silver Medal**

2018

## PROJECTS

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**Route Planner**

Java, SQLite, XML, Android Studio

- Finds the shortest route visiting a list of up to 10 places, specified by an address or a place name
- Computed the fastest route possible using bitmask dynamic programming and breadth-first search

**Chat For Class**

Node.js, Express, MongoDB, AWS S3, Redis, Socket.IO, React.js

- A messaging app that displays conversations in a hierarchical tree structure where users can branch new sub-conversations from a message or conversation, allowing communication to be more organized
- Stored the conversations tree in MongoDB with caching in Redis for faster queries
- Improved server scalability and performance by adding multiprocessing using Clustering and Redis