# Kanwarpal Brar

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## Education

**University of Waterloo** *Waterloo, Ontario, Canada*

Bachelor of Computer Science (BCS) | **CGPA: 3.84/4.0** *2020 - 2025*

**Courses:** Data Structures & Algorithms, Operating Systems, Object-Oriented Programming, Distributed Systems, Concurrency, Databases

## Work Experience

### Carta

Payments Software Engineering Co-op *Sept 2024 - Dec 2024*

- Averted **$5000+** in potential regulatory penalties within first **2 weeks** by implementing financial compliance controls with **Django** + **React**
- Managed **$5M+** monthly leading international banking integration expansion, leveraging **Python**, **gRPC**, and **Domain Driven Design**
- Architected highly scalable **Microservices** on **AWS** with **Docker** and **Kubernetes**, achieving **99.99%** uptime for robust fintech operations
- Slashed network overhead **50%** by implementing centralized money movement controls with **RBAC** in a **Java Microservice**
- Accelerated feature development **40%** through flexible Django permission system using YAML-templated definitions

### University of Waterloo

Distributed Systems Research Assistant *May 2024 - Aug 2024*

- Benchmarked **serverless** frameworks with **WRK** and custom **Bash** scripts, informing design decisions for high-performance system architecture
- Delivered **200+** requests/second per node by deploying & optimizing **Kubernetes** clusters with **KNative** Serving and **Istio** ingress controls
- Cut cold-start latency **20%** through targeted autoscaling and **TCP/IP** network optimization, increasing platform responsiveness
- Designed architectural changes improving resource utilization **15%**, validated with monitoring scripts in a comprehensive technical report

### Carta

Backend Software Engineering Co-op *Jan 2024 - Apr 2024*

- Accelerated OCX report generation speed **10%** using an O(n) complexity cell management system with **Apache POI** + **Java**, streamlining results
- Enhanced AI-powered search accuracy by **6%** via refined prompt engineering for report queries & real-world use-cases
- Eliminated **3000+** tickets by streamlining Ownership Report permissions in **Django**, collaborating cross-functionally with product leaders
- Slashed user wait times by **10%** through optimizing ownership report queries in **Spring**, enhancing system responsiveness

### Arctic Wolf Networks

Software Developer Co-op *May 2023 - Aug 2023*

- Slashed response times by **25%** by implementing a concurrent **Go** monitoring system for **Prometheus** metrics on an **Apache Kafka** wrapper
- Attained **100%** accuracy in identifying test gaps with a reflection-based **Golang** unit test verifier for an **Apache Kafka** wrapper
- Expedited development by creating a forward/backward compatible Kafka Serialization system using **SchemaVer** and **Avro**

### Genesys Cloud Services

Full Stack Software Developer Co-op *Sept 2022 - Dec 2022*

- Slashed hosting costs by **5%** by migrating a monolithic scheduling API to an end-to-end serverless architecture with **Python** + **Flask** + **Lambda**
- Compressed codebase size by **30%** and enhanced maintainability through a documented **Python** + **Flask** + **OpenAPI** service for scheduling

### Cloudspark Labs

Software Engineering Intern *Jan 2022 - Apr 2022*

- Crafted scalable **RESTful** and event-driven microservices for web applications using **Microsoft Azure**, meeting evolving user demands
- Spearheaded the creation of Licensing, Notification, and Auth microservices with **TypeScript**, **Nest.JS**, and **CosmosDB**, for a startup MVP

## Projects

### Event-Driven Data Aggregation App *2025*

- Architected robust backend with **Go** + **Gin**, implementing **CQRS** and **Event Sourcing** for real-time data updates
- Achieved **sub-200ms** query latency with **Goroutines**, optimized **Event Sourcing** architecture, and efficient **WebSocket** handlers
- Crafted responsive cross-platform experience with **React Native** + **Google Maps SDK**, enabling dynamic location-based features

### Concurrent Lock-Free Hash Table *2025*

- Built concurrent hash table in **C++** reaching **100M+** ops/sec on **64+** cores with **<1µs** latency using **lock-free** techniques and open addressing
- Achieved **10x** performance over mutex-based tables with **linear** scaling across cores using **CAS** operations and cache-line padding

### Location-Based Social Discovery App *2025*

- Boosted event attendance by building a geolocation-based app with **Kotlin** and **Firebase**, simplifying user discovery of local gatherings
- Implemented **MVVM**, Repository, and **Singleton** design patterns to ensure modular, maintainable architecture for future expansions

## Skills

**Languages:** Python, C++, Java, Go, TypeScript, JavaScript, Kotlin, C#, C, SQL

**Frameworks:** Spring Boot, Django, Flask, Gin, Node.js, Express.js, React, React Native, GraphQL, REST APIs, OAuth2.0

**Data Systems:** PostgreSQL, MongoDB, Redis, Elasticsearch, Hadoop, Spark, HBase, Kafka, ZooKeeper, gRPC, Protocol Buffers, Avro

**Infrastructure:** AWS, Azure, Kubernetes, Docker, Terraform, CI/CD, GitHub Actions, Jenkins, Linux, Git, Microservices, CQRS, Event Sourcing, TCP/IP