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## Summary of Qualifications

- Proven leadership experience in Motion Planning for Self-Driving Vehicles
- Prolific individual contributor with an immense impact
- Proficient in C++17/20 and Python
- Bachelor of Science in Computer Science. UBC, 2017

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## Experience

### Argo AI, Staff Software Engineer/Software Engineering Manager II (Aug 2019 – Nov 2022)

- Led the Trajectory Selection & Remote Guidance team within Motion Planning (10 direct reports)
  - Highly regarded leader with excellent rapport with all direct reports and a mentor to many on other teams. Perfect eNPS scores for Growth, Management Support, and Recognition.
- Responsible for analyzing the desirability of each proposed AV candidate trajectory and selecting the optimal one considering safety, comfort, and other factors.
- Pioneered a movement to increase novel candidate trajectory diversity throughout the planning stack, greatly expanding the AV's ability to appropriately evaluate complex interactions.
- Designed, implemented, and iterated on the system for object interaction risk evaluation.
- Drove the effort to incorporate Deep Learning into Motion Planning for evaluating human-likeness and contributed to successful and accelerated deployment in the fleet.
- Frequently contributed very high-impact self-motivated projects (*select examples from 2022Q3*):
  - Reduced the runtime of every simulation by 73s, reducing simulation costs by 25%.
  - Optimized in-house serialization codegen to reduce single build-unit compile times by up to 7.5mins, reduced overall vehicle software binary sizes by 15%.
  - Reduced overall post-simulation metrics evaluation runtimes by 35%.
  - Redesigned the org-wide profiling library, removing lock contention and undue overhead.
- Led the cross-functional development of the Remote Guidance platform with a focus on integration into the autonomy stack. Deployed 13 guidance features and 7 request detectors.
  - Successfully mitigated 2000 interventions per month.
- Developed onboard/offboard metrics and dashboards used to enable fleet-driven program management and inform project priorities.
- Co-architected the next-generation visualization framework based on Magnum Graphics and ImGui.
  - Drastically reduced the development effort needed for improved system introspection (~5x).
  - Improved rendering runtime performance by ~10x & enabled compelling modern visual effects.
  - Provided a pathway for tools to be transpiled for web-based deployment using WASM.

### NIO, Senior Autonomous Controls Engineer (August 2017 - Aug 2019)

- Developed an efficient, real-time-safe robotics software framework and middleware that replaced ROS in the L4 system. Created rich developer-facing tooling for real-time diagnostics as well as data recording, replay, processing, and visualization, enabling teams to iterate at a rapid pace
- Architected and implemented many of the core L4 stack libraries
- Acted as the de facto software engineering/C++ expert for all AD/AI SW teams
- Optimized algorithm designs and implementations across the full AD stack
- Designed and implemented the base object fusion solution (multi-modal, multi-target)
- Established and co-managed the L4 SW testing release process

### Google, Software Developer Intern (May – August 2016)

- Contributed to improving Chrome Autofill for 100M+ users
- Created an automated integration testing suite for Autofill in Chrome
  - Removed the need for tedious manual reliability/website compatibility testing
- Experimental investigation of future directions for Autofill
  - Prototyped a next-gen automated checkout solution during an internal two-day hackathon

## Tesla Motors, Software Engineering Intern (January – April 2016)

- Co-developed a new CAN requirement spec. format for company-wide usage (JCAN)
  - Replacement for DBC, designed for data de-duplication, flexibility, and auto-optimization
- Created a fully-featured JCAN editor application (Canode)
  - Natively multi-platform, fully asynchronous, loosely coupled and highly cohesive
  - Provides instantaneous bus analysis results and input feedback for improved workflow
- Advised on and enabled data driven decision-making for Model 3 CAN architecture
- First week: built and deployed a release artifact service with LDAP authenticated web app

## UBC Sailbot, Software Lead (Sept 2013 – Aug 2017) [Autonomous Sailboat](http://Autonomous Sailboat) [ubcsailbot.org](http://ubcsailbot.org)

- Achieved the record for the furthest fully autonomous boat crossing of the Atlantic Ocean
- Won the International Robotic Sailing Regatta in 2014, 2013, and 2012
- Optimal real-time motion planning with dynamic obstacles in the complex sailing domain
- Efficient, optimal global path planning considering weather data for performance and risk
- Created a novel marine obstacle detection system using thermal imaging & CV
- Developed a fully redundant sensor system with intelligent failure-resistant firmware
- Managed a 17-person software team with Agile methods (Scrum)

## Vikom Media, Lead Developer & Founder (Sept 2011 – Dec 2017)

[vikom.io](http://vikom.io)

- Reached 2.5 million unique users in 5 months with an MVC web app (AdCraft.co 2011)
  - Created and deployed a fast, scalable and responsive image sharing website
  - PostgreSQL & MongoDB optimization and management
  - Long-term software consulting (Web Development / Graphics)
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## Education

The University of British Columbia, Vancouver, BC, 2013 – 2017

Bachelor of Science (Computer Science)

Coursera (Stanford), Summer 2015  
Intro to Machine Learning – Andrew Ng

Udacity (Georgia Tech), Summer 2014  
Artificial Intelligence for Robotics – Sebastian Thrun

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## Scholarships and Awards

5x Spot Bonuses (nominated by leadership for high-impact work) – Argo AI

3x High-Five Awards (nominated by peers for high-impact work) – Argo AI

3x You Rock Award – NIO

Top Oral Presentation – UBC Multidisciplinary Undergraduate Research Conference, 2015

Dean's Honors List – UBC, 2014

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