MASc Electrical and Computer Engineering
UWaterloo (class of 2025, 93% GPA)
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Ben Zhang

(Some also call me "Chuan Tian")

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TL;DR

- Hands-on experience with autonomous vehicle compilers/runtimes at Tesla, WATonomous, and MIT-PITT-RW.
- Master's research in Control, Robotics & Autonomous Systems: sensor malfunction detection and mitigation for safety-critical systems.
- Built a bare-metal server cluster at WATcloud for student AI/ML research; architecture adopted by major labs on campus.
- Previously completed a Bachelor of Computer Science (AI Option) at the University of Waterloo.
- Proficient in Python, TypeScript, C/C++, Docker, Terraform, Ansible, Kubernetes, ROS, and Linux system administration.
- Active open-source contributor; upstreamed changes and maintained forks of Terraform, Ansible, Ceph, Microk8s, and LeRobot.

Work Highlights

Founder and Advisor @ WATcloud **Jan 2020 - present**
Making compute accessible for students and researchers. Waterloo, Ontario, Canada

• Built a bare-metal compute cluster from consumer PCs, addressing reliability challenges through robust observability and cluster design.
• Led multiple funding rounds to scale the cluster 10x in CPU/RAM and 20x in GPU FLOPS.
• Managed end-to-end operations: hardware assembly, networking, user management, observability tooling, and CI/CD.
• Deployed and maintained Proxmox+Ceph, Kubernetes, zero-trust authentication, centralized logging, and high-availability.
• Backported kernel modules, compiled LVM for advanced caching, and contributed to/forked Terraform, Ansible, and Microk8s.
• Supported 700+ students and researchers in multiple competitions; collaborated with universities in Canada, the US, and Italy.
• Now serving dozens of teams, research labs, and courses, with 200+ active users per term; architecture adopted by major labs on campus.

Autopilot Engineer (Intern) @ Tesla Inc. **May 2022 - Aug 2022**
"Ben performed at a level commensurate with our best engineers." — Mentor Palo Alto, California

• Designed a directed acyclic graph (DAG) scheduling algorithm delivering solutions within 3% of optimal, running 120x faster than the prior SAT-based approach and reducing neural network (NN) deployment time from hours to 15 minutes.
• Sped up the trace extraction pipeline by 8x by optimizing data structure queries.
• Accelerated next-gen hardware bring-up by tightening the NN deployment cycle.

Team Captain @ Waterloo Autonomous Racing, Controls Lead @ MIT-PITT-RW **Jul 2020 - Dec 2021**
Autonomous vehicles for racing, with a focus on planning and control. Waterloo, Ontario, Canada

• Integrated and improved upon a Nonlinear Model Predictive Path Following Controller.
• Built simulator interface, racing line optimizer, containerized dev environment, data pipeline, visualization tools, and team website.
• Led development in a 2021 simulation competition; team placed 4th of 33 schools.

Software Engineer (Intern) @ Apple Inc. **May 2019 - Aug 2019**
"He is a self-motivated, focused engineer who strives to look at problems in depth..." — Manager Cupertino, California

• Improved Apple's HLS player, reducing HD/UHD startup time by 30% through bandwidth prediction and recording optimizations.
• Created a Media Source Extensions conformance suite to streamline the certification process for external hardware.

Software Engineer (Intern) @ Hive.AI **Jan 2019 - Apr 2019**
"Ben is the best intern we've had on our team and one of the strongest engineers at the company." — Manager San Francisco, California

• Rewrote a data export pipeline, boosting large export speed 50x via resource, caching, and concurrency optimizations.
• Developed a polygon consensus algorithm using vertex-voting and multi-density clustering techniques.
• Implemented a Node.JS Streams library with batching, bucketing and concurrency control capabilities.

Also previously worked at Yahoo, Kik, and 500px **May 2016 - Apr 2018**

Publications

• **C.T. Zhang**, D. Rayside, C. Nielsen. *Sensor Protection and Fault Detection: Application to Autonomous Vehicles*. IEEE CCTA, 2025.
• *Optimal Sensor Protection and Measurement Corruption Detection in Safety-Critical Systems*. Master's Thesis, UWaterloo, 2025.
• A. Saba, ... , **C.T. Zhang**, et al. *Fast and Modular Autonomy Software for Autonomous Racing Vehicles*. Field Robotics, 2024.
• P.J. Genovese, F. Xu, M. Singh, L.W. Chan, **C.T. Zhang**. *Adjusting recipients of a message*. US Patent 10,686,742, 2020.