

# ROWAN DEMPSTER

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## SKILLS

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**Programming:** C++, Python, Java, JavaScript, ReactJS, GraphQL, Relay  
**Environments/Toolboxes:** PyTorch, CasADi, Git, ROS, Linux, Docker, CARLA Simulator

## EDUCATION

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**University of Waterloo, *Electrical and Computer Engineering, MSc*** Sep 2020 — Dec 2022

- Research in motion planning for autonomous vehicles (AVs). Thesis work on relational graph models for decision making [↗](#), action classification in video streams [↗](#), and unified trajectory planning & control [↗](#).
- Recipient of the NSERC Alexander Graham Bell Canada Graduate Scholarship.
- 95% average in courses including Optimal Control and MPC, Computational Vision, and Reinforcement Learning.

**University of Waterloo, *Bachelor of Computer Science*** Sep 2015 — Apr 2020

- Dean's Honours List (90% average), 2x recipient of the NSERC Undergraduate Student Research Award (USRA).
- Coursework including Autonomous Mobile Robotics, Autonomous Vehicles, Intro to AI, and Intro to ML.

## RESEARCH

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**WATonomous** [↗](#) - Building an AV from the ground up, competitor in the SAE AutoDrive Challenge (ADC).

**Director - Autonomy (ADC Year 4 and Onwards)** Sep 2020 — Sep 2022

- Headed a team of undergraduate and graduate students as we overhauled the automated driving stack. The team's final design earned 2nd place in the ADC Year 4 competition, demo video available online [↗](#).
- Implemented a neural architecture for action recognition in road scenes, based on the SlowFast feature extractor and a modified ACAR-Net classification head. Demonstrated superior performance on the ICCV 2021 ROAD challenge, beating the baseline by 2.2 points on video-level mAP@0.2IOU. Submitted to ICRA 2023, preprint available [↗](#).
- Applied optimal control principles to develop a unified trajectory planning and control scheme, and an accompanying novel real-time MPC solution. Submitted to ICRA 2023, preprint available [↗](#).
- Designed a dynamic relation graph (DRG), building on the success of relational mapping in *Lanelet2*, for unified prior-online environment modeling and explainable decision making. Presented at ICRA 2022 [↗](#).

**Program Manager - Team Principle (ADC Year 2 & 3)** Aug 2018 — May 2020

- Led 100+ software, electrical, and mechanical engineers as we transformed a Chevrolet Bolt into a Level 4 AV.
- Achieved 3rd place in the ADC Year 3 competition (up from 8th place in Year 2) by defining a range of organizational policies (e.g. development cycles, test plans) aimed at increasing the team's efficiency.

**Tech Lead - Trajectory Generation (ADC Year 1)** Sep 2017 — May 2018

- Oversaw 14 students as we used ROS and C++ to create a custom costmap environment representation and implement a modified RRT\* path search algorithm.

## INDUSTRY

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**Matician** [↗](#), *Research Engineer* Sep 2021 — Dec 2021

- Researched self-supervised learning (SSL) for scene reconstruction via dense stereo matching in mapping applications.
- Introduced visual odometry to the SSL pipeline, allowing for photometric loss computations across time, reducing end-point error (EPE) in the disparity maps by >10%.

**Facebook** [↗](#), *Software Engineer* Jan 2019 — Apr 2019

- Built new features for an internal tool which identifies anomalies in timeseries data and notifies subscribers. Implemented a new entry point for creating anomaly detectors, introducing thousands of new users to the tool.
- Gained experience with modern data structuring and querying frameworks such as *GraphQL*, *Thrift*, and *Relay*.

**Zynga** [↗](#), *Software Engineer (Analytics)* May 2018 — Aug 2018

- Developed services that allow game teams to segment their players based on custom attributes, and assign those player segments to different variants of experiments.
- Migrated experiment history blobs from JSON to SMILE encoding, decreasing deserialization heap usage by 30%.

**Sony Creative Software** [↗](#), *Software Engineer* Sep 2017 — Dec 2017

**Kik Interactive** [↗](#), *Android Developer* Jan 2017 — Apr 2017

**TribalScale** [↗](#), *Software Engineer* May 2016 — Aug 2016