

# Ali Toyserkani

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## EXPERIENCE

- Lyft Level 5 | Hardware Engineer Intern – Autonomous Driving | Palo Alto, CA** May '19 – Aug '19
  - Improved **compute efficiency (latency/power)** by over **10x** through benchmarking and integration of **neural network hardware accelerators**
  - Designed a **camera interface board** in Altium which performs image compression, lens correction and filtering through an ISP
  - Optimized compute performance by using TensorFlow (Python) and vendor-specific tools to **re-format, prune, and re-train detection models**
- Lyft Level 5 | Software Engineer Intern – Autonomous Driving | Palo Alto, CA** Aug '18 – Dec '18
  - Implemented and deployed a **<1ms time-critical steering controller** on a new fleet of self-driving vehicles, used by motion planning team
  - Integrated multiple RTOS's (ThreadX, FreeRTOS, Nucleus) onto MCUs (TI, STM) for the autonomous fleet's embedded platforms
  - Created a hardware-agnostic embedded software framework (**C++**) which performs critical drive-by-wire functions on the vehicle platform
- WATonomous – SAE Autonomous Vehicle Challenge | Technical Project Manager | Waterloo, ON** Jan '18 – Apr '19
  - Managed and **led a group of over 100 students** in building a self-driving car for the [SAE AutoDrive Challenge](#)
  - Created an embedded controls interface to execute planned trajectories using **PID controllers** and **CAN communication**
  - Developed data pipelining package in **ROS** and **PCL** to synchronously distribute ~100 MB/s of camera, **LiDAR** and **RADAR** data
- Core Avionics & Industrial, Inc. | Embedded Software Developer | Waterloo, ON** Jan '18 – Apr '18
  - Developed safety-critical **GPU drivers** (OpenCL, Vulkan, OpenGL) in **C & C++** for AMD and NVIDIA **embedded graphics cards**
  - Built new multithreaded/multipartitioned sample applications for the drivers, **increasing code coverage by 25%**
- Multi-Scale Additive Manufacturing (3D Printing) Lab | Research Assistant | Waterloo, ON** May '17 – Aug '17
  - Took initiative to re-design, build and assemble a **binder-jetting 3D printer**, allowing researchers to run over 15% more experiments
  - Co-developed a **new hybrid additive manufacturing method** ([paper](#)) for making polymer parts without the need for support structures
  - Created a [real-time image processing model](#) and an [STL slicer](#) using **OpenCV/Qt** to adjust process parameters when detecting part defects

## PROJECTS

- Quadruped Robotic Dog**
  - Designing a self-balancing four-legged robot in Fusion360, and manufacturing using harmonic gear trains, 3D printing, and machining tools
  - Developing **control logic in ROS** to control the robot, read in sensor data on a Raspberry Pi, and send motor actuation commands to Arduino's
- 4-Axis Robotic Arm**
  - Created a **multi-purpose robotic arm** with 4 D.O.F. to repeat a user-recorded set of tasks
  - Wrote **embedded C software** to wirelessly control the robotic arm's axes with a console joystick

## AWARDS & COMPETITIONS

- 3<sup>rd</sup> Place @ IEEE Hardware Hackathon 2017** for creating a electronic hand glove for smart home automation
- Winner of CANSOFCOM Military Challenge @ Hack the North 2017** for creating a video surveillance tool
- Top 15 Autonomous Mars Rover Robot @ International University Rover Competition 2017**
- Best IoT Project @ Queens University Hackathon 2018** for prototyping a home facial recognition platform

## TECHNICAL SKILLS & TOOLS

- Languages:** C++, C, Python, MATLAB, Bash, JavaScript, Java
- Software:** ROS, Qt, OpenCV, TensorFlow, Arduino, CUDA, OpenGL, Git
- Design/Hardware:** SolidWorks, Fusion360, AutoCAD, Machining Tools, PCB Design, Soldering, Oscilloscopes

## EDUCATION

- University of Waterloo, Mechatronics Engineering, Option in Artificial Intelligence (GPA: 3.86)** Sep '16 – Apr '21
  - Online Coursework:** Robotics SW Engineering (ColumbiaX), AI for Robotics (Udacity), CS 231n - CNNs for Visual Recognition (Stanford)

## INTERESTS

- Long Distance Running** - Ontario 2014 Track and Field Finalist, Cross Country Runner
- Hiking** - Climbed mountains in Alberta, climbed Mount Damavand, looking to climb Mount Kilimanjaro