Johnson **Zhong**

Robotics Engineering Student

Contact

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Education

2013-09 to 2018-06

University of Toronto

- B.ASc in Engineering Science Robotics
- Cumulative GPA: *3.91/4.0*
- Major GPA: *4.0/4.0*
- **Rank 2**/161 in 3rd year

Work Experience

2016-05 to 2017-09

Verity Studios R&D Engineering Intern with Prof. Raffaello D'Andrea

16 months Professional Experience Year, Zurich - veritystudios.com

Verity Studios is an ETH spinoff specializing in indoor drone show systems. My largest project was designing and implementing a parameters framework for multiple hardware platforms. Parameters differentiated behaviour for devices running the same firmware.

- No code duplication between hardware platforms
- No wasted space for parameters of other platforms
- Parameters retained values intelligently through addition/removal of parameters
- PC software can communicate parameters with all hardware platforms and versions without recompilation

Awards

2016-03 **1st** in Ontario Engineering Competition Programming category **($2000)** - johnsonzhong.me/projects/snowfun

2015-10 **1st** in Canada in IEEEXtreme 9.0 (28/6800 globally) **($2000)** - johnsonzhong.me/res/ieee9.pdf

2015-01 Context.io API prize in PennApps Winter 2015 **($500)** - devpost.com/software/snowball

2014-10 8th in Canada in IEEEXtreme 8.0 (52/6500 globally) - johnsonzhong.me/res/ieee8.pdf

2014-09 Google Cloud Platform prize in Hack the North 2015 **($1000)** - devpost.com/software/forenships

2013-10 6th in Canada in IEEEXtreme 7.0 (43/7500 globally) - johnsonzhong.me/res/ieee.jpg

Languages

	Experience [> lines of code]
C++	50k
Javascript	10k
Python	5k
C	5k
Java	2k

Projects

2015-09 to 2015-11

Autonomous Cooperating Robots

AER201 Design Project in a team of 3 - johnsonzhong.me/projects/robot/

The task was to design and build a mobile robot to play connect-4 on a semi-randomized game board. We decided to pursue a two robots approach, one for retrieving the ball and one for playing the ball.

- Targeted randomly placed high-reward ball dispensers to obtain **fastest ball retrieval time** (3 ball/min vs average 0.5 ball/min)

2014-11 to 2015-09

Simple Algorithms and Data Structures Library

Open source personal project - johnsonzhong.me/sal/

Header only C++ template library with an interactive tester focused on implementation readability.

- Implemented sets and maps with treaps to get **4x insertion and 2x read** time improvements over standard library

Research Experience

2016-05 to 2017-09

Verity Studios R&D Engineering Intern with Prof. Raffaello D'Andrea

16 months Professional Experience Year, Zurich - veritystudios.com

- Modelled localization system that gave position updates to drones
- Estimated localization performance at any point inside any hypothetical flight space
- Achieved **0.86 correlation with 95% confidence of >0.8** against real performance
- Designed model for computational efficiency and suitability as a cost function

2015-05 to 2015-09

FPGA CAD Routing Optimization with Prof. Vaughn Betz

Summer research with USRA NSERC 5k grant, University of Toronto - johnsonzhong.me/projects/vpr

Verilog-to-Routing (VTR) is a CAD flow mapping Verilog to FPGAs. Its runtime performance was bottlenecked by the routing phase for large circuits.

- Developed route tree pruning algorithm to allow incremental reroutes, speeding up routing by up to **3x** on difficult benchmarks
- Designed targeted rerouting algorithm for critical yet suboptimal connections, producing up to **30% faster** resulting circuits (maximum frequency)
- Benchmarked over realistic circuits, with speedups scaling with circuit size

Software Skills

Build tools	CMake, Makefile
Version control	Git, SVN
Environments	Windows, Linux, Arduino
Libraries	Boost, QT
Code review	Gerrit
Integration	Buildbot, Jenkins

Courses

Heavy focus	Control theory, Machine learning, Modelling

Medium focus

Dynamics, Kinematics, Probability, Algorithms

Light focus	Economics, Marketing