

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: 3.92/4.0
- ◆ Major GPA: 4.0/4.0
- ◆ Rank 2/161 in 3rd year

RESEARCH EXPERIENCE

2017-09 to 2018-05

Magnetic Microbead Control for Intracellular Manipulation with Prof. Yu Sun

Undergraduate Thesis at the Advanced Micro and Nanosystems Laboratory

Project plan is to:

- ◆ Create simulation of the magnetic system
- ◆ Adapt controllers to a lower visual feedback frequency (30Hz to 4Hz)
- ◆ Design a controller to simultaneously control multiple beads to enable twist manipulation

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.

- ◆ 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
- ◆ Designed and implemented cross-platform parameters framework
- ◆ Parameters retained stored values intelligibly after firmware updates

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

FUNDING AWARDED

2015-05

Undergraduate Student Research Awards (USRA) grant from Natural Sciences and Engineering Research Council of Canada (NSERC) (\$6000)

ACADEMIC HONOURS

2013-09 to 2018-05

Shaw Admission Scholarship (\$20000)

2013-09

Walter Scott Guest Memorial Scholarship (\$5000)

AWARDS

2016-03

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

2015-10

1st in Canada in IEEEExtreme 9.0 (28/6800 globally) - 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 IEEEExtreme 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 IEEEExtreme 7.0 (43/7500 globally) - johnsonzhong.me/res/ieee.jpg

PUBLICATIONS

2018-01

Kevin Murray, Oleg Petelin, Jason Luu, Sheng Zhong, Jia Min Wang, Eugene Sha, Ken Kent, Vaughn Betz. "VTR 8.0: Highly Customizable FPGA Architecture Evaluation and CAD." To be submitted to ACM Transactions on Reconfigurable Technology and Systems.

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

LANGUAGES

Experience [> lines of code]

C++	50k
Javascript	10k
Python	5k
C	5k
Java	2k