

JOHNSON ZHONG

ROBOTICS ENGINEERING STUDENT

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EDUCATION

2018-09 TO NOW

University of Michigan

- PhD Candidate in Robotics under Dmitry Berenson
- Cumulative GPA: **4.0**/4.0

2013-09 TO 2018-06

University of Toronto

- B.ASc in Engineering Science Robotics with high honours - johnsonzhong.me/res/grad/degree.pdf
- Cumulative GPA: **3.91**/4.0
- Major GPA: **4.0**/4.0
- Rank **2**/161 in semester 5 | **5**/158 in semester 6

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 **MATLAB** **QT**

The lab develops a cutting edge magnetic tweezer to manipulate nano-sized beads

- Created simulation of the magnetic system
- Explored how practical constraints impacted controllable region
- Designed a learned gain scheduling controller to optimize controllable region

2016-05 TO 2017-09

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

16 months Professional Experience Year, Zurich - veritystudios.com **C++** **QT** **boost**

Verity Studios is an ETH spinoff specializing in indoor drone show systems.

- Modelled novel indoors localization system using physics first principles
- Enabled optimization of flight performance
- Achieved **correlation of 0.86** (95% confidence >0.80) against experimental performance

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 **C++**

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

2018-04

Engineering Science Award of Excellence -

johnsonzhong.me/res/grad/award_of_excellence.pdf

2018-01

3rd in Ontario Engineering Competition 2018 Programming category (\$500)

2016-03

1st in Ontario Engineering 2016 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

K. E. Murray, O. Petelin, S. Zhong, J. M. Wang, M. Eldafrawy, J.-P. Legault, E. Sha, A. G. Graham, J. Wu, M. J. P. Walker et al., "Vtr 8: High performance cad and customizable fpga architecture modelling," ACM Transactions on Reconfigurable Technology and Systems (TRETs), 2019.

PROJECTS

2015-09 TO 2015-11

Autonomous Cooperating Robots

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

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/ C++

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 [> thousands of lines of code]
C++	50
Python	30
Javascript	15
C	5