

Trevor A. Brown

42 Berkshire Square, Brampton, Ontario, Canada, L6Z 1N4
(647) 286-0462, me@tbrown.pro, http://tbrown.pro

Postdoctoral researcher at the Technion, Israel Institute of Technology

Education

- **University of Toronto**, Toronto, Canada, Jan. 2013 – Jun. 2017
Ph.D. Computer Science (supervised by Faith Ellen); A+ GPA
Thesis: Techniques for constructing efficient lock-free data structures
- **University of Toronto**, Toronto, Canada, Sep. 2011 – Jan. 2013
M.Sc. Computer Science (supervised by Faith Ellen); A+ GPA
Thesis: Pragmatic primitives for non-blocking data structures
- **York University, First Class with Distinction**, Toronto, Canada, 2006 – 2011
B.Sc. Hons. Major Computer Science, Hons. Minor Mathematics; A+ GPA

Research Interests:

- Data structures for shared memory systems
- Lock-free memory reclamation
- Atomic synchronization primitives and transactional memory
- Non-volatile memory

Employment

- *Postdoctoral Researcher.* Technion, Israel Institute of Technology (2017).
Working with Professor Hagit Attiya.
- *Research Assistant.* Oracle Labs East (Summer 2015).
Scalable synchronization group. Designed and implemented adaptive transactional lock-elision algorithms, and work delegation algorithms, for large scale systems with non-uniform memory architectures.
- *Web Application Developer.* UPS Canada (2005 – 2006, 2008 – 2009).
Redesigned internal software to handle 20 times larger user base and replaced aging desktop applications with web applications.

Conference and Journal Publications

1. (2017) Maya Arbel-Raviv and Trevor Brown. Reuse, don't recycle: transforming lock-free algorithms that throw away descriptors. To appear at **DISC'17**.
2. (2017) Trevor Brown and Srivatsan Ravi. Cost of concurrency in hybrid transactional memory. To appear at **DISC'17**.
3. (2016) Hillel Avni and Trevor Brown. PHyTM: persistent hybrid transactional memory. To appear at **VLDB'17**. Also published in the journal **VLDBJ**.
4. (2017) Trevor Brown. A template for implementing fast lock-free trees using HTM. **PODC'17**.
5. (2016) Trevor Brown, Alex Kogan, Yossi Lev and Victor Luchangco. Investigating the performance of hardware transactions on a multi-socket machine. **SPAA'16**.
6. (2015) Trevor Brown. Reclaiming memory for lock-free data structures: there has to be a better way. **PODC'15**.
7. (2014) Trevor Brown. B-slack trees: space efficient B-trees. **SWAT'14**.
8. (2014) Trevor Brown, Faith Ellen and Eric Ruppert. A general technique for non-blocking trees. **PPoPP'14**.
9. (2013) Trevor Brown, Faith Ellen and Eric Ruppert. Pragmatic primitives for non-blocking data structures. **PODC'13**.
10. (2012) Trevor Brown and Hillel Avni. Range queries in non-blocking k-ary search trees. **OPODIS'12**.
11. (2011) Trevor Brown and Joanna Helga. Non-blocking k-ary search trees. **OPODIS'11**.

Patent Applications

1. (2016) Alex Kogan, Yossi Lev, Victor Luchangco and Trevor Brown. Adaptive techniques for improving performance of hardware transactions on multi-socket machines (Oracle Labs, US patent application #20170075720).

Short Papers and Posters

1. (2017) Maya Arbel-Raviv and Trevor Brown. Reuse, don't recycle: transforming lock-free algorithms that throw away descriptors. Poster and short paper at **PPoPP'17**.
2. (2016) Faith Ellen and Trevor Brown. Concurrent data structures. Invited talk by Faith and short paper (co-authored) at **PODC'16**.
3. (2015) Trevor Brown. Faster data structures in transactional memory using three paths. Short paper at **DISC'15**.
4. (2014) Trevor Brown, Faith Ellen and Eric Ruppert. A general technique for non-blocking trees. Short paper at **DISC'13**.

Technical Reports

1. (2017) Trevor Brown. A template for implementing fast lock-free trees using HTM. Arxiv Computing Research Repository (CoRR), abs/1708.04838
2. (2017) Maya Arbel-Raviv and Trevor Brown. Reuse, don't recycle: transforming lock-free algorithms that throw away descriptors. Arxiv Computing Research Repository (CoRR), abs/1708.01797
3. (2011) Trevor Brown and Joanna Helga. Non-blocking k-ary search trees. York University Technical Report CSE-2011-04.

Workshop Papers

1. (2017) Trevor Brown and Srivatsan Ravi. Cost of concurrency in hybrid transactional memory. **TRANSACT'17**.
2. (2016) Hillel Avni and Trevor Brown. PHyTM: persistent hybrid transactional memory. **TRANSACT'16**.
3. (2016) Trevor Brown, Alex Kogan, Yossi Lev and Victor Luchangco. Investigating the performance of hardware transactions on a multi-socket machine. **TRANSACT'16**.

Invited Lectures

- Java Experiments on MTL: From past mistakes to best practices. York University. CSE6490: Concurrent Object Oriented Languages (2015).
- Experiences with Intel's Multicore Testing Lab. York University. CSE6490: Concurrent Object Oriented Languages (2011).

Seminars

- Techniques for Constructing Efficient Lock-free Data Structures. Technion, Israel (2017). (An expanded version of the previous talk.)
- Techniques for Constructing Efficient Lock-free Data Structures. University of Toronto (2017)
- Scalable transactions on NUMA systems. Oracle Labs (2015).
- Building a non-blocking chromatic tree. TransForm School on Research Directions in Distributed Computing (2013).
- Pragmatic primitives for non-blocking data structures. University of Toronto (2013).

Supervisory Experience (undergraduate research projects)

- Jialin Song: designing a locking scheme that bridges the gap between fine-grained and coarse-grained locking (2014).
- Ken Hoover: designing and implementing a non-blocking relaxed AVL tree, and a non-blocking relaxed (a,b)-tree (2013).

Teaching Experience

- *Teaching Assistant – University of Toronto* (2011 – 2014)
CSC263: data structures and analysis (2011, 2012, 2013, 2014).
CSC265: enriched data structures and analysis (2011).
CSC369: principles of operating systems (2012).
CSC2221: graduate theory of distributed computing (2013).
Conducted over 60 lectures, and graded and invigilated exams.
- *Programming contest coach: conducting workshops – York University* (2009)
Held a series of mini-workshops on algorithms. Gave short lectures, involving students in the process of solving algorithmic problems, then directed hands-on problem solving sessions.

Academic Awards

NSERC Postdoctoral fellowship (\$90,000)	2017 – 2018
<i>Second highest</i> ranked applicant, according to NSERC rankings	
NSERC Alexander Graham Bell CGS D3 (\$105,000)	2013 – 2016
U of T fellowship (\$28,000)	2013 – 2016
NSERC Alexander Graham Bell CGS M (\$17,500)	2011
U of T fellowship (\$11,000)	2011
NSERC Undergraduate Research Awards (\$22,000)	2009, 2010, 2011
York University Entrance/Continuing Scholarships (\$3,720)	2006 – 2010
York Professor Ruth Hill Memorial Award (\$1,045)	2008
Awarded to the top undergraduate student in the Faculty of Science and Engineering	

Other Achievements

- Award for Excellence in Teaching Assistance (U of T CS Student Union, 2014).
- Faculty of Science and Engineering Silver Medal (York University, 2011).
- Honourable Mention in the Computing Research Association's Outstanding Undergraduate Researcher Award competition (2011).
- Represented York at the ACM International Collegiate Programming Contests, ECNA region (2007 – 2011). In 2009, led senior school team to finish 6th (of 115).
- Dean's Honour Roll (York University) – Science and Engineering (2007 – 2011).
- Chair's Honour Roll (York University) – Mathematics and Statistics (2010).

Community Service

- *Refereed papers* for PODC'11, DISC'12, PODC'13, DISC'14, PODC'14, PPOPP'16, SIROCCO'16, SPAA'16, DISC'16, SPAA'17, RANDOM'17, DISC'17, three papers for the journal Distributed Computing, and one for the IEEE journal TPDS.
Also performed artifact evaluation for PPOPP'16.
- *Served on comp. sci. chair search committee - University of Toronto (2015)*
- *Wrote three tenure recommendation letters for professors - York University*
- *Developed student study resources (2009 – 2010)*
Developed online student resources for York courses in Operations Research and Japanese, and for would-be participants in the ACM ICPC programming contests. They have been accessed over 250,000 times.
- *Volunteer note-taker (2008 – 2009)*
Tutored and took notes on behalf of students with extra accessibility needs.

Technical skills

- Extensive experience in Java, C/C++, shell scripting, Linux tools, Java concurrency and x86/amd64/POWER8 concurrency in C++
- Extensive experience with large scale Intel, AMD, SPARC and POWER8 systems
- Knowledge of algorithm optimization and cache coherence protocols
- Extensive practice designing experiments, determining whether experimental results are valid, and identifying errors that yield invalid results