ANDY A. HWANG

Ph.D. Student
Department of Computer Science
University of Toronto

www.cs.toronto.edu/~hwang/
hwang@cs.toronto.edu

EDUCATION

Current	**Ph.D. Student, Department of Computer Science, University of Toronto** Advisor: Prof. Bianca Schroeder
2009-2011	**M.Sc., Department of Computer Science, University of Toronto** Advisor: Prof. Bianca Schroeder Research Paper: Statistical Study of DRAM Failure Characteristics
2004-2009	**B.A.Sc., Honours Computer Engineering with Mathematics Option, University of Waterloo**

PUBLICATIONS AND REPORTS

ACM Trans. Storage April 2020	**The Reliability of Modern File Systems in the face of SSD Errors**, Shehbaz Jaffer, Stathis Maneas, **Andy Hwang**, and Bianca Schroeder ACM Transactions on Storage (ACM TOS), Volume 16, Issue 1, Article 2 • Invited to appear based on ATC work
ATC 2019 Renton, WA, U.S.A.	**Evaluating File System Reliability on Solid State Drives**, Shehbaz Jaffer, Stathis Maneas, **Andy Hwang**, Bianca Schroeder USENIX Annual Technical Conference (ATC '19)
SIGMETRICS 2012 London, U.K.	**Temperature Management in Data Centers: Why some (might) like it hot**, Nosayba El-Sayed, Ioan Stefanovici, George Amvrosiadis, **Andy A. Hwang**, Bianca Schroeder ACM SIGMETRICS/PERFORMANCE joint international conference on Measurement and Modeling of Computer Systems (SIGMETRICS '12), • Conference **Best Paper Award** • Short version invited to appear in USENIX ;login: Magazine, Feb 2013 • Reported in the Communications of the ACM, Oct 2012
ASPLOS 2012 London, U.K.	**Cosmic Rays Don't Strike Twice: Understanding the Nature of DRAM Errors and the Implications for System Design**, **Andy A. Hwang**, Ioan Stefanovici, Bianca Schroeder Architectural Support for Programming Languages and Operating Systems (ASPLOS '12),. • Short version invited to appear in IEEE Spectrum Magazine • Highlighted by Wired: "Your PC just crashed? Don't blame Microsoft"
2011	**Statistical Study of DRAM Failure Characteristics**, M.Sc. Research Paper, Department of Computer Science, University of Toronto

AWARDS

2018-2019	**Bell Graduate Scholarship**
2015-2016	**Doctoral Completion Award**, Department of Computer Science, University of Toronto
2013-2014	**Ontario Graduate Scholarship**
2009	**The Sandford Fleming Foundation Medal for Cooperative Work Term Proficiency**, Faculty of Engineering, University of Waterloo

AWARDS

2008	**Undergraduate Research Assistantship**, Faculty of Engineering, University of Waterloo
2006	**NSERC Undergraduate Student Research Award**

EXPERIENCE

Summer 2012 — **Business Intelligence Intern**
Amazon Web Services, Seattle, WA
- Data-driven product analysis and customer profiling

Fall 2008 — **International Student Intern**
Sun Labs, Sun Microsystems Inc., Menlo Park, CA
- In-memory implementation of BigTable
- Investigation of the data structure, properties and usage of BigTable and Hadoop HBase

Winter 2008 — **Undergraduate Research Assistant**
Faculty of Engineering, University of Waterloo
Advisor: Prof. Patrick Lam
- Investigation and optimization of Soot Java point analysis framework

Fall 2007 — **Software Developer, Imaging Algorithms Team**
Epson Canada, Toronto, ON
- Parallel programming using OpenMP and 64bit port of object detector training program
- Algorithm experimentation and optimization
- Developed software to for sample gathering and demonstration

Winter 2007 — **Compilation Technologies Build, Packaging, and Install**
IBM Toronto Lab, Toronto, ON
- Involved in build setup, planning and testing of IBM XL C/C++/Fortran compilers
- Administrated build environments, resolved daily build issues on AIX/Linux

Spring 2006 — **Research Assistant**
Department of Electrical and Computer Engineering, University of Waterloo
Advisor: Prof. Amir K. Khandani
- Derived input estimation methods for switching implementations during runtime based on Bayesian and other statistical approaches
- Constructed and conducted simulations, investigated practical applications

TEACHING

2016-2018	CSC 469 **Advanced Operating Systems** (TA)
2011-2015, 2017	CSC 369/C69 **Operating Systems** (TA)
2013	CSC B09 **Software Tools and Systems Programming** (Assistant Instructor and TA)
2009-2011	CSC 258 **Computer Organization** (Laboratory TA)

PROJECTS

Current — **Memory Error Mitigation Using Virtualization Extensions**
- Transparent memory remapping using Extended Page Tables (KVM and Intel VMX)
- Transition from bare-metal to virtualized of a running OS instance

2017-Current — **File System Reliability on Solid State Drives**
- Implement device-mapper module to inject errors into multiple file systems at block level

PROJECTS

2009-Current **Memory Error Characteristics in HPC Clusters**
- Analysis of failure data from Google, Argonne National Lab, Los Alamos National Lab, SciNet
- Explore Spatial and temporal correlation between errors; aging and degradation trends
- Correlate memory errors with node outages and job failures

2014 **Enhancing Reliability of Phase Change Memory**, Topics in Storage Systems Course Project
- Enable page reuse by storing fine-grained remapping information
- Performance evaluation of Read-After-Write mechanism for PCM access

2011-2012 **Temperature Effects on Datacenter Performance and Reliability**
- Whole server and component benchmarking under different operating temperatures
- Performance and energy measurements

2012 **Online Database Consistency Checking**, Dependable Systems Course Project
- Online checking of database invariants in SQLite

2011 **PAX for PostgreSQL**, Advanced Topics in Database Systems Course Project
- Implement and evaluate column-wise layout within data pages for PostgreSQL

2008-2009 **Swarm Robotic Construction**, 4th Year Engineering Design Project
- Develop swarm algorithms for construction using LEGO Mindstorms NXT robots
- Implement image processing and Bluetooth communication modules

EXTRACURRICULAR

2014-2016 CUPE 3902 Departmental Steward

2013 Grad Visit Day Volunteer and Student Mentor, Department of Computer Science

2010-2012 Systems & Networking Research Pizza Lunch Organizer