Mario J. Badr

Contact Information	The Edward S. Rogers Department of Electrical and Computer Engineering Room 1107, Sandford Fleming Bldg. 10 King's College Road, Toronto, ON M5S 3G4 Canada University of Toronto
Research Interests	Many-core/multi-core/heterogeneous architectures, synchronization, cache coherence, interconnection networks, analytical models, computer systems performance analysis.

Industry Experience

Qualcomm Research Silicon Valley Santa Clara, California, USA
Intern (C++, OpenCL, Hexagon, CMake) *May, 2015 - August, 2015*
Used the Multicore Asynchronous Runtime Environment (MARE) to develop a heterogeneous application with multiple domain-specific kernels. Provided feedback to the MARE team on performance issues and bottlenecks.

Environment Canada Toronto, Ontario, Canada
Intern (Java, XML) *June, 2009 - August, 2010*
Implemented new features and bug fixes for the NinJo workstation, a tool for meteorologists. Notable projects include upgrading the visualization framework for lightning strikes to be faster and use significantly less memory, incorporating storm cell data for Canada, and helping to create a configurable view of weather data for a given storm cell.

Awards

Electrical & Computer Engineering Teaching Assistant Award *2016*
Awarded by student vote and department review to the top three teaching assistants for the Fall semester.

Roberto Padovani Intern Scholarship - *$5,000* *2015*
Awarded to seven Qualcomm Research interns across the globe for outstanding technical contributions made during their internship.

Thomas Noakes & Queen Elizabeth II Graduate Scholarship - *$15,000* *2015*
Awarded for excellence in science and technology.

Teaching Assistant Teaching Excellence Award - *$200* *2015*
Awarded to four recipients across the three University of Toronto campuses based on nominations, references, and teaching philosophy.

Peer-Reviewed Publications

Joshua San Miguel, **Mario Badr**, and Natalie Enright Jerger. *Load Value Approximation.* In Proceedings of the International Symposium on Microarchitecture (MICRO), December 2014. (acceptance rate: 19%)

Mario Badr and Natalie Enright Jerger. *SynFull: Synthetic Traffic Models Capturing a Full Range of Cache Coherence Behaviour.* In Proceedings of the International Symposium on Computer Architecture (ISCA), June 2014. (acceptance rate: 18%)

Refereed Workshops & Posters

Workshop Paper
Ajaykumar Kannan, **Mario Badr**, Parisa Khadem Hamedani and Natalie Enright Jerger. *Offloading to the GPU: An Objective Approach.* In Proceedings of the International Workshop on Parallelism in Mobile Platforms (PRISM), June 2015.

Poster
Joshua San Miguel, **Mario Badr**, and Natalie Enright Jerger. *Load Value Approximation.* At the International Symposium on Microarchitecture (MICRO), December 2014.

Mario Badr and Natalie Enright Jerger. *SynFull: Traffic Models Capturing Cache Coherence Behaviour.* At the International Symposium on Computer Architecture (ISCA), June 2014.

Mario Badr and Natalie Enright Jerger. *SynFull: Synthetic Traffic Models That Capture Cache Coherent Behaviour.* At the University of Toronto Electrical and Computer Engineering Graduate Symposium (Connections), May 2014. Awarded *Best Oral Presentation.*

Mario Badr and Natalie Enright Jerger. *Realistic Synthetic Traffic* At the University of Toronto Electrical and Computer Engineering Graduate Symposium (Connections), May 2012.

SynFull   *MIT License*

Implementation of a statistical simulation methodology for design-space exploration of Networks-on-Chip. The artifact includes R scripts for generating models based on network traces. In addition, a C++ executable can load the models to generate synthetic traffic.

Engineering Strategies and Practice   1st Year Undergraduates, T-Program
Teaching Assistant   *Tutorials*

Supervised students through the design process for a given project and provided feedback on written design documents, with a focus on stimulating an engineering methodology to design.

Computer Fundamentals   1st Year Undergraduates, T-Program
Teaching Assistant   *Tutorials, Computer Lab*

Taught the fundamentals of computer programming in C, including data structures, recursion, and sorting algorithms. Also delivered the 2013 Exam Jam review session, covering multiple prior exam questions in detail.

Programming Fundamentals   2nd Year Undergraduates
Teaching Assistant, Substitute Lecturer   *Tutorials*

Taught the fundamentals of C++ and object-oriented programming, including value versus reference semantics and memory management on the stack and heap. Delivered two lectures on recursion using an in-depth maze example with a step-by-step visualization of the maze traversal.

Communication and Design   2nd Year Undergraduates
Teaching Assistant, Course Development   *Tutorials, Computer Lab*

Mentored student groups in the implementation of an application that visualizes and finds routes in a city map. Developed six new tutorials in 2017 to help students with software engineering.

Computer Organization   3rd Year Undergraduates
Teaching Assistant   *Computer Lab*

Supervised and helped students implement a simple von Neumann processor using verilog.

Computer Architecture   4th Year Undergraduates & Graduates
Teaching Assistant   *Computer Lab*

Taught computer architecture concepts, including caches, pipelining, out-of-order cores, and cache coherence.

Appointed Graduate Representative   2015-2016

Executive Committee of Faculty Council - Faculty of Applied Science & Engineering

Graduate Representative   2015-2016

Faculty Council - Faculty of Applied Science & Engineering

President   2015-2016

Electrical and Computer Engineering Graduate Students' Society

Bargaining Support Committee Member   January - April 2014

Canadian Union of Public Employees

Department Steward   2013-2014
Canadian Union of Public Employees

Social Event Coordinator   2012-2013
Electrical and Computer Engineering Graduate Students' Society

PROFESSIONAL
DEVELOPMENT

Teaching in Higher Education   2015
One semester course
Learned more about teaching theories and styles and was observed by peers while teaching a tutorial on Computer Architecture. Also developed a course syllabus for a fictitious course.

Prospective Professors in Training   2014-2015
Thirteen Seminars, One semester course
Began preparations for becoming a professor in academia, attending several seminars and preparing a preliminary teaching dossier and research statement. Also completed a course on Teaching Engineering in Higher Education.

Mini-MBA   2015
Ten Classes
Gained an understanding of fundamental business concepts and applied what I learned in a group-based case competition.

Oral Presentation Skills   2014
Five Classes
Examined presentation structure and the use of visual aids. Exchanged feedback with peers and the instructor on individual oral presentations.

Prewriting Strategies for Developing and Organizing Your Ideas   2014
Four Classes
Learned several new strategies for developing and organizing ideas before (and during) the writing process.

NSERC Proposal Workshop   2014
Three Classes
Examined features of good and bad proposal writing, and exchanged feedback with peers on our own NSERC proposals.

Teaching Fundamentals Certificate   2012-2013
Six Workshops
Improved my teaching skills with workshops on pedagogy, research, academic integrity, and students in difficulty.

EDUCATION

Ph.D., Computer Engineering   September, 2013 - Present
University of Toronto   *Toronto, Ontario, Canada*
Dissertation: "Novel Evaluation Methodologies for Future Architectures"
Advisor: Natalie Enright Jerger

M.A.Sc, Computer Engineering   January 2014
University of Toronto   *Toronto, Ontario, Canada*
Thesis: "Synthetic Traffic Models that Capture Cache Coherence Behaviour"
Advisor: Natalie Enright Jerger

B.A.Sc, Electrical Engineering   May 2011
University of Toronto   *Toronto, Ontario, Canada*