

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.
EDUCATION	<p>Ph.D., Computer Engineering September, 2013 - Present <i>University of Toronto</i> Dissertation: "Novel Evaluation Methodologies for Future Architectures" Advisor: Natalie Enright Jerger</p> <p>M.A.Sc, Computer Engineering January 2014 <i>University of Toronto</i> Thesis: "Synthetic Traffic Models that Capture Cache Coherence Behaviour" Advisor: Natalie Enright Jerger</p> <p>B.A.Sc, Electrical Engineering May 2011 <i>University of Toronto</i></p>
INDUSTRY EXPERIENCE	<p>Qualcomm Research Silicon Valley Santa Clara, California, USA <i>Intern (C++, OpenCL, Hexagon, CMake)</i> 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.</p> <p>Environment Canada Toronto, Ontario, Canada <i>Intern (Java, XML)</i> 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.</p>
AWARDS & SCHOLARSHIPS	<p>Ontario Graduate Scholarship - \$15,000 2017 Awarded for excellence in graduate studies.</p> <p>Electrical & Computer Engineering Teaching Assistant Award 2016 Awarded by student vote and department review to the top three teaching assistants for the Fall semester.</p> <p>Roberto Padovani Intern Scholarship - \$5,000 2015 Awarded to seven Qualcomm Research interns across the globe for outstanding technical contributions made during their internship.</p> <p>Thomas Noakes & Queen Elizabeth II Graduate Scholarship - \$15,000 2015 Awarded for excellence in science and technology.</p> <p>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.</p>

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. *Off-loading 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.

PRESENTATIONS

Mario Badr, Natalie Enright Jerger, Riken Gohil, Radhika Jagtap, and Matteo Andreatti. *Generating Synthetic Traffic for Heterogeneous Architectures* At the ARM Research Summit, September 2017.

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.

SOFTWARE
ARTIFACTS

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.

TEACHING
EXPERIENCE

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
	<i>Teaching Assistant</i>	<i>Computer Lab</i>
	Supervised and helped students implement a simple von Neumann processor using verilog.	
	Computer Architecture	4th Year Undergraduates & Graduates
	<i>Teaching Assistant</i>	<i>Computer Lab</i>
	Taught computer architecture concepts, including caches, pipelining, out-of-order cores, and cache coherence.	
UNIVERSITY SERVICE	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	
	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. Developed a course syllabus for a fictitious course.	
	Teaching Engineering in Higher Education	2015
	<i>One semester course</i>	
	Learned concepts on curriculum, teaching, and learning. Reviewed research in engineering education.	
	Prospective Professors in Training	2014-2015
	<i>Thirteen Seminars, One semester course</i>	
	Began preparations for becoming a professor in academia and prepared academic dossier.	
	Mini-MBA	2015
<i>Ten Classes</i>		
Gained an understanding of fundamental business concepts and participated a case competition.		
Oral Presentation Skills	2014	
<i>Five Classes</i>		
Examined presentation structure and the use of visual aids. Exchanged feedback with peers.		
Prewriting Strategies for Developing and Organizing Your Ideas	2014	
<i>Four Classes</i>		
Learned several new strategies for developing and organizing ideas before the writing process.		
NSERC Proposal Workshop	2014	
<i>Three Classes</i>		
Examined features of good and bad proposal writing, and exchanged feedback with peers.		
Teaching Fundamentals Certificate	2012-2013	
<i>Six Workshops</i>		
Improved my teaching skills with workshops on pedagogy, research, academic integrity, and students in difficulty.		