

# Ioana Burcea

**Office Address:**

Dept. of Electrical and Computer Engineering  
10 King's College Road  
Toronto, ON, M5S 3G4, Canada

**Email:** [ioana@eecg.toronto.edu](mailto:ioana@eecg.toronto.edu)**Web:** <http://www.eecg.toronto.edu/~ioana>**Citizenships:** Romanian, Canadian

## RESEARCH INTERESTS

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**Computer Architecture** (focus on hardware optimizations, cache performance and multi-core chip design)

**Runtime Systems** (focus on hardware-software interaction and dynamic optimizations)

## EDUCATION

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### University of Toronto, Electrical and Computer Engineering Department

2004 - 2011 (expected)

Ph.D. Candidate, GPA: 4.0

Thesis Title: Predictor Virtualization - Teaching Old Caches New Tricks

Thesis Supervisor: Professor Andreas Moshovos

2002 - 2004

M.A.Sc., GPA: 4.0

Thesis Title: XToPSS - Efficient XML Filtering Against Large Numbers of XPath Expressions

Thesis Supervisor: Professor Hans-Arno Jacobsen

### University Politehnica of Bucharest (Romania), Computer Science and Engineering Department

1997 - 2002

B.Sc. Final Average: 9.95 (out of 10)

Ranked first of the 2002 graduating class

## PUBLICATIONS

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- **Ioana Burcea**, Andreas Moshovos - "Phantom-BTB: A Virtualized Branch Target Buffer Design", *The 14<sup>th</sup> International Conference on Architectural Support for Programming Languages and Operating Systems - ASPLOS 2009*
- **Ioana Burcea**, Jason Zebchuk, Andreas Moshovos - "Teaching Old Caches New Tricks: RegionTracker and Predictor Virtualization", IEEE Pacific Rim Conference on Communications, Computers, and Signal Processing - **PacRim 2009**, invited paper
- **Ioana Burcea**, Stephen Somogyi, Andreas Moshovos, Babak Falsafi - "Predictor Virtualization", *The 13<sup>th</sup> International Conference on Architectural Support for Programming Languages and Operating Systems - ASPLOS 2008*
- **Ioana Burcea**, Hans-Arno Jacobsen, Eyal de Lara, Milenko Petrovic, Vinod Muthusamy - "Disconnected Operation in Publish/Subscribe Systems", *The 5<sup>th</sup> IEEE International Conference on Mobile Data Management - MDM 2004*
- Milenko Petrovic, **Ioana Burcea**, Hans-Arno Jacobsen - "S-ToPSS - Semantic Toronto Publish Subscribe System", *The 29<sup>th</sup> International Conference on Very Large Data Bases - VLDB 2003*, demo paper
- **Ioana Burcea**, Hans-Arno Jacobsen - "L-ToPSS - Push-Oriented Location-Based Services", *The 4<sup>th</sup> International Workshop on Technologies for E-Services - TES 2003* - Collocated with VLDB 2003
- **Ioana Burcea**, Milenko Petrovic, Hans-Arno Jacobsen - "I Know What You Mean: Semantic issues in Internet-Scale Publish Subscribe Systems" - *The 1<sup>st</sup> International Workshop on Semantic Web and Databases - SWDB 2003* - Collocated with VLDB 2003
- Hubert Ka Ya Leung, **Ioana Burcea**, Hans-Arno Jacobsen - "Modeling Location Based Services with Subject Spaces", International Conference of the IBM Center for Advanced Studies on Collaborative Research, **CASCON 2003**

## SELECTED HONORS AND AWARDS

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2010 - 2011	IBM PhD Fellowship
2010 - 2011	Google Canada Anita Borg Memorial Scholarship
2009	ECE Viola Carless Smith Research Fellowship
2005 - 2008	NSERC (NSF equivalent in Canada) Canada Graduate Scholarship - 3 years
2005 - 2006	Ontario Graduate Scholarship (declined)
2002 - 2005	University of Toronto Fellowship
1997 - 2002	Merit grants from the National Ministry of Education, Romania
1997	University Politehnica of Bucharest, Romania – accepted in the undergraduate program without an entrance examination due to prizes in the Romanian National Mathematics Olympiad
1997	"Mircea cel Batran" High school - First of the 1997 graduating class
1995 - 1997	Prizes and distinctions from National and Regional Mathematics Contests, Romania

## RESEARCH EXPERIENCE

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2006 - present	Research Assistant - Electrical and Computer Engineering Department, University of Toronto Research focus in computer architecture Developed and applied "Predictor Virtualization" technique in three different contexts: a data prefetcher, branch target buffers, and a Java pointer prefetcher
June - Aug 2010	Research Intern - IBM T.J. Watson Research Lab, Yorktown Heights, NY Mentors: Viji Srinivasan, Alper Buyuktosunoglu, Brian Prasky; Manager: Philip Emma Worked with the IBM research timing simulator for the System z core Designed, implemented and analyzed reactive and proactive thread prioritization techniques for simultaneous multithreading (SMT) in the context of an out-of-order System z core
Jan - July 2009	Graduate Research Intern - Intel Labs, Microarchitecture Research Lab (MRL), Santa Clara, CA Mentor: Anne Bracy; Manager: Hong Wang Worked with Intel's production-quality timing processor simulator Implemented a critical path analyzer that identifies where time is spent in the out-of-order pipeline Designed, implemented and analyzed several replacement and insertion policies for on-chip cache memories, taking data prefetching into consideration
2004 - 2005	Research Assistant - Electrical and Computer Engineering Department, University of Toronto Analyzed code-paths for Java applications Studied the potential of method-specific optimizations using the JikesRVM Just-In-Time compiler
May - Aug 2003	Research Intern - IBM Center for Advanced Studies, Toronto Investigated the application of publish/subscribe concepts to location-based services Research findings were included in a prototype demo presented at the technology exhibition in CASCON 2003
2002 - 2004	Research Assistant, Electrical and Computer Engineering Department, University of Toronto Researched different aspects related to publish/subscribe systems Designed, implemented and evaluated matching algorithms for XML documents against XPath queries

## TEACHING EXPERIENCE

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2002 - 2010	University of Toronto, Electrical and Computer Engineering Department Multiple teaching assistant appointments for the following courses: <ul style="list-style-type: none"><li>• Programming Fundamentals</li><li>• Computer Fundamentals</li><li>• Computer Organization</li><li>• Computer Architecture</li><li>• Operating Systems</li><li>• Systems Software</li><li>• Data Structures and Algorithms</li></ul>
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- Systems Design and Technical Communication
- Software Engineering II

<b>May 2006</b>	University of Toronto Teaching Assistants' Training Program (TATP) Certificate
<b>June 2004</b>	Instructor, da Vinci Engineering Enrichment Program (DEEP), University of Toronto Designed and delivered a five-day intensive course in object-oriented programming in Java, targeted at gifted high-school students
<b>2002, 2003</b>	University of Toronto, Mechanical and Industrial Engineering Teaching Assistant for Information Systems Infrastructure (Java)
<b>2001 - 2002</b>	Politehnica University of Bucharest, Romania Teaching assistant for the following courses: <ul style="list-style-type: none"> <li>• Compiler Design</li> <li>• Object Oriented Programming</li> <li>• Numerical Analysis</li> <li>• Data Structures and Algorithms</li> </ul>

## POSTERS

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<b>Sept 2010</b>	"Predictor Virtualization: A Pay-As-You-Go Approach to Hardware Predictors" - Grace Hopper Celebration of Women in Computing, selected to participate in the ACM Student Research Competition (ACM SRC)
<b>April 2010</b>	"I Know Where Your Pointers Are! Software-Directed Hardware Pointer Prefetching for Java Applications" - International Symposium on Code Generation and Optimization - CGO
<b>Mar 2009</b>	"Predictor Virtualization" - poster at the Programming Languages, Operating Systems and Architecture mentoring workshop
<b>Oct 2003</b>	"L-ToPSS – Push-oriented location-based services" – poster and demo presentation at the conference of the Centre for Advanced Studies on Collaborative Research - IBM CASCON
<b>Sept 2003</b>	"S-ToPSS – Semantic Toronto Publish Subscribe Systems" – poster and demo presentation at the International Conference on Very Large Data Bases - VLDB

## SELECTED PRESENTATIONS

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<b>July 2009</b>	"Predictor Virtualization: Teaching Old Caches New Tricks" - invited talk, Intel Corporation, Oregon
<b>Mar 2009</b>	"Phantom-BTB: A Virtualized Branch Target Buffer Design" - presentation at the International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)
<b>Jan 2009</b>	"Predictor Virtualization" - invited talk, Intel Labs, Santa Clara, CA
<b>May 2008</b>	"Predictor Virtualization" - Connections 2008 – ECE Graduate Symposium, University of Toronto Best Talk Award, May 2008
<b>Mar 2008</b>	"Predictor Virtualization" - invited talk, IBM Toronto Lab
<b>Mar 2008</b>	"Predictor Virtualization" - presentation at the International Conference on Architectural Support for Programming Languages and Operating Systems - ASPLOS
<b>Sept 2003</b>	"L-ToPSS - Push-Oriented Location-Based Services" – presentation at the 4 <sup>th</sup> International Workshop Technologies for E-Services, collocated with VLDB 2003
<b>Aug 2003</b>	"Push-Oriented Location-Based Services" – presentation at the IBM Center for Advanced Studies

## PROFESSIONAL SERVICE AND ACTIVITIES

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### DEPARTMENTAL VOLUNTEERING - ECE University of Toronto

<b>2006/2008/2009</b>	Computer Group Graduate Student Orientation Delivered presentation "How to Survive and Thrive in Graduate School" Acted as host for incoming graduate students
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- May 2008** ECE Connections 2008 Graduate Symposium  
Helped with logistics during a one-day student symposium
- 2007, 2008** Graduate Recruitment Event  
Acted as host for prospective graduate students
- 2006** Undergraduate Recruitment Event  
Showcased undergraduate student projects to high school students and their families

#### **DIVERSITY ACTIVITIES**

- May 2010** NCWIT (National Center for Women & IT) "Award for Aspirations in Computing" Reviewer (Bay Area)  
Reviewed several award applications from high school girls in the Bay Area (US)
- April 2010** Co-Host (with Prof. Natalie Enright Jerger), CRA-W/CDC DLS Recruitment Event for Groups Underrepresented in Computing  
Helped prepare the proposal for hosting a recruitment event at University of Toronto for groups underrepresented in computing  
Helped organizing the event; the event involved lectures by two distinguished speakers, followed by a panel discussion about issues pertaining to graduate life and research
- Jan 2010** Participant, Google Graduate Researchers in Academia of Diverse backgrounds (GRAD) CS Forum  
Selected to participate in the first annual Google GRAD CS Forum, a three-day networking event that brings together students who are historically underrepresented in the computer science field
- Mar 2009** Participant, CRA-W Programming Languages, Operating Systems and Architecture (PLOSA) workshop  
Offered scholarship to attend two-day mentoring workshop targeted at graduate students and early career researchers in underrepresented groups, pursuing research in programming languages, operating systems or computer architecture
- July 2006** Participant, CRA-W & CDC Computer Architecture Summer School  
Offered scholarship to participate in a three-day summer school organized for female and minority students pursuing research in computer architecture
- 2005, 2007** Participant, University of Toronto Annual Women in Academia Workshop  
Attended one-day workshop targeted at female students at University of Toronto interested in pursuing an academic career

#### **RESEARCH COMMUNITY INVOLVEMENT**

##### **Web Co-Chair**

International Conference on Parallel Architecture and Compiler Techniques (PACT 2008)

##### **Program Committee Member**

International Conference on Database and Expert Systems Applications (DEXA 2007)

##### **External Referee**

International Conference on High-Performance Computer Architecture (HPCA) 2011  
 International Symposium on Microarchitecture (MICRO) 2007, 2009, 2010  
 International Conference on Computer Design (ICCD) 2010  
 International Conference on Parallel Architecture and Compiler Techniques (PACT) 2010  
 International Symposium on Computer Architecture (ISCA) 2006, 2007  
 International Parallel & Distributed Processing Symposium (IPDPS) 2007  
 International Conference on Supercomputing (ICS) 2006  
 International Middleware Conference 2004  
 International Conference on Very Large Data Bases (VLDB) 2003

##### **Member of ACM**

##### **Member of Special Interest Group on Computer Architecture (SIGARCH)**

## **MISCELLANEOUS TRAINING**

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- 2006 - 2007** Pilot Program "Prospective Professors in Training" (20 selected student participants) - Faculty of Applied Sciences and Engineering, University of Toronto
- July 2006** Second International Summer School on Advanced Computer Architecture and Compilation for Embedded Systems (ACACES), L'Aquila, Italy
- 2000 - 2002** Microsoft Student Consultant, University Politehnica of Bucharest, Romania  
Acted as the liaison between the Microsoft Bucharest branch and the Computer Science and Engineering Department  
Delivered presentations about Microsoft technologies  
Designed and deliver C++ tutorials for second year students participating in the Microsoft Lab in the Computer Science and Engineering Department