

FAIZAL KARIM

Curriculum Vitae

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RICHMOND, BC V7E 5X9
CANADA

EDUCATION

- Ph.D., Electrical Engineering** Dec 2012
The University of British Columbia, Vancouver, Canada
Investigation of the Role of Quantum Correlations in the Modeling and Operation of Molecular Quantum-Dot Cellular Automata Based Circuits
Supervisors: Konrad Walus & André Ivanov
- M.A.Sc., Electrical Engineering** May 2007
The University of British Columbia, Vancouver, Canada
Clocking Electrode Design and Phase Analysis for Molecular Quantum-Dot Cellular Automata Based Circuits
Supervisors: Konrad Walus & André Ivanov
- B.Eng., Electrical Engineering** May 2005
Ryerson University, Toronto, Canada

RESEARCH EXPERIENCE

- RESEARCH ASSISTANT** 2007-2012
Department of Electrical and Computer Engineering, The University of British Columbia
Currently investigating techniques to improve existing numerical methods for computing the dynamics and ground state of QCA circuits by modeling the effects of higher-level correlation.
- RESEARCH ASSISTANT** 2005-2007
Department of Electrical and Computer Engineering, The University of British Columbia
Established the limitations on the applied potential and phase of clocking electrodes to ensure error-free operation of fundamental building blocks in a clocked molecular QCA circuit.
- UNDERGRADUATE RESEARCH ASSISTANT** 2003-2004
Department of Electrical and Computer Engineering, Ryerson University
Performed early validation of a potential wireless communication system that employed radio-over-fiber techniques. Designed and built a small prototype to compare physical results against numerical results.

RESEARCH INTERN 2003-2004
MARFTEC Inc.
Researched and developed an early prototype of a voice-operated telephone designed for individuals with low finger dexterity.

HONOURS AND AWARDS

NSERC CGS-D Scholarship - **\$35,000/year** 2008-2011
Faculty of Applied Science Graduate Award - **\$10,000/year** 2008-2011
UBC Four Year Fellowship - **\$18,000/year (declined)** 2008-2011
UBC Ph.D. Tuition Waiver Scholarship - **\$4,000/year** 2008-2011
Micronet R&D Scholarship - **\$20,000/year** 2007-2008
Ontario Graduate Scholarship - **\$15,000/year (declined)** 2005-2007
Award for Academic Excellence - **\$500/year** 2005
Rockwell Automation Award - **\$250/year** 2004
Ryerson In-Program Scholarship - **\$2,000/year** 2003-2005

TEACHING ACTIVITIES

SESSIONAL INSTRUCTOR Fall 2012
*Department of Mechanical Engineering,
The University of British Columbia*
MECH 368 – Engineering Measurements and Instrumentation

SESSIONAL INSTRUCTOR Fall 2012
*Department of Electrical and Computer Engineering,
The University of British Columbia*
APSC 261 – Technology and Society I

SESSIONAL INSTRUCTOR Winter 2012
*Department of Electrical and Computer Engineering,
The University of British Columbia*
APSC 160 – Intro to Computation in Engineering Design

SESSIONAL INSTRUCTOR Fall 2011
*Department of Electrical and Computer Engineering,
The University of British Columbia*
EECE 280 – Electrical Engineering Laboratory I

SESSIONAL INSTRUCTOR Fall 2011
*Department of Mechanical Engineering,
The University of British Columbia*
MECH 368 – Engineering Measurements and Instrumentation

SESSIONAL INSTRUCTOR Summer 2011
*Department of Electrical and Computer Engineering,
The University of British Columbia*
EECE 375/474 – Instrumentation and Design Laboratory

SESSIONAL INSTRUCTOR <i>Department of Electrical and Computer Engineering, The University of British Columbia</i> EECE 360 – Systems and Controls	Winter 2011
SESSIONAL INSTRUCTOR <i>Department of Electrical and Computer Engineering, The University of British Columbia</i> EECE 375/474 – Instrumentation and Design Laboratory	Fall 2010
SESSIONAL INSTRUCTOR <i>Department of Electrical and Computer Engineering, The University of British Columbia</i> EECE 375/474 – Instrumentation and Design Laboratory	Summer 2010
FACULTY FELLOW <i>UBC Student Affairs, The University of British Columbia</i> Jump Start - An introduction to Canadian academic culture for incoming international undergraduate students	Summers 2010 - present
TEACHING ASSISTANT TRAINING COORDINATOR <i>Faculty of Applied Science, The University of British Columbia</i> Developed the curriculum for the TA training program; provided training to the facilitators; assisted with the program's budget proposal and progress report	Spring 2009 - present
TEACHING ASSISTANT TRAINING FACILITATOR <i>Faculty of Applied Science, The University of British Columbia</i> Provided graduate students with the fundamental skills necessary to begin their work as Teaching Assistants	Spring 2009 - present
TEACHING ASSISTANT <i>Department of Electrical and Computer Engineering, The University of British Columbia</i>	
<ul style="list-style-type: none"> • EECE 375/474 - Instrumentation and Design • EECE 280 - Electrical Engineering Laboratory I • EECE 251 - Circuit Analysis I • EECE 466 - Digital Signal Processing • EECE 281 - Electrical Engineering Laboratory II • EECE 280 - Electrical Engineering Laboratory I • EECE 251 - Circuit Analysis I • EECE 450 - Economic Analysis of Engineering Proj. • EECE 281 - Electrical Engineering Laboratory II • EECE 280 - Electrical Engineering Laboratory I • EECE 281 - Electrical Engineering Laboratory II 	<ul style="list-style-type: none"> Winter 2010 Fall 2009 Fall 2009 Summer 2009 Winter 2009 Fall 2008 Fall 2008 Summer 2008 Winter 2008 Fall 2007 Winter 2007

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- EECE 280 - Electrical Engineering Laboratory I Fall 2006
 - EECE 365 - Applied Electronics and Electromechanics Winter 2006
 - EECE 263 - Basic Circuit Analysis Fall 2005

GUEST LECTURER

*Department of Electrical and Computer Engineering,
The University of British Columbia*

- EECE 576 - Semiconductor Theory for Device App. 2009, 2010
- EECE 401 - Nanotechnology in Electronics 2009, 2010
- EECE 466 - Digital Signal Processing 2009
- EECE 251 - Circuit Analysis I 2008, 2009

UNDERGRADUATE PROJECT SUPERVISION

*Department of Electrical and Computer Engineering,
The University of British Columbia*

- **Jacob Slack**, NSERC USRA Summer 2010
Project: *Investigated numerical methods for computing the correlated dynamics of QCA circuits and systems*
- **Calvin Chang**, EECE 496 Winter 2010
Project: *Investigated the potential of QCA for quantum computing*
- **Kenn Wang**, EECE 496 Summer 2009
Project: *Investigated the potential of a field-driven clocking scheme for molecular QCA*
- **Hajir Hoseini**, EECE 496 Summer 2009
Project: *Investigated the role of the clock and tunneling energy on the correlated dynamics of QCA circuits*
- **Aryan Navabi**, NSERC USRA Winter 2008
Project: *Investigated numerical methods for computing the ground state energy of correlated QCA circuits and systems*

JOURNAL PUBLICATIONS

1. **Faizal Karim**, Konrad Walus, André Ivanov, “Analysis of Field-Driven Clocking for Molecular Quantum-Dot Cellular Automata”, *Journal of Computational Electronics*, vol. 9, issue 1, pp. 16-30, 2010.

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2. Konrad Walus, **Faizal Karim**, André Ivanov, "Architecture for an External Input into a Molecular QCA Circuit", *Journal of Computational Electronics*, vol. 8, issue 1: Springer, pp. 35-42, 03/2009.
 3. **Faizal Karim**, Marco Ottavi, Hamidreza Hashempour, Vikram Vankamamidi, Konrad Walus, André Ivanov, F. Lombardi, "Modeling and Evaluating Errors due to Random Clock Shifts in Quantum-Dot Cellular Automata Circuits", *Journal of Electronic Testing: Theory and Applications (JETTA)*, vol. 25, issue 1, pp. 55-66, 02/2009.

CONFERENCE PUBLICATIONS

4. **Faizal Karim**, Konrad Walus, "The Characterization of the Displacement Tolerance of QCA Circuits", *Nano Devices, Circuits and Systems 2008*, Cambridge, Massachusetts, pp. 49-53, 29/09/2008.
5. **Faizal Karim**, Aryan Navabi, Konrad Walus, André Ivanov, "Quantum Mechanical Simulation of QCA with a Reduced Hamiltonian", *IEEE Nano 2008*, Arlington, Texas, pp. 327-330, 18/08/2008.
6. **Faizal Karim**, Konrad Walus, André Ivanov, "Testing of Combinational Majority and Minority Logic Networks", *International Mixed-Signals, Sensors and Systems Test Workshop 2008*, Vancouver, Canada, pp. 1-6, 18/06/2008.
7. **Faizal Karim**, Marco Ottavi, Vikram Vankamamidi, Konrad Walus, André Ivanov, "On the Error Effects of Random Clock Shifts in Quantum Cellular Automata Circuits", *In Proceedings of 22nd IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems, DFT 2007*, Rome, Italy, pp. 487-495, 2007.
8. Yaser Pourmohammadi-Fallah, Darrell Koskinen, Avidah Shahabi, **Faizal Karim**, Panos Nasiopoulos, "A Cross Layer Optimization Mechanism to Improve H.264 Video Transmission over WLANs", *2007 IEEE Consumer Communications and Networking Conference*, pp. 875-879, 11/01/2007.
9. **Faizal Karim**, Konrad Walus, André Ivanov, "Crosstalk in QCA Arithmetic Circuits", *Proc. of SPIE*, vol. 6313, San Diego, CA, USA, pp. 631306.1-631306.9, 2006.
10. **Faizal Karim**, Alagan Anpalagan, Xavier Fernando, "Design and Evaluations of a Fiber Based CDMA Wireless Link", *Proceeding of the ICUE, International Conference for Upcoming Engineers*, Windsor, Ontario, 2005.
11. **Faizal Karim**, Konrad Walus, "Ground State Simulation Tool for Field-Clocked Three-State Molecular Quantum-dot Cellular Automata (QCA)", *Invited paper to the IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2011.

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12. **Faizal Karim**, Ryan Anderson, Deborah Feduik, Robert Hall, “The UBC Teaching Assistant Training Program”, *ASEE Annual Conference and Exposition on Engineering Education*, June 2011.
 13. **Faizal Karim**, Saloome Motavas, Deborah Feduik, “Engineering Teaching Assistant Training - Increased Engagement Using Varied Delivery Methods”, *Accepted to ASEE Annual Conference and Exposition on Engineering Education*, June 2012.

THESES

14. **Faizal Karim**. Investigation of the Role of Quantum Correlations in the Modeling and Operation of Molecular Quantum-Dot Cellular Automata Based Circuits. *Ph.D. Dissertation*, Dec 2012.
15. **Faizal Karim**. Clocking Electrode Design and Phase Analysis for Molecular Quantum-Dot Cellular Automata Based Circuits. *M.A.Sc. Dissertation*, May 2007.

PRESENTATIONS

Presentations given for each publication listed above except [1-3, 8, 14, 15].

OTHER TALKS

- Simulation of Correlated Dynamics in Quantum-Dot Cellular Automata*
2010 Workshop on Innovative Designs and Systems
Hapuna Beach Prince Hotel, Kohala Coast, Hawaii December 7, 2010
- UBC Engineering Teaching Assistant Training Program*
Teaching Assistant Training at UBC – Poster Display
The University of British Columbia, Vancouver, Canada October 27, 2010
- The Effect of Quantum Correlations on QCA Circuits*
Microsystems and Nanotechnology Group (MiNa) Seminar
The University of British Columbia, Vancouver, Canada October 7, 2009
- Modeling the Correlated Dynamics between QCA Cells*
1st International Workshop on Quantum Cellular Automata
The University of British Columbia, Vancouver, Canada August 8, 2009
- Understanding the role of Quantum Correlations in QCA Circuits*
System on Chip (SoC) Seminar Series
The University of British Columbia, Vancouver, Canada July 17, 2009

Design and Evaluations of a Fiber Based CDMA Wireless Link

Research Overview

Ryerson University, Toronto, Canada

May 4, 2005

**SERVICE
ACTIVITIES**

Workshop Organizer

International Workshop on Quantum Cellular Automata

2009

Program Committee Member

International Mixed-Signals, Sensors and Systems Test Workshop

2008

Peer Reviewing Activities

- Journal of Zhejiang University Science C August 2012
- International Journal of Quantum Computation July 2012
- IEEE Transactions on Nanotechnology January 2012
- IEEE Transactions on Nanotechnology August 2011
- IEEE Transactions Circuits and Systems – Part I March 2011
- IEEE Transactions on Nanotechnology September 2010
- IEEE Transactions on Nanotechnology June 2010
- IEEE Transactions on Nanotechnology February 2010
- IEEE Transactions on VLSI October 2009
- VLSI Test Symposium 2010 October 2009
- Journal of Computational Electronics August 2009
- Int. Conference on Nanoscience and Nanotechnology July 2009
- IEEE Transactions on Nanotechnology January 2009
- IEEE Transactions on Circuits and Systems – Part I June 2008
- IEEE Transactions on Computer-Aided Design February 2007
- IEEE Latin-American Test Workshop January 2007
- Microelectronics Journal September 2006