

# Neil Dickson, B.C.S.

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<http://www.neildickson.com/>

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## EDUCATION

### Master of Mathematics, Computer Science, Institute of Quantum Computing

University of Waterloo

Starting September 2010

- NSERC Canada Graduate Scholarship (\$17,500), David R. Cheriton Graduate Scholarship (\$10,000 × 2 years), Institute for Quantum Computing entrance scholarship (\$5,000)

### Bachelor of Computer Science, Software and Computing Stream, Minor in Mathematics, Co-op Option

Carleton University

2004-2009

- Completed, 11.9 of 12.0 CGPA, Corresponding letter grade: A<sup>+</sup>
- Nortel Networks Scholarship (\$6,000 × 4 years), Tracey and Siva Ananmalay Scholarship in Computer Science (\$1,100), John R. Pugh Scholarship (\$1,150), Derek Rymerson Memorial Scholarship 2007 (\$1,500), Derek Rymerson Memorial Scholarship 2008 (\$1,750), Carleton University Medal in Computer Science

## HIGHLIGHTS OF QUALITIES

- Enthusiastic, creative, and hard-working for difficult challenges and projects
- Specialty is performance optimization
- Experience with C/C++, Assembly, Java, deployed on thousands of users' computers

## WORK EXPERIENCE

### Software Developer

Jun. 2009-Present

D-Wave Systems Inc., Burnaby, British Columbia

- Optimizing AQUA@Home distributed, multi-threaded quantum physics and classical physics simulation software: 10x speedups on two different applications in addition to multi-threading
- Quantum computer algorithm design and analysis
- Management of simulations deployed on 5,000 to 7,000 volunteer computers, as well as volunteer relations

### Software Development Engineer

May-Jul. 2008

Microsoft, Redmond, Washington

- Developed a conversion library from Works Database format to Excel format

### Embedded Systems Software Developer

Jan.-Apr. 2008

Research In Motion, Waterloo, Ontario

- Created a system to inject profiling code into the Bluetooth library source to gain detailed timing information

- Performed Bluetooth throughput testing on BlackBerry devices

**Quantum Application Designer (official title: Software Co-op Student)** May-Aug. 2007  
D-Wave Systems Inc., Burnaby, British Columbia

- Designed a wide variety of potential applications that could make use of a quantum computer that can find approximate solutions to NP-hard problems
- Partly implemented one such potential application

**Quantum Application Programmer (official title: Research Assistant)** May-Dec. 2006  
D-Wave Systems Inc., Burnaby, British Columbia

- Designed and implemented a molecular substructure comparison program that was one of the three applications in the world's first public demonstration (February 13<sup>th</sup>, 2007) of a quantum computer being used for practical purposes
- Designed and implemented algorithms for NP-hard combinatorial optimization problems, especially Maximum Independent Set (same as Max Clique & Min Vertex Cover) and Ising model energy minimization (same as Weighted Max-2-SAT & Binary Quadratic Programming)

**CANDU Reactor Control Code Reverse-Engineer (official title: Student)** May-Aug. 2005  
Atomic Energy of Canada Limited, Chalk River, Ontario

- Created program specifications by reverse engineering assembly source listings of 12 nuclear reactor control computer programs, totalling over 20,000 lines of listing
- Wrote a plug-in on own time to configure an assembly language editor, greatly improving code readability for the project

## APPLIED PROJECTS

**Integrated Development Environment Programming (Inventor IDE)**

- (see <http://www.codecortex.com/ide/>)
- Fully-integrated documentation as a key focus, to aid in PwnOS development
- Designed for the flexibility to support many languages, but current releases support x86 assembly language
- Supports auto-completion, refactoring, and error-detection

**Operating System Programming (PwnOS, pronounced "Own OS")**

- (see <http://www.neildickson.com/os/>)
- Boot process and kernel development and optimization
- Thread scheduling and memory management programming
- Device I/O management and configuration: ATA, APIC, ACPI, PS/2 mouse & keyboard
- Filesystem programming: NTFS, FAT

## EXTRA-CURRICULAR ACTIVITIES

**Vancouver Concert Band: Horn Player** Sept. 2009-Present

- Performed in several concerts on French horn.

**Carleton Chamber Music Ensemble: Cellist and Horn Player** 2006-2009

- Performed in many different small ensembles (over 20) on cello and French horn in April 2006, April 2007, December 2007, December 2008, and April 2009.

**COURSES**

<b>Title</b>	<b>Code</b>	<b>Term</b>	<b>Grade</b>
Honours Project	COMP 4905	Summer 2009	5.5/6.0 (A)
Design & Analysis of Algorithms II	COMP 4804	Winter 2009	6.0/6.0 (A <sup>+</sup> )
Introduction to Computer Vision	COMP 4900	Winter 2009	6.0/6.0 (A <sup>+</sup> )
Directed Study	COMP 4901	Winter 2009	6.0/6.0 (A <sup>+</sup> )
Introduction to [Music] Composition	MUSI 2602	Winter 2009	6.0/6.0 (A <sup>+</sup> )
Introduction to Logic	PHIL 2001	Winter 2009	6.0/6.0 (A <sup>+</sup> )
Computational Geometry	COMP 5008	Fall 2008	5.5/6.0 (A)
Parallel Computing	COMP 4009	Fall 2008	6.0/6.0 (A <sup>+</sup> )
Distributed Operating Systems	COMP 4000	Fall 2008	6.0/6.0 (A <sup>+</sup> )
Numerical Analysis	MATH 3806	Fall 2008	6.0/6.0 (A <sup>+</sup> )
Planetary Astronomy	PHYS 1901	Fall 2008	5.5/6.0 (A)
Operating Systems	COMP 3000	Fall 2007	6.0/6.0 (A <sup>+</sup> )
Programming Paradigms	COMP 3007	Fall 2007	6.0/6.0 (A <sup>+</sup> )
Mobile Robot Programming	COMP 4807	Fall 2007	6.0/6.0 (A <sup>+</sup> )
Open Source Software Engineering	COMP 4900	Fall 2007	6.0/6.0 (A <sup>+</sup> )
Classical Music History	MUSI 1001	Fall 2007	6.0/6.0 (A <sup>+</sup> )
Object-Oriented Software Engineering	COMP 3004	Winter 2007	6.0/6.0 (A <sup>+</sup> )
Database Management Systems	COMP 3005	Winter 2007	6.0/6.0 (A <sup>+</sup> )
Design & Analysis of Algorithms I	COMP 3804	Winter 2007	6.0/6.0 (A <sup>+</sup> )
Abstract Algebra I	MATH 2108	Winter 2007	6.0/6.0 (A <sup>+</sup> )
Programming in C++	COMP 2404	Winter 2006	6.0/6.0 (A <sup>+</sup> )
Computer Organization	COMP 2003	Winter 2006	6.0/6.0 (A <sup>+</sup> )
Linear Algebra II	MATH 2107	Winter 2006	6.0/6.0 (A <sup>+</sup> )
Probability Models	STAT 2605	Winter 2006	6.0/6.0 (A <sup>+</sup> )
Theoretical [Music] Studies II	MUSI 1702	Winter 2006	6.0/6.0 (A <sup>+</sup> )
Abstract Data Types and Algorithms	COMP 2402	Fall 2005	6.0/6.0 (A <sup>+</sup> )
Discrete Structures II	COMP 2805	Fall 2005	6.0/6.0 (A <sup>+</sup> )
Internet Application Programming	COMP 2405	Fall 2005	6.0/6.0 (A <sup>+</sup> )
Calculus II	MATH 2007	Fall 2005	6.0/6.0 (A <sup>+</sup> )
Theoretical [Music] Studies I	MUSI 1701	Fall 2005	6.0/6.0 (A <sup>+</sup> )
Design and Implementation of Computer Apps	COMP 1406	Winter 2005	6.0/6.0 (A <sup>+</sup> )
Introduction to Systems Programming	COMP 1402	Winter 2005	6.0/6.0 (A <sup>+</sup> )
Linear Algebra I	MATH 1104	Winter 2005	6.0/6.0 (A <sup>+</sup> )
Electromagnetism and Wave Motion	PHYS 1004	Winter 2005	6.0/6.0 (A <sup>+</sup> )
Management Accounting	BUSI 1002	Winter 2005	5.5/6.0 (A)
Object-Oriented Programming	COMP 1405	Fall 2004	6.0/6.0 (A <sup>+</sup> )
Discrete Structures I	COMP 1805	Fall 2004	6.0/6.0 (A <sup>+</sup> )
Elementary Calculus I	MATH 1007	Fall 2004	6.0/6.0 (A <sup>+</sup> )
Mechanics and Thermodynamics	PHYS 1003	Fall 2004	6.0/6.0 (A <sup>+</sup> )
Financial Accounting	BUSI 1001	Fall 2004	6.0/6.0 (A <sup>+</sup> )