Nick Houghton | Resumé

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Profile

Software engineer with 3+ years experience. Proficient with industrial software development and cutting edge research. Proven experience working in collaborative environments, leadership roles and self-reliant projects. Skilled in designing, developing, and maintaining software systems with a focus on building efficient and reliable products.

Key Competencies

- Comprehensive knowledge and skills with the latest generation of both the C++ and Java programming languages. Additionally experienced with C#, Javascript, SQL, HTML, CSS, and more.
- Experience in discovering, learning, and mastering leading edge technologies such as the Unreal Engine 4 and Unity 5.
- Game development and physical simulation experience with OpenGL and DirectX APIs.
- Experience developing and maintaining large scale distributed system using Java.
- Experienced with Agile methodologies.
- Experience with version control using both *Subversion* and *Git*.
- Considerable experience with customer relations in industrial settings.
- Multiple academic publications.
- Passion for continued learning and skill development.
- Positive attitude.
- Extensive first-aid training.

Experience

Ocean Networks Canada **Victoria B.C.**
Software Engineer/Developer *2016–2017*
Developed and maintained the data management and acquisition service (DMAS). This service ingests over 200 Terabytes of information a day while performing quality assurance analysis, data product generation, management of the large device network and hosting a web-based user interface.

- Developed *RESTful* web services using Java and Hibernate.
- Designed and developed user-interface applications with Javascript, HTML and CSS.
- Adapted database designs for continually changing models. Used SQL with *Oracle* and CQL with *Cassandra*.
- Performance testing using *JMeter*.
- Employed version control with *Subversion*.
- Employed agile methodologies using the *Jira* ticketing system.

University of Victoria **Victoria B.C.**
Hardware Security Fellow *2015–2016*

Member of the Uvic hardware security fellowship. Studied the existence, characteristics, and impact of maliciously modified integrated circuits. Developed applications, tools, and techniques to combat industrial or military sabotage of computer hardware.

- Developed an application which can automatically detect and analyze hardware trojans in Field-programmable gate-arrays using Java and the *RapidSmith* library.
- Assisted in the development of a comprehensive topology to describe and organize characteristics of hardware trojans.
- Developed a web-based series of trojan analysis tools using ASP.NET and C#.
- Published four academic papers.

University of Victoria **Victoria B.C.**
Teaching Assistant *2015–2015*
Instructed and managed a laboratory section of Uvic Engineering's Computer Engineering 255: Computer Architecture class. The laboratories focused on exposing students to assembly programming, embedded system architecture and algorithm design.

- Became intimately familiar with embedded C programming, the *ARM* assembler language, low-level algorithm design and implementation, and platform architecture.
- Debug student code and troubleshot classroom equipment.
- Gave instructional lectures.
- Marked assignments.
- Recorded student grades.

University of Victoria **Victoria B.C.**
Research Assistant *2014–2015*
Selected to be a member of the cryptographic research fellowship under the supervision of Dr. Fayez Gebali. Responsible for the proof-of-concept C++ implementation of an experimental homomorphic encryption algorithm.

- Became intimately familiar with the practices of encryption, homomorphic algorithms and discrete mathematics.
- Designed and developed a proof-of-concept implementation of experimental algorithm using C++.
- Employed the *WestGrid* super-computer network to execute large, resource demanding experiments.
- Designed and developed a simple client-server system which encrypted/decrypted messages, performed performance analysis, and managed message transmission.
- Co-wrote and published an academic paper on findings.

MMM Group **Vancouver B.C.**
Co-op Employee *2011–2011*
Assisted Senior Project Engineers and Project Managers design and execute designs of power distribution, lighting and emergency systems in large-scale construction projects.

- Drafted and reviewed project plans using *AutoCad*.
- Designed and developed an award calculator for LEED's mercury-content, 'green'-design award using Excel and Visual Basic.
- Communicated with clients and suppliers on project progress and needs.
- Performed project site inspections.

Saanich Commonwealth Place **Victoria B.C.**
Aquatic Team Leader / Lifeguard *2006–2015*

Employed as a lifeguard during high-school and undergraduate studies; promoted to Aquatic Team Leader.

- Responsible for supervision and management of aquatic staff.
- Performed incident management, first-aid quality assessment and emergency services interaction.
- Partook in first aid and lifeguarding technique training and instruction.

Education

University of Victoria **Victoria**
Masters of Applied Science, 3.0 GPA *2015–2016*

- Wrote and published a thesis.
- Invented an application which automatically detects hardware trojan viruses in field-programmable gate-arrays. Written in Java.
- Three published academic papers. One pending.
- Gained experience as a teaching assistant for an embedded systems programming class.
- Gave a presentation on hardware trojans at the *International Workshop on Information Security, Assurance, and Trust* (I-SAT 2016).

University of Victoria **Victoria**
Bachelor of Engineering, Computer Engineering *2011–2015*

- Graduated with both the *Networks, Security and Privacy* and the *Digital and Embedded Systems* specialties.
- Won third place in the IEEE Student Technical Design Competition.

Continuing Education and Personal Projects

*Visit my website for more details, demonstrations and walkthroughs.

Udemy.com **Online**
Unreal Engine Developer Course *2016*

- Completed three 3D games: Building Escape, Battle Tank, and Testing Grounds.
- Became intimately familiar Unreal Engine 4 developer interface.
- Studied material development and design.
- Familiar with both C++ and Blueprint development methodologies.

Personal Project
Unity 5: Jump-Ship *2016*

- Created a 2D space shooter game.
- Created sprites.
- Developed game mechanics and enemy AI in C#.
- Developed user-interface using the canvas system.
- Created simple explosion animations.

Personal Projects
OpenGL: Various Projects using C++ *2015–2016*

- Created a first person shooter called 'Zombie-Hunt'.
- Created a simulation of globular physics spurting from a fountain which employed an implicit mesher.
- Created a 2D simulation of a pendulum-cart system using Lagrangian Mechanics.

Master's Thesis

Title: *Automated Trojan Detection and Analysis in Field Programmable Gate Arrays*

Supervisors: Dr. Fayez Gebali, Dr. Samer Moein

Description: Electronics have become such a staple in modern life that we are just as affected

by their vulnerabilities as they are. Ensuring that the processors that control them are secure is paramount to our intellectual safety, our financial safety, our privacy, and even our personal safety. The market for integrated circuits is steadily being consumed by a reconfigurable type of processor known as a field-programmable gate-array (FPGA). The very features that make this type of device so successful also make them susceptible to attack. FPGAs are reconfigured by software; this makes it easy for attackers to make modification. Such modifications are known as hardware trojans. There have been many techniques and strategies to ensure that these devices are free from trojans but few have taken advantage of the central feature of these devices. The configuration Bitstream is the binary file which programs these devices. By extracting and analyzing it, a much more accurate and efficient means of detecting trojans can be achieved. This discussion presents a new methodology for exploiting the power of the configuration Bitstream to detect and described hardware trojans. A software application is developed that automates this methodology.

References

Dr. Brian Wyvill

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Dr. Fayez Gebali

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