
Education

- Jan 2013 – Dec 2015 **B.Sc. Mathematics**, *Université Laval*, Québec.
Sep 2011 – May 2012 **B.Sc. Software Engineering (not completed)**, *Université Laval*, Québec.

Experience

- May 2017 – present **Member of the Boost Steering Committee**, Boost.org.
Participate in technical decisions impacting the future of the Boost community, but also day-to-day procedural and policy-related issues.
- Dec 2016 – present **Amazon Representative on the C++ Standards Committee**.
- Jun 2016 – present **Software Development Engineer**, A9.com (*an Amazon company*), Palo Alto.
Member of the search infrastructure team powering Amazon's search engine. Notable contributions:
- Replace parts of the internal key-value store with a lock-free prefix tree backed by a variant of RCU and a custom allocator allowing the structure to be stored in a memory mapped file. Achieved throughput improvement of more than 50% for real-time updates.
 - Replace the component that applies real-time updates to search indices by a new one that scales better.
 - Played key role in the low-level design of a novel query processing pipeline allowing the space and time cost of any query to be bounded. Achieved significant fleet cost reduction.
 - Pioneer a C++ library of high-quality fundamental utilities for use throughout Amazon.
- Dec 2014 – Jun 2016 **C++ consulting**, (finance, embedded systems).
Development of C++ libraries to retain a high level of abstraction in applications where both performance and correctness matter. Also some refactoring of existing systems to add new features and/or improve performance.
- 2014 – 2017 **Development of Hana**, a [Boost](http://Boost.org) library for C++ metaprogramming.
Design and implementation of a library to manipulate heterogeneous sequences at compile-time and at runtime. The library introduces a new paradigm for expressing meta-computations allowing a very high level of expressiveness with little to no performance penalty.
- 2014 – 2015 **GSoC student with Boost**, [Google Summer of Code](http://Google.com).
Work on [Boost.Hana](http://Boost.org) during the summers of 2014 and 2015 as part of the Google Summer of Code program. I also received a grant from the [Boost](http://Boost.org) Steering Committee to continue working during the winter of 2015, which had never been done before for a GSoC student.
- Sep 2012 – Dec 2012 **Software Developer**, [Coveo Solutions](http://Coveo.com), Québec.
Work on a MIME parser in C++. Resigned to pursue a degree in mathematics.
- May 2012 – Aug 2012 **Intern**, [Coveo Solutions](http://Coveo.com), Québec.
- Conception and implementation of a deadlock detection system for internal use
 - Presentations on C++ techniques and idioms to co-workers:
 - The [Boost.ConceptCheck](http://Boost.org) library and associated template metaprogramming techniques
 - C++11 rvalue references

Selected talks (full list)

- 2017 **Runtime Polymorphism: Back to the Basics** ([slides](#)/[video](#)), [CppCon](http://CppCon.com), Bellevue.
- 2016 **Closing keynote on metaprogramming** ([slides](#)/[video](#)), [Meeting C++](http://MeetingC++.com), Berlin.
Was voted the best presentation by attendees
- 2015 **Metaprogramming: a paradigm shift** ([slides](#)/[video](#)), [C++Now](http://CplusplusNow.com), Aspen.
Awards for the best presentation and the most inspiring presentation
- 2014 **Hana: Expressive metaprogramming** ([slides](#)/[video](#)), [CppCon](http://CppCon.com), Bellevue.
- 2013 **A system for resource deadlock prevention** ([slides](#)/[video](#)), [C++Now](http://CplusplusNow.com), Aspen.

Personal Projects

- Metabench** **A simple framework for doing compile-time benchmarks**
Implemented a self-contained CMake module to perform compile-time benchmarks of C++ metaprograms. Such benchmarks are very useful when writing a metaprogramming library, where the performance of the library must be measured in terms of compilation time. The module works by having the user write [ERB](#) templates that are then used to generate C++ programs. The C++ programs are compiled and various metrics such as compilation time, link time and executable size are gathered. The module generates HTML5 charts to easily visualize the metrics.
- mpl11** **Conception and implementation of a C++11 replacement for the Boost.MPL**
Reimplemented the functionality of the Boost.MPL library using new template metaprogramming techniques made possible by C++11. Redesigned the API of the library using ideas from Haskell to make it more powerful, easier to use and to extend.
- d2** **Conception and implementation of a deadlock detection system in C++**
Detects deadlocks that would have happened under different thread scheduling conditions by performing intrusive dynamic analysis on a non-deadlocking run of a program. Additionally, provides statistics about lock and thread usage.
- joy** **Implementation of a preprocessor metaprogramming library**
Implemented associative sequences and other utilities for preprocessor metaprogramming on top of the [Chaos preprocessor library](#).
- nstl** **Conception and implementation of a generic algorithm library in pure C**
Implemented a basic name mangling system and “preprocessor-based classes” using PMP techniques. Using these facilities, implemented a subset of the C++ standard library algorithms. The result is a collection of generic algorithms instantiable and usable from pure C without sacrificing type safety or performance by using traditional techniques like pointers to void.
- duck** **Implementation of a minimal concept-based overloading library**
Implemented a subset of Boost.ConceptCheck’s concepts as metafunctions, which allows overloading based on the modeling of a concept by a type.
- cisp** **Implementation of a minimalist object system with the preprocessor**
Created a system to manipulate complex preprocessor objects using associative sequences imbued with object semantics.
- nstl-lang** **Implementation of a translator for a toy language in Python**
Implemented basic parsing, semantic analysis and code generation to C.
- Contributions to other projects**
- Contribution of the [hawick_circuits](#) algorithm to Boost.Graph
 - Occasional patches to Boost (Spirit, Graph, Archive, MPL and others)
 - Active on the [Boost.Dev](#) mailing list
 - CMake port of the [FastPFor](#) integer compression library’s build system
 - Too frequent bug reports against the [Clang](#) and [GCC](#) compilers.