Louis Hildebrand

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Education

McGill University Msc Electrical Engineering *Winter 2024–Winter 2026*
- **GPA:** 4.0/4.0
- **Advisor:** Prof. Christophe Dubach (Compilers and Synthesis Lab)
- **Thesis:** "A Minimal Intermediate Language for Generating Streaming Accelerators"

McGill University B. Software Engineering *Fall 2020–Fall 2023*
- **GPA:** 4.0/4.0
- Dean's Honour List: 2020/2021, 2021/2022, 2022/2023
- British Association Medal (highest final exam grades)

John Abbott College Honours Science *Fall 2018–Winter 2020*
- Valedictorian
- Dean's List: Fall 2018, Winter 2019, Fall 2019

Skills

- **Formal languages:** C, Assembly (ARMv7, MIPS), Rust, Python, Scala, Java, C#, SQL (MS SQL Server, PostgreSQL), VHDL, OCaml, JavaScript, HTML, CSS
- **Natural languages:** English, French, Afrikaans
- **Frameworks:** Spring Boot, .NET (Framework, Core), Django, Vue.js
- **Other tools:** Git, Bash, Valgrind, Gradle, JUnit, LaTeX, etc.

McGill Teaching Assistant Experience

Computer Organization (ECSE 324) *Fall 2025*
- Delivered tutorials on computer organization (e.g., interacting with devices via memory-mapped I/O)
- Guided students in lab work (writing C and ARM assembly programs)
- Answered students' questions on the online discussion board
- Graded assignments

Model-Based Programming (ECSE 223) *Winter 2025*
- Delivered weekly tutorials on model-based programming (e.g., UML class and state diagrams, Umple) and other tools (e.g., Git, JUnit, Gradle, Cucumber)
- Answered students' questions on the online discussion board
- Helped prepare assignments

Intro. to Software Engineering (ECSE 321) *Fall 2022–Winter 2025*

- Delivered weekly tutorials on developing a fullstack web app with PostgreSQL, Spring Boot, and Vue.js
- Held weekly office hours and answered questions on the online discussion board
- Helped write and grade tests

Ordinary Differential Equations for Engineers (MATH 263) *Fall 2021*

- Delivered weekly tutorials on differential equations, including a summary of lecture content and practice problems
- Answered students' questions by email
- Graded assignments

Industry Experience

MDA Space Engineering Intern, DevOps *Summer 2023*

- Implemented new features and fixed bugs in web services using ASP.NET MVC, Razor Pages, Telerik, and Kendo UI
- Optimized SQL queries and stored procedures

123Loadboard Backend Intern *Summers 2021, 2022*

- Independently implemented new microservices with C# and .NET Core given a predefined specification
- Fixed bugs in and added new endpoints to the main API (.NET Framework)

Pierrefonds Day Camps Counselor *Summers 2017–2019*

- Supervised groups of children aged 5–12
- Worked in both French and English

Projects

Sirop (Scala app; master's thesis project)

- Programming language and optimizing compiler
- Generates VHDL description of hardware accelerator from high-level source code

Twisty Timer (Java Android app)

- Contributed new features to an existing Rubik's Cube app (e.g., a practice mode for blindfolded solving)

SH Prediction (Python command-line app)

- Predicts players' roles in the social deduction game "Secret Hitler"

Pocket Cube Solver (Arduino project)

- Robot to solve a $2\times2\times2$ Rubik's Cube
- Presented at the 2018 Montreal Regional Science and Technology Fair
- **Prizes:** Intel Excellence in Computer Science Award, McGill University School of Computer Science (Robotics) Award

Selected Courses

Language-Based Security (COMP 523) *Winter 2025*

- Formally studied the syntax and semantics of programming languages and type systems
- **Project:** `chick`, a type checker for a dependently-typed language

Computer Graphics (ECSE 532) *Fall 2024*

- Learned the fundamentals of computer graphics: 3D transformations, meshes, the graphics pipeline, lighting, textures, etc.
- **Project:** a raytracer with support for surfaces of different colour and smoothness, mirrors, depth of field blur, spherical environment maps, textures, etc. Implemented in Python using the taichi library for GPU acceleration.

Machine Learning for Engineers (ECSE 551) *Fall 2024*

- Studied classical machine learning models (decision trees, naïve Bayes, etc.) as well as neural networks, CNNs, and RNNs
- **Project:** stacked classifier (with random forest, logistic regression, etc. as the base models) to categorize Reddit posts from four cities. Achieved the second-highest accuracy on the test dataset (out of 25 groups).

Compiler Design (COMP 520) *Winter 2024*

- Learned to implement a compiler, including parsing, semantic analysis, register allocation, and code generation
- **Project:** compiler targeting MIPS assembly from a subset of C

Microprocessors (ECSE 444) *Fall 2023*

- Programmed an STM32 B-L4S5I-IOT01A board using C and ARMv7 assembly
- **Project:** memory game that plays a series of tones (high or low), detects user inputs via accelerometer (up or down), and provides feedback via a speaker

Parallel Computing (ECSE 420) *Fall 2023*

- Learned GPU programming with CUDA
- **Project:** CUDA implementation of a general 2D cellular automaton simulator, achieving 590× higher throughput than an equivalent sequential implementation in C

Operating Systems (ECSE 427) *Fall 2022*

- Learned fundamental OS concepts: processes, threads, memory management, etc.
- **Assignments:** a simple shell, threading library, and file system (all in C)