

# Louis Hildebrand

[louis.hildebrand@mail.mcgill.ca](mailto:louis.hildebrand@mail.mcgill.ca)   
[github.com/louis-hildebrand](https://github.com/louis-hildebrand)   
[linkedin.com/in/louis-hildebrand](https://linkedin.com/in/louis-hildebrand) 

## Education

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**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

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- **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, L<sup>A</sup>T<sub>E</sub>X, etc.

## McGill Teaching Assistant Experience

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**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

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- 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 pre-defined 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

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- 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  $2 \times 2 \times 2$  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

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<b>Language-Based Security</b> (COMP 523)	<i>Winter 2025</i>
<ul style="list-style-type: none"><li>• Formally studied the syntax and semantics of programming languages and type systems</li><li>• <b>Project:</b> <code>chick</code>, a type checker for a dependently-typed language</li></ul>	
<b>Computer Graphics</b> (ECSE 532)	<i>Fall 2024</i>
<ul style="list-style-type: none"><li>• Learned the fundamentals of computer graphics: 3D transformations, meshes, the graphics pipeline, lighting, textures, etc.</li><li>• <b>Project:</b> 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.</li></ul>	
<b>Machine Learning for Engineers</b> (ECSE 551)	<i>Fall 2024</i>
<ul style="list-style-type: none"><li>• Studied classical machine learning models (decision trees, naïve Bayes, etc.) as well as neural networks, CNNs, and RNNs</li><li>• <b>Project:</b> 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).</li></ul>	
<b>Compiler Design</b> (COMP 520)	<i>Winter 2024</i>
<ul style="list-style-type: none"><li>• Learned to implement a compiler, including parsing, semantic analysis, register allocation, and code generation</li><li>• <b>Project:</b> compiler targeting MIPS assembly from a subset of C</li></ul>	
<b>Microprocessors</b> (ECSE 444)	<i>Fall 2023</i>
<ul style="list-style-type: none"><li>• Programmed an STM32 B-L4S5I-IOT01A board using C and ARMv7 assembly</li><li>• <b>Project:</b> 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</li></ul>	
<b>Parallel Computing</b> (ECSE 420)	<i>Fall 2023</i>
<ul style="list-style-type: none"><li>• Learned GPU programming with CUDA</li><li>• <b>Project:</b> CUDA implementation of a general 2D cellular automaton simulator, achieving 590× higher throughput than an equivalent sequential implementation in C</li></ul>	
<b>Operating Systems</b> (ECSE 427)	<i>Fall 2022</i>
<ul style="list-style-type: none"><li>• Learned fundamental OS concepts: processes, threads, memory management, etc.</li><li>• <b>Assignments:</b> a simple shell, threading library, and file system (all in C)</li></ul>	