Léonard Oest O'Leary

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Education

Master of Science in Computer Science – Compilation — Montréal, Canada
Université de Montreal – GPA: 4.2/4.3 – supervisor: Marc Feeley — *Jan 2023 – Mar 2026 (expected)*

Bachelor of Science in Computer Science – Honours — Montréal, Canada
Université de Montreal – GPA: 3.92/4.3 — *Aug 2019 – July 2022*

Projects

Ribbit – a size-optimizing and portable Scheme compiler (github) — University of Montréal
Master's Project — *2023 – Present*

- Led development of the first compiler leveraging virtual-machine tailoring from my Master's research.
- Implemented and maintained 25 lightweight virtual machines across **x86**, **C**, **Python** and **Idris**.
- Wrote **3 papers** on Ribbit (sources in paper section):
  [1] Invention of the **Arborescent Garbage Collector**, which frees cycles immediately and achieves orders-of-magnitude speedups over prior work. Implementation in **C**.
  [2] Developed a code-size optimization that specializes a virtual machine's bytecode to its source program, producing the **smallest known R4RS-compliant Scheme REPL**.
  [3] Created a macro system enabling **redefinition of virtual-machine primitives** and providing FFI extensibility across all 25 targets.

Experiences

Octasic — Montréal, Canada
Compiler engineer (internship, then part-time) — *2023 – 2024*

- Fixed a regression in LLVM (**pull request**)
- Implemented custom pragmas to control optimizations in the company's LLVM-based compiler (C++).
- Integrated existing optimizations into a proprietary-assembly Fast Fourier Transform (18% speedup).

Meta — Seattle, WA
Production Engineer — *2022*

- Hired for a full-time position but impacted by massive layoffs 3 days after my arrival.

Compilation and Language Lab — University of Montréal
Research Assistant — *2020 – 2023*

- Designed and developed an **optimizing Python–to–Scheme compiler**.
  * Implemented Python's module system ('import').
  * Added type inference and inlining for up to 10× faster microbenchmarks.
- Built the API powering the benchmark visualizer for the Gambit Scheme compiler. (**demo**)
- Integrated the CodeBoot.org Python interpreter into reveal.js. (**demo**)

Leadership & Awards

- Graduate scholarship from the NSERC (Canada) and FRQNT (Quebec). *2022-2023*
- Best paper award for the *Arborescent Garbage Collection* paper. *2025*
- Represented the Université de Montreal at two ICPC competitions. *2022 and 2023*
- President of the CS student association, AEDIROUM. *2021-2022*
- Founder of Université de Montréal's cybersecurity club (RHUM). *2019-2020*
- 1st place at three hackathons: UdeM Hackathon, McHacks (McGill), NAD-UQAC GameJam. *2019-2022*

Papers

[1] **Arborescent Garbage Collection: A Dynamic Graph Approach to Immediate Cycle Collection.** *Frédéric Lahaie-Bertrand, Léonard Oest O'Leary, Olivier Melancon, Marc Feeley and Stefan Monnier.* In International Symposium on Memory Management (ISMM '25). *June 2025.*

[2] **A R4RS Compliant REPL in 7 KB.** *Léonard Oest O'Leary, Mathis Laroche, and Marc Feeley.* In Scheme and Functional Programming Workshop (SFPW '23). *September 2023.*

[3] **A Compact and Extensible Portable Scheme VM.** *Léonard Oest O'Leary, and Marc Feeley.* MoreVMs Workshop at PROGRAMMING '23. *March 2023.*

[4] **A platform for sharing Artificial Intelligence Algorithms in Autonomous Driving : An overview of Enhanced LAOP.** *Jihene Rezgui, Clement Bisaillon, and Léonard Oest O'Leary.* International Symposium on Networks, Computers and Communications (ISNCC '20). *June 2020.*

[5] **Finding better learning algorithms for self-driving cars: An overview of the LAOP Platform.** *Jihene Rezgui, Léonard Oest O'Leary and Clément Bisaillon.* International Symposium on Networks, Computers and Communications (ISNCC '20). *June 2019.*

[6] **Training Genetic Neural Networks Algorithms for Autonomous Cars with the LAOP Platform.** *Jihene Rezgui, Léonard Oest O'Leary, Clement Bisaillon, Lamia Chaari Fourati.* International Wireless Communications, Mobile Computing Conference (IWCMC '19). *August 2019.*

Other Experiences

"Oups!", a women's health app (C++, RTOS and PlatformIO). (Website)
Firmware developer *2024-2025*

Programming Languages and Compiling class (IFT3065)
Twice teaching assistant at the Université de Montréal *2023 and 2025*

First programming class (IFT1015/IFT1016)
Five times teaching assistant at the Université de Montréal *2019-2023*

Other Projects

Extended Kalman Filter SLAM implementation (ROS, Python). (Blog)
Featured Project from Duckietown's graduate class *2024*

Led a user study of 18 participants on backstepping in debuggers (Python).
Accepted paper at PLATEAU'26 workshop (appearing soon). *2023-2026*

Implemented holes in Typer, a dependently typed language (think Roq + Lisp).
Programming Semantics final project *2023*

An LLM client that can rewrite itself (Python). (GitHub)
Personal Project *2021*

Classification of extreme weather events contest (Python). (Kaggle)
Machine Learning Class project (from MILA) *2021*

LAOP: Autonomous driving deep learning training platform (Java). (GitHub)
Research Project *2019*