SALOU Hugo

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Education

École Normale Supérieure de Lyon — Lyon, France
A highly selective French university, mainly focused on research and education — 2024–auj.

- Licence 3/Prémaster (eq. BSc): Algorithmics I/II, Programming, Logic, Programming Language Theory, Foundations of Computer Science, Probability, Functional Programming Project, Group Theory and Linear Algebra, Lebesgue Integration and Measure Theory, Introduction to Category Theory
- Master 1 (eq. 1st year of MSc): Optimization, Parallel and Distributed Algorithms and Programs, Semantics and Verification, Compiler and Program Analysis, Quantum Computer Science, Integrated Project (only 1st semester courses are listed here, for now)
- Took some LaTeX notes of the lectures, available on GitHub (Licence 3/Prémaster, Master 1)

École Centrale Nantes — Nantes, France
A selective French School of Engineering conferring a diploma equivalent to a Master's Degree (1st year only) — 2023–2024

Clemenceau High School – MP2I/MPI* — Nantes, France
A 2-year intensive pre-engineering competitive entry program centered around Mathematics, Physics, Computer Science — 2021–2023

- Class representative in second year
- Took some LaTeX notes of the lectures (Mathematics and Computer Science), available on GitHub (MP2I, MPI*)

Academic Experience

Formal proof of the Classification of Covering Spaces in Homotopy Type Theory — Palaiseau, France
Research internship at the LIX laboratory, École Polytechnique (*report*, in English) — June–July 2025

- Eight-week internship supervised by Samuel MIMRAM and Émile OLEON
- Formal proof in Cubical Agda of the article by Samuel MIMRAM and Émile OLEON

Tutoring

Computer Science Oral Exams "colles" in MP2I/MPI/MPI* — 2025–now
For first-year students at Champollion high school — Grenoble, France

- Wrote exercises adapted to the notions seen in class
- Designed a custom "document distribution system" that allows students to submit their code for review

Mock Computer Science Oral Admission Exams in MP2I/MPI/MPI* — 2024, 2025
For second-year students at Clemenceau high school, Nantes, France

- Wrote various exercises covering most of the MP2I/MPI/MPI* program (some exercises are openly available on my tutoring page)
- Organized 37 half-hour mock oral exams (14 in 2024, 23 in 2025)
- Organized three-hour mock labs for 10 students (7 in 2024, 3 in 2025)

Computer Science Tutor at Clemenceau high school — 2023–2024
Tutored second-year students in Computer Science — Nantes, France

- Created and modified various exercises (theoretical and programming)
- Designed interactive tools (a finite automaton editor/playground, and a proof tree editor) to help students (website)
- Tutored three first-year students (MP2I) in Mathematics, Physics, and Computer Science (they were admitted to Télécom Paris and Télécom Nancy)

Projects

Interactive Mini Proof-Assistant *à la Coq* in OCaml
Completed with Thibaut BLANC as part of the Functional Programming Project at ENS de Lyon — April 2025–June 2025

- Dependent typing
- Support for the Calculus of Inductive Constructions
- Management of a universe hierarchy

- Definition of several tactics (including the `inversion` tactic)
- Built a VSCode extension that communicates with the Proof Assistant

OCaml interpreter written in OCaml
Completed with Thibaut BLANC as part of the Functional Programming Project at ENS de Lyon — February 2025–April 2025

- Evaluation of OCaml expressions including side effects
- Inference and polymorphic typing of expressions (definition of new types and handling of the *weak* types)
- Database of 5784 sample codes; we compare this interpreter's behaviour with `utop`'s
- Translation in *Continuation Passing Style* of a given OCaml code and β-reduction optimizations

OCaml interpreter with linear polymorphic typing
Supervised by Daniel Hirschkoff (LIP) — April 2025–now

- Extension of the OCaml interpreter (*c.f.* above)
- Polymorphic type inference for linear types
- Based on J. Garret Morris's article *The Best of Both Worlds: Linear Functional Programming without Compromise* (linear typing in Haskell)

Interactive tools for Computer Science students
Created as part of my tutoring at Clemenceau high school, Nantes — September 2023–June 2024

- Built a finite automaton editor/playground (construction based on a regular expression, removing ε-transitions, minimization, *etc.*), link to the editor
- Designed a proof-tree editor that checks correctness of the tree (linguistic logic and classical logic), link to the editor

Mini research project: What impact does the structure of a city have on an epidemic's response?
Completed in MP2I/MPI* — February 2022–June 2023

- Simulation of epidemics spreading in a city (Paris, Lyon, Nantes, Mulhouse) with a multi-agent model
- Code written in Julia, with parallelization of simulations
- About 500,000 epidemics simulated in total
- Analysis of the simulation results

Professional experience

IFREMER — Brest, France
HR Access data historization (*report*, in French) — June–July 2024

- Six-week professional internship in the **INGE** team (Administrative information systems)
- Detection of changes in more than 2400 PL/SQL tables
- Designed a user-friendly interface for this data
- Created a technical documentation (in French)

Tactile Studios — Nantes, France
Data Analyst Intern at Tactile Studios — January–May 2024

- Collaboration between École Centrale de Nantes, Tactile Studios, and the Château des ducs de Bretagne museum
- Worked with 5 other students
- Analyzed data coming from different data sources (paper surveys with OCR, sensors)
- Visualized data to show trends and patterns

IT Skills

- **Programming:** OCaml, C, C++, JS, Python, Julia
- **Tools:** LaTeX, Typst, Git, Agda, Rocq, SQL
- **Web:** HTML/CSS, JavaScript, TypeScript, React.js

Languages

- **English:** fluent, C1 level (CAE: 194, Grade B; TOEIC: 955/990)
- **French:** native language
- **Spanish:** high-school level