ANTONIN RADET

Computer science student
MSc, 22 years old

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EDUCATION

Master's degree, Computer science (MPRI)

Université de Paris

September 2020 – Ongoing | Paris, France

- Compiler Principles
- Algorithms
- Computability and Complexity theory
- Advanced Automata theory
- Introduction to Artifical Intelligence and Game Theory
- Advanced Algorithms
- Semantics & Computer Assited Proofs
- Advanced Functional Programming

Master's degree, Computer science

Ecole Normale Supérieure

September 2019 – Ongoing | Rennes (Brittany), France

- Compiler Principles
- Solver Principles and Architectures
- Advanced Complexity Theory
- Model Checking
- Signal Processing
- Semantics & Coq Proof Assistant
- Logic and Constraint Programming
- Computer Science Philosophy

Bachelor's degree, Computer science

Ecole Normale Supérieure

September 2018 – August 2019 | Rennes (Brittany), France

- Programming fundamentals in OCaml and C++
- Automata theory
- Computability theory
- Algorithms
- Unix System Programming
- Low-level Network Programming
- Advanced Programming Concepts in Lisp, Scheme & C++
- Propositional Calculus & First Order Logics
- Computer Architecture
- Probabilistic Algorithms
- Statistics & Introduction to Machine Learning
- Mathematics: Convex optimisation
- Mathematics: Algebra & Introduction to Cryptography

MPSI/MP* Preparatory classes

Lycée Joffre

September 2015 – August 2018 | Montpellier, France

RESEARCH INTERESTS

Logic & Theoritical Foundations | Formal Methods | Proof Assistants | Functional Programming

PROGRAMMING & TOOLS

OCaml | Coq | Python | C/C++

Unix | LaTeX | Git | Make | OCamlBuild

LANGUAGES

French ●●●●●

English ●●●●○

Spanish ●●○○○

Ancient Greek ●●○○○

MISCELLANEOUS

Violin, Classical Guitar
Played at professional level. Won several first prizes in international contests during my childhood and teenage years. Many performances as a soloist.

Piano, Trombone, French Horn
End of conservatory playing.

Other Musical Aspects
Teaching level in music theory. Experience as choir and orchestra conductor.

Sports
Swimming (10 years of intensive training), windsurfing, archery, roller skating, fencing.

Others
Strong interest in philosophy, litterature, ancient languages.

Activism
Invested in feminist and LGBT+ communities. Traducted resources about transgender people and their rights. Official referent at ENS for harrassment and discrimination matters.

RESEARCH EXPERIENCE

Intership (Computer Science / Software engineering)

Pragmatic static analysis of industrial OCaml code

June 2021 - August 2021 — Nomadic Labs, Paris, France

The goal of this current internship is to initiate the development (and adoption) of static analyzers relevant for the Tezos codebase. I am supervised by Mehdi Bouaziz and Thomas Letan

Intership (Computer Science)

Causal preorder between synchronous types

January - June 2021 — IRIF, Paris, France

Masters Research Intership. During this semester, I worked with Adrien Guatto around the notion of a natural causal preorder between synchronous types. This work was based on this article: https://www.irif.fr/ guatto/papers/lics18.pdf. My job was to define and formalize this preorder, which required to look at the topos of trees. I also proved a few properties about this preorder and how it behaves between normalized types. Most of the internship was spent trying to fix an incomplete proof about precedence deciding.

Summer Intership (Computer Science)

Impact of a block representation in CompCert, a verified compiler

June - July 2019 — INRIA, Rennes (Brittany), France

Bachelor Research Intership. I spent 8 weeks in the CELTIQUE team at INRIA at Rennes (Brittany, France), for an internship supervised by David Pichardie and Jean-Christophe Léchenet.
I worked on CompCert, a verified C compiler written in Coq by Xavier Leroy. The current representation in the *Register Transfer Language* is quite atypical, as it maps a single instruction to each node in the control flow graph. My job was to study the impact of a more common representation, with blocks of instructions. It represents a few thousands lines of Coq code.

PROJECTS

Small Compiler (compilers course)

Implementation of a compiler, written with a classmate (Alexandre Drewery). It is written in OCaml, and compiles a small imperative language to LLVM code.

Applying various solvers to cellular automatas (solvers course with Khalil Ghorbal)

Study of a decision problem about one-dimensional cellular automatas.

- Proof of the NP-completeness of the given problem
- Solving with different kinds of solvers (some of them completely irrelevant, but it was fun to show it) : SMT solver (two ways of doing it), Constraint Programming solver, Linear solver, Convex Optimization solver, Quantifier Elimination

Various school projects (bachelor)

- Lisp interpreter (written in C++ for programming class, rewritten in OCaml for fun)
- Little two-player game of the 7 colors (system programming class, written in C)
- Iceberg detection (network class, written in C++)
- Raytracing engine (programming class, written in C++)
- Digit recognition (machine learning class, written in Python and C++ to compare performances)
- Delaunay triangulation, Hanoï towers & Penrose tiling (programming class, written in OCaml)

Small undergraduate research projects (preparatory classes)

- 2017 - 2018 : Selberg sieve and prime numbers that can be written $p = n^2 + 1$
- 2016 - 2017 : Simulated annealing applied to music generation and automatic harmonization (comparison of performances for Python code and OCaml code)
- 2015 - 2016 : Knot theory & Tait conjectures

Personal projects

- Automata library in OCaml (Work in Progress)
- Formalization of measure theory, general topology and probabilities in Coq (Work in Progress)
- Coq Proof of the Cantor-Bernstein-Schröder theorem
- Algorithms competitions (SWERC, Google Hash Code, Prologin)
- Project Euler : $\sim$ 200 problems solved (Ocaml)