

Simon Cruanes

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Computer Science PhD and Engineer

Professional Experience

- 2018–2023 **Research Engineer**, *Imandra*, Austin, TX/Remote
Worked on the core system of Imandra, a novel proof system combining the traditions of the Boyer-Moore family of provers, and SMT solving. Developed or contributed to every aspect of the system, in OCaml, from the integration with OCaml's toplevel loop, to the core reasoning algorithms. In addition to that: some performance work, networking (custom RPC), code generation, serialization tools, development of OpenTelemetry bindings.
- 2015–2017 **Research Engineer**, *Veridis*, Inria Nancy, France
Developed *Nunchaku*, a tool dedicated to find models for higher order logic, in collaboration with Jasmin Blanchette. The tool bridges its input and a set of backend solvers, via a series of reversible encodings. In addition to that, did several months of research and development on *SMBC*, a constraint solver for computational logic (that can be called by Nunchaku) based on a SMT-like approach. Published a paper at CADE 2017.
- 2013 **Teacher**, *Lycée Saint-Louis*, Paris, France
Served as a temporary teacher for 5 months (one semester) in the prestigious Lycée Saint-Louis in first year of CPGE. Taught both theoretical basics of computer science and introduction to programming in Caml Light.
- 2011–2012 **Intern**, *SRI International*, California, USA
Did a 6-months long Master project in the [Computer Science Lab](#) of SRI International, on the SMT solver *Yices2*. The topic was about writing a first order prover in C, and integrate it into Yices, so that the solver can tackle formulas with quantifiers.
- 2011 **Intern**, *Polyconseil*, France
Did a 2-months long internship on [autolib](#), an electrical car-sharing service in Paris. Developed a part of the information system controlling the fleet of cars, in python/django.
- 2010 **Intern**, *INRIA Saclay*, France
Did a research internship during 3 months in the [ProVal team](#), on *Why3*, a tool that allows, among other features, to dispatch proof obligations into multiple automatic provers, and is used in Ada/SPARK. The topic was the integration into Why3 of first order provers that rely on [TPTP](#).

Education

- 2012–2015 **PhD Studies**, *Inria*, Paris, France
Computer Science PhD in automated theorem proving. Theoretical work on a first order calculus with integer linear arithmetic, structural induction, and a lot of implementation work (around [50 000 lines of OCaml](#).) Papers at Fricos'13 and Fricos'17.
- 2010–2012 **Master**, *École Polytechnique Fédérale de Lausanne (EPFL)*, Switzerland
Master degree in computer science, with a focus on Formal Methods.
- 2007–2012 **Engineering Degree**, *École Polytechnique*, France
Graduated with the diploma "Diplôme d'ingénieur" in Mathematics and Computer Science (eq. M.Sc) in 2012. [École Polytechnique](#) is France's top-ranking university for science and engineering.
- 2005–2007 **Student**, *Lycée Hoche, Versailles*, France
Classes Préparatoires aux Grandes Écoles ("CPGE"), MP – Mathematics and Physics, option in computer science. Two-year intensive undergraduate training for highly competitive entrance exams to scientific university-level schools (*Grandes Écoles*).

Skills

Computer skills

Languages OCaml (expert), Rust (decent), C (rusty), Java, Scala (from school)

Tools UNIX systems, nvim, L^AT_EX, fish, git
Free Software in OCaml, development of tools and libraries, numerous and various contributions (see <https://github.com/c-cube>; in particular [Containers](#), [an extension of OCaml's stdlib](#) that is reasonably popular; and [QCheck](#), [a property testing library](#))

Computer
Science

- Solid notions (theory and implementation) of:
 - logic, calculability
 - first order theorem provers, plus extensions (theories, induction)
 - SAT solvers, SMT solvers
 - type systems
 - serialization formats (CBOR, Protobuf, SBE)
- Knowledgeable about:
 - algorithmic
 - compilers
 - profiling and tracing tools (perf, Tracy, perfetto/catapult)
 - distributed systems and networking
 - proof systems (Coq, a bit of Isabelle/HOL)
 - operating systems (mainly GNU/Linux)

Languages

French Native speaker
English Fluent, oral and written

Student Associations

- Volunteer worker at [Satellite](#), the student's bar at EPFL (1 year)
- Member of the [student choir](#) of EPFL, as barytone, ending with Verdi's Requiem in concert (1 year); similarly, member of a choir in Paris for 1 year (Bach's Johannes-Passion)
- Former vice-president of the *Binet Réseau*, the association in charge for the students network in École Polytechnique – server administrator (GNU/linux) and leader of the sysops team (2 years)

Interests

Science Artificial Intelligence (well... GOFAI): D. Hofstadter ("Gödel, Escher et Bach"), J. Hawkins ("On Intelligence"), M. Minsky ("The society of Mind")
Books Science-fiction and Fantasy: Hyperion, The Name of the Wind, Schismatrix+, The Laundry files, La Horde du contrevient, Nausicaä ...
Programming free software, logic (SMT solving), functional programming, design of programming languages, data structures