

Hichem Rami AIT EL HARA

PhD in Computer Science · R&D Engineer · Expert in Formal Methods & SMT Solving

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SUMMARY

Formal methods researcher and engineer, with 5 years of experience working at a French R&D consultancy, conducting studies, implementing prototypes and delivering solutions to industrial and academic clients and partners. Author and co-author of 9 publications at venues including PLDI, TACAS, and LPAR, and contributor to multiple open-source projects.

SKILLS

Formal Methods & Verification: SMT Solving, Constraint Programming, Deductive Verification, Symbolic Execution, Code Transformation, Interactive Theorem Proving, Abstract Interpretation, Functional Programming, Data Structures

Programming Languages: OCaml (Expert), Python, Lean, Rust (Novice), C, Rocq, Java, Scala (From school)

Development Tools: Git, VS Code, Unix, $\text{\LaTeX}$, Typst (Experienced), Nix (Novice)

Languages: English (Fluent), French (Fluent), Kabyle (Native), Arabic (Fluent), Spanish (Basic)

EXPERIENCE

OCamlPro [↗](#), R&D Engineer

Sept 2021 – present
5 years 1 month

- Conducted studies, implemented prototypes and delivered solutions for industrial and academic clients and partners
- Contributed to multiple open-source projects ([Alt-Ergo](#) [↗](#), [Owi](#) [↗](#), [Colibri2](#) [↗](#), [Smtml](#) [↗](#), [Dolmen](#) [↗](#), ...)
- Managed relationships with clients and prospects, organized and led technical meetings, and secured funding for R&D projects

Université Paris-Saclay [↗](#), **CEA List** [↗](#), PhD Student (CIFRE PhD, jointly with OCamlPro)

Sept 2022 – Oct 2025
3 years 1 month

- Designed an SMT theory of sequences tailored for the verification of Ada programs
- Authored and co-authored multiple research papers (see Publications)
- Implemented multiple calculi to reason over SMT problems using (n-indexed) sequences and a difference logic engine
- Developed the labeled union-find data structure and used it both to reason over SMT sequences and to implement a new interval domain for real and integer arithmetic based on it

OCamlPro [↗](#), R&D Intern

Mar 2021 – Sept 2021
6 months

- Developed [Alt-Ergo-Fuzz](#) [↗](#), a fuzzer for the [Alt-Ergo](#) [↗](#) SMT solver, published at JFLA 2022
- Implemented context reinitialization in [Alt-Ergo](#) [↗](#), making it possible to reuse one running instance for multiple problems
- Found both runtime and subtle soundness bugs, most of which have been fixed since

EDUCATION

PhD **Université Paris-Saclay** [↗](#), **CEA List** [↗](#), Computer Science

Sept 2022 – Oct 2025

- Thesis: [Theory of Sequences Tailored for Program Verification](#) [↗](#) (CIFRE PhD prepared jointly with OCamlPro, [defended on 15 October 2025](#) [↗](#))

MSc	Sorbonne University ↗ , Computer Science	Sept 2021
	• Software Science and Technology (STL — Science et Technologie du Logiciel) ↗, R&D track focused on Software safety and reliability • Main subjects: Algorithmics, Formal Methods, Type Checking, Static Analysis, Program Verification, Operational Semantics and Process Algebras	
BSc	Sorbonne University ↗ , Computer Science	Sept 2019

PUBLICATIONS

colibri2: A CP solver for SMT problems	Mar 2026
François Bobot, Hichem Rami Ait-El-Hara , Bruno Marre cea.hal.science/cea-05644448 ↗ (Preprint)	
Smt.ml: A Multi-Backend Frontend for SMT Solvers in OCaml	Apr 2026
João Madeira Pereira, Filipe Marques, Pedro Adão, Hichem Rami Ait-El-Hara , Léo Andrès, Arthur Carcano, Pierre Chambart, Petar Maksimović, Nuno Santos, José Fragoso Santos link.springer.com/chapter/10.1007/978-3-032-22752-2_2 ↗ (TACAS @ ETAPS 2026)	
Theory of Sequences Tailored for Program Verification	Nov 2025
Hichem Rami Ait-El-Hara theses.fr/2025UPASG067 ↗ (PhD Dissertation)	
Reasoning over n-Indexed Sequences in SMT	Aug 2025
Hichem Rami Ait-El-Hara , François Bobot, Guillaume Bury link.springer.com/article/10.1007/s00236-025-00496-w ↗ (Acta Informatica — Selected Extended Papers of SMT 2024 and Related Papers)	
Constraint Propagation for Bit-Vectors in Alt-Ergo	Aug 2025
Hichem Rami Ait-El-Hara , Guillaume Bury, Basile Clément, Pierre Villemot ceur-ws.org/Vol-4008 ↗ (SMT 2025: 23rd International Workshop on Satisfiability Modulo Theories)	
Relational Abstractions Based on Labeled Union-Find	June 2025
Dorian Lesbre, Matthieu Lemerre, Hichem Rami Ait-El-Hara , François Bobot dl.acm.org/doi/10.1145/3729298 ↗ (PLDI 2025: 46th ACM SIGPLAN Conference on Programming Language Design and Implementation)	
An SMT Theory for n-Indexed Sequences	July 2024
Extended abstract; see the full paper above (Reasoning over n-Indexed Sequences in SMT, Acta Informatica) Hichem Rami Ait-El-Hara , François Bobot, Guillaume Bury ceur-ws.org/Vol-3725 ↗ (SMT 2024: 22nd International Workshop on Satisfiability Modulo Theories)	
On SMT Theory Design: The Case of Sequences	May 2024
Hichem Rami Ait-El-Hara , François Bobot, Guillaume Bury easychair.org/publications/paper/qdvj ↗ (LPAR 2024: 25th Conference On Logic For Programming, Artificial Intelligence and Reasoning)	
Alt-Ergo-Fuzz: A fuzzer for the Alt-Ergo SMT solver	June 2022
Hichem Rami Ait-El-Hara , Guillaume Bury, Steven de Oliveira hal.inria.fr/hal-03626861 ↗ (JFLA 2022: 33èmes Journées Francophones des Langues Applicatifs)	

TALKS & SERVICE

See [Talks](#) [↗](#) and [Service](#) [↗](#) for a full list of invited talks, presentations, and reviewing/committee activities.