

# Curriculum Vitæ

Jacques-Henri JOURDAN

LMF, Bat 650  
Université Paris-Saclay  
91405 Orsay Cedex  
France

(+33)1.69.15.67.35

[jacques-henri.jourdan@cnrs.fr](mailto:jacques-henri.jourdan@cnrs.fr)  
<http://jhjourdan.mketjh.fr>

## Research Experiences

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October 2017–...

**Full-time CNRS researcher.** LMF (Laboratoire Méthodes Formelles), Université Paris-Saclay, ENS Paris-Saclay, CNRS.

April 2016–September 2017

**Postdoctoral position at *Max Plank Institute for Software Systems, Sarrebruck (Germany)*.** RustBelt project: study and formal proof in Coq of the type system of the Rust language by using the Iris concurrent separation logic [17,18].

April 2012–March 2016

**PhD of Computer Science of *Paris VII Diderot University (France)*,** advised by Xavier Leroy, in *Gallium team, Inria Paris. Verasco: a Formally Verified C Static Analyzer* [3–5,19,21,22,24,27]. Defended on May, 26th 2016. Reviewers: Antoine Miné et Tobias Nipkow. Examiners: Yves Bertot, Patrick Cousot, Roberto Di Cosmo, David Pichardie, Francesco Logozzo.

**2016 thesis prize** of GdR GPL (french research group on programming and software engineering).

September 2011–March 2012

**Internship in *LMeASI, CEA Saclay (France)*,** with Eric Goubault and Sylvie Putot. Inference of invariant inequalities for polynomial dynamical systems [20].

April–July 2011

**Internship in *Gallium team, Inria Rocquencourt (France)*,** with François Pottier and Xavier Leroy. Implementation of a certified parser for Compcert, a formally verified C compiler [23].

April–August 2010

**Internship in *Rise team, Microsoft Research Redmond (USA)*,** with Francesco Logozzo. Design and implementation of abstract interpretation techniques in Spur, a powerful Javascript engine.

Performance improvements in Clousot, a static analyzer for .Net code, based on abstract interpretation.

July–August 2009

**Internship in *ASAP team, INRIA Rennes (France)*,** with Davide Frey and Anne-Marie Kermarrec. Design and implementation of Papeer, a P2P papers sharing system. Taking part of the Gossple project.

## Research Supervision

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September 2020–...

**Co-supervision of Xavier Denis's PhD**, co-advised with Claude Marché (supervision ratio: 50%). *Deductive Verification of Rust Programs* [7–9]. Université Paris-Saclay. Final writing phase, defense planned on December, 18th 2023.

September 2018–December 2022

**Co-supervision of Glen Mével's PhD**, co-advised with François Pottier (supervision ratio: 50%). *A mechanized program logic for concurrent programs with the weak memory model of Multicore OCaml* [10, 11]. Université Paris Cité. Thesis defended on December, 14th 2022.

March–July 2023

**Supervision of Dominik Stolz Master's internship**, with Xavier Denis's participation. *Type invariants and ghost code for deductive verification of Rust code*.

September 2022

**PhD monitoring committee member for Daniel de Carvalho**, supervised by Sylvain Boulmé, David Monniaux and Frédéric Wagner.

November 2020, June 2021, November 2021

**PhD monitoring committee member for Pierre Nigron**, supervised by Pierre-Evariste Dagand and Julia Lawall.

March–July 2020

**Co-supervision of Xavier Denis's second year Master internship**, co-advised with Claude Marché (supervision ratio: 50%). *Deductive program verification for a language with a Rust-like typing discipline*.

March–July 2020

**Co-supervision of Glen Mével's second year Master internship**, co-advised with François Pottier (supervision ratio: 50%). *Time credits and time receipts in Iris* [15].

## Awards

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2023

**Alonzo Church Award**, for the design and implementation of *Iris*, a higher-order concurrent separation logic framework. With Lars Birkedal, Aleš Bizjak, Derek Dreyer, Ralf Jung, Robbert Krebbers, Filip Sieczkowski, Kasper Svendsen, David Swasey and Aaron Turon.

2022

**Distinguished Paper Award at PLDI**, for the paper *RustHornBelt: A Semantic Foundation for Functional Verification of Rust Programs with Unsafe Code*. With Yusuke Matsushita, Xavier Denis and Derek Dreyer.

2022

**ACM SIGPLAN Programming Languages Software Award**, for contribution to the development of the formally verified compiler CompCert. With Xavier Leroy, Sandrine Blazy, Zaynah Dargaye, Michael Schmidt, Bernhard Schommer and Jean-Baptiste Tristan.

2022

**ACM Software System Award**, for contribution to the development of the formally verified compiler CompCert. With Xavier Leroy, Sandrine Blazy, Zaynah Dargaye, Michael Schmidt, Bernhard Schommer and Jean-Baptiste Tristan.

2016

**Thesis prize of GdR GPL** (french research group on programming and software engineering).

## Service Work

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2021–...

**Member of the research commission** of the computer science graduate school of *Univerté Paris-Saclay*.

2021–...

**Technology transfer point of contact** of the Formal Methods Laboratory.

2023

**Selection comity member for an assistant professor position** at university Paris-Saclay.

**Program committee member:** ITP 2018, Coq Workshop 2018, ICFP 2019, ML Workshop 2019, CoqPL 2021, OOPSLA 2022, POPL 2023

**External reviewer for the conferences:** NASA Formal methods 2012, ICFP 2015, SAS 2016, POPL 2017, ESORICS 2017, POPL 2018, PLDI 2019, ESOP 2020, VMCAI 2021, JFLA 2021

**Reviewer for journal articles:** TOPLAS (2019, 2020), JFP (2020)

2012–2015

**Coorganizer of the *Inria Paris-Rocquencourt junior seminar***. Scientific seminar by PhD students about the very diverse subjects studied at Inria.

## Teaching and Science Popularization

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2022–...

**Teacher at the *advanced programming course of computer science department of ENS Paris-Saclay, L3 level***. 24h cours on advanced concepts of programming languages: continuations, monads, type classes, substructural type systems, ... In collaboration with Armaël Guéneau.

2021–...

**Teacher at the *functional programming and type systems (2-4) course*** of parisian master of research in computer science (*MPRI*), M2 level. 10h module on the Rust language, its type sytem and the guarantees it brings

2018, 2019 and 2021

**Examiner of the oral test in fundamental computer science for the entrance competitive exam of *École Normale Supérieure de Paris***.

2013–2015

**Teaching Assistant at *École Normale Supérieure***. Compilation and programming languages course with Jean-Christophe Filliâtre.

2006–...

**Member of the *France-IOI association***, teaching algorithmics to French teenagers and coaching the French team for the International Olympiad in Informatics (IOI).

2017–2020

**Member of the jury of the SWERC contest**. The SWERC is the West European branch of the ACM ICPC.

2011–2013

**Member of the french *beaver contest organization committee***, allowing high school and junior high school students to discover computer science.

## Funded Grants

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2024–2027

**Décysif project member.** *Formal Cyber-Security Diagnostic.* Industrial partners: Ada-Core, OCamlPro and TrustInSoft. Funding: 3M€, including 500k€ for Laboratoire Méthodes Formelles.

2023–2026

**Gospel project member.** *Towards a specification language and an ecosystem to specify, test, and verify OCaml programs.* Founded by the ANR agency. Partners: Cambium (Inria Paris), LMF, Nomadic Labs (industry), Tarides (industry). Funding: 541k€, including 129k€ for Laboratoire Méthodes Formelles.

2019

**Initiator and sole member of the project WPRust.** *Towards a deductive verification tool for Rust.* CNRS PEPS JCJC Project. Funding: €7,000.

## Education and Diplomas

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2008–2013

**École Normale Supérieure diploma.** Main specialty: computer science. Secondary specialty: physics.

2009–2011

**Master of Computer Science** at *MPRI* (Paris Master of Research in Computer Science), delivered by *École Normale Supérieure*.

2008–2009

**License of Computer Science**, delivered by *Paris VII Diderot University*.

2008

**Entered École Normale Supérieure de Paris** by competitive exam, *option MPI* (Mathematics, Physics and Computer Science entrance contest).

2006–2008

**Classes Préparatoires aux Grandes Écoles** at *Lycée Louis le Grand* (Paris, France).

## Publications

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### Articles in International Journals

- [1] Ralf Jung, Jacques-Henri Jourdan, Robbert Krebbers, and Derek Dreyer. Safe systems programming in Rust: The promise and the challenge. *Communications of The ACM*, 64(4):144–152, March 2021.
- [2] Ralf Jung, Robbert Krebbers, Jacques-Henri Jourdan, Aleš Bizjak, Lars Birkedal, and Derek Dreyer. Iris from the ground up. *Journal of Functional Programming (JFP)*, 28(e20), 2018.
- [3] Jacques-Henri Jourdan and François Pottier. A simple, possibly correct LR parser for C11. *Transactions on Programming Languages and Systems (TOPLAS)*, 39(4), August 2017.
- [4] Sylvie Boldo, Jacques-Henri Jourdan, Xavier Leroy, and Guillaume Melquiond. Verified compilation of floating-point computations. *Journal of Automated Reasoning (JAR)*, 54(2):135–163, February 2015.
- [5] Thomas Braibant, Jacques-Henri Jourdan, and David Monniaux. Implementing and reasoning about hash-consed data structures in Coq. *Journal of Automated Reasoning (JAR)*, 53(3):271–304, October 2014.

## Publications in International Conferences

- [6] François Pottier, Armaël Guéneau, Jacques-Henri Jourdan, and Glen Mével. Thunks and debits in separation logic with time credits. In *Symposium on Principles of Programming Languages (POPL)*. ACM, January 2024.
- [7] Xavier Denis and Jacques-Henri Jourdan. Specifying and verifying higher-order rust iterators. In *International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*. Springer Verlag, April 2023.
- [8] Xavier Denis, Jacques-Henri Jourdan, and Claude Marché. Creusot: a foundry for the deductive verification of rust programs. In *International Conference on Formal Engineering Methods (ICFEM)*. Springer Verlag, October 2022.
- [9] Yusuke Matsushita, Xavier Denis, Jacques-Henri Jourdan, and Derek Dreyer. RustHornBelt: A semantic foundation for functional verification of rust programs with unsafe code. In *Conference on Programming Language Design and Implementation (PLDI)*. ACM, June 2022.
- [10] Glen Mével and Jacques-Henri Jourdan. Formal verification of a concurrent bounded queue in a weak memory model. In *International Conference on Functional Programming (ICFP)*. ACM, September 2021.
- [11] Glen Mével, Jacques-Henri Jourdan, and François Pottier. Cosmo: A concurrent separation logic for Multicore OCaml. In *International Conference on Functional Programming (ICFP)*. ACM, September 2020.
- [12] Hoang-Hai Dang, Jacques-Henri Jourdan, Jan-Oliver Kaiser, and Dreyer Derek. RustBelt meets relaxed memory. In *Symposium on Principles of Programming Languages (POPL)*. ACM, January 2020.
- [13] Paulo Emílio de Vilhena, François Pottier, and Jacques-Henri Jourdan. Spy game: Verifying a local generic solver in Iris. In *Symposium on Principles of Programming Languages (POPL)*. ACM, January 2020.
- [14] Armaël Guéneau, Jacques-Henri Jourdan, Arthur Charguéraud, and Pottier François. Formal proof and analysis of an incremental cycle detection algorithm. In *Interactive Theorem Proving (ITP)*, September 2019.
- [15] Glen Mével, Jacques-Henri Jourdan, and François Pottier. Time credits and time receipts in Iris. In *European Symposium on Programming (ESOP)*. Springer, April 2019.
- [16] Robbert Krebbers, Jacques-Henri Jourdan, Ralf Jung, Joseph Tassarotti, Jan-Oliver Kaiser, Amin Timany, Arthur Charguéraud, and Derek Dreyer. MoSeL: a general, extensible modal framework for interactive proofs in separation logic. In *International Conference on Functional Programming (ICFP)*. ACM, September 2018.
- [17] Ralf Jung, Jacques-Henri Jourdan, Robbert Krebbers, and Derek Dreyer. RustBelt: Securing the foundations of the Rust programming language. In *Symposium on Principles of Programming Languages (POPL)*. ACM, January 2018.
- [18] Robbert Krebbers, Ralf Jung, Aleš Bizjak, Jacques-Henri Jourdan, Derek Dreyer, and Lars Birkedal. The essence of higher-order concurrent separation logic. In *European Symposium on Programming (ESOP)*. Springer, April 2017.
- [19] Jacques-Henri Jourdan, Vincent Laporte, Sandrine Blazy, Xavier Leroy, and David Pichardie. A formally-verified C static analyzer. In *Symposium on Principles of Programming Languages (POPL)*, pages 247–259. ACM, January 2015.
- [20] Eric Goubault, Jacques-Henri Jourdan, Sylvie Putot, and Sriram Sankaranarayanan. Finding non-polynomial positive invariants and lyapunov functions for polynomial systems through darboux polynomials. In *American Control Conference (ACC)*, pages 3571–3578. IEEE, June 2014.
- [21] Thomas Braibant, Jacques-Henri Jourdan, and David Monniaux. Implementing hash-consed structures in Coq. In *Interactive Theorem Proving (ITP)*, pages 477–483, July 2013.
- [22] Sylvie Boldo, Jacques-Henri Jourdan, Xavier Leroy, and Guillaume Melquiond. A formally-verified C compiler supporting floating-point arithmetic. In *IEEE Symposium on Computer Arithmetic (ARITH)*, pages 107–115. IEEE, April 2013.
- [23] Jacques-Henri Jourdan, François Pottier, and Xavier Leroy. Validating LR(1) parsers. In *European Symposium on Programming (ESOP)*, pages 397–416. Springer, March 2012.

## Workshop Publications

- [24] Jacques-Henri Jourdan. Sparsity preserving algorithms for octagons. In *Numerical and Symbolic Abstract Domains Workshop (NSAD)*, pages 57–70. Elsevier, September 2016.
- [25] Jacques-Henri Jourdan. Statistically profiling memory in OCaml. OCaml Workshop, September 2016.
- [26] Sébastien Briaïs, Stéphane Caron, Jean-Michel Cioranescu, Jean-Luc Danger, Sylvain Guilley, Jacques-Henri Jourdan, Arthur Milchior, David Naccache, and Thibault Porteboeuf. 3D hardware canaries. In *Cryptographic Hardware and Embedded Systems (CHES)*, pages 1–22. Springer, September 2012.

## Thesis

- [27] Jacques-Henri Jourdan. *Verasco: a Formally Verified C Static Analyzer*. PhD thesis, Université Paris Diderot (Paris 7), May 2016.