

# Jordy Ruiz, Ph.D

## Research Engineer

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## Profile

French research engineer based in London since 2019, with experience in low-level program analysis of embedded systems. Enjoys mathematics, well-structured programming and clever use of abstractions. Highly enthusiastic towards mentoring and cross-disciplinary learning.

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## Work

### Software Team Lead at StatInf – 2 years

#### Research Engineer at StatInf – 4 months

2022/10 –

- R&D for a hybrid static/statistical analysis of binary embedded systems programs
- Led a small software team (4–7 engineers), built from the ground up, mentoring collaborative development
- Management using Agile methods, interfacing with R&D, Product and Corporate teams
- In-house disassembly and program analysis plugins for our clients' architecture needs (TMS320C28, MPC5554 PPC, ARMv7+Thumb-2, ARMv9...)
- Led the development and go-to-market of StatInf's key product **RocqStat**, including:
  - GUI design and implementation in Qt;
  - Backend development for binary code and software trace analysis
  - Securing our patented EVT algorithms;
  - Docker containerization;
  - CI/CD pipeline setup with integration testing;
  - Go-to-production processes and product demonstrations;
  - Iterative collaboration on product specifications.

```
#C++ #Python #QML #ARM-assembly #TI-assembly #PPC-assembly #embedded-systems  
#statistical-analysis #static-analysis #software-traces #team-management  
#Agile-methods #collaborative-development #CI-CD #Github-Actions #Docker #Deployment
```

### Research Associate at Imperial College London

2019/10 – 2022/09

Automating test generation using “chopped” symbolic execution in KLEE, through program analysis of LLVM IR code.

*with Pr. Cristian Cadar*

```
#C++ #LLVM #KLEE #patch-testing #static-analysis #dynamic-analysis #concolic-execution
```

### Postdoctoral fellowship at Université de Lille

2018/06 – 2019/06

Detection of arrays in assembly code for static timing analysis

*with Pr. Giuseppe Lipari*

```
#C++ #ARM-assembly #OTAWA #PPL #static-analysis #abstract-interpretation #WCET
```

### Internship at Université Toulouse III

2013/07

Co-inductive reasoning for the transformation of deterministic automata.

Complete formal proof of Brzozowski's algorithm<sup>1</sup> in Coq.

*with Dr. Ralph Matthes*

```
#Coq #Haskell #formal-proofs #category-theory
```

<sup>1</sup>Based on the categorical proof by Bonchi et al., *Brzozowski's Algorithm (Co)Algebraically* (2012)

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## Education

*Université Toulouse III*

### Ph.D. at Université Toulouse III

2014/10 – 2017/12

Thesis: Identifying data flow properties to improve worst-case execution time estimations

Analysed actual critical embedded applications (Continental, DEBIE-1, PapaBench...)

*with Pr. Christine Rochange*

```
#C++ #ARM-assembly #OTAWA #static-analysis #embedded-systems #infeasible-paths  
#abstract-interpretation
```

### Masters in Computer Science

2012 – 2014

*Second year:* Critical Software & Distributed systems (ranked 2/8)

*First year:* Artificial Intelligence & Pattern Recognition (ranked 1/15)

## Publications in journals, international conferences, and workshops

- Relational Abstract Interpretation of Arrays in Assembly Code. 2021/12  
C. Ballabriga, J. Forget, **J. Ruiz**  
In: *Formal Methods in System Design*, Volume 59. (regular paper)
- Static Analysis Of Binary Code With Memory Indirections Using Polyhedra. 2019/01  
C. Ballabriga, J. Forget, L. Gonnord, G. Lipari, **J. Ruiz**  
In: *VMCAI – International Conference on Verification, Model Checking, and Abstract Interpretation*, 2019. (regular paper)  
★ best paper award
- Working around loops for infeasible path detection in binary programs. 2017/09  
**J. Ruiz**, H. Cassé, M. De Michiel.  
In: *SCAM – IEEE International Working Conference on Source Code Analysis and Manipulation*, 2017. (regular paper)
- The W-SEPT project: Towards Semantic-aware WCET Estimation. 2017/06  
C. Maïza, P. Raymond, C. Parent-Vigouroux, A. Bonenfant, F. Carrier, H. Cassé,  
P. Cuenot, D. Claraz, N. Halbwachs, F. Carrier, H. Cassé, E. Jahier, H. Li, M. De Michiel,  
V. Mussot, I. Puaut, C. Rochange, E. Rohou, **J. Ruiz**, P. Sotin, W.-T. Sun.  
In: *WCET – Workshop on Worst-Case Execution Time Analysis*, 2017. (regular paper)
- Expressing and Exploiting Path Conflicts in WCET Analysis. 2016/07  
V. Mussot, **J. Ruiz**, P. Sotin, M. De Michiel, H. Cassé.  
In: *WCET – Workshop on Worst-Case Execution Time Analysis*, 2016. (regular paper)
- Using SMT Solving for the Lookup of Infeasible Paths in Binary Programs. 2015/07  
**J. Ruiz**, H. Cassé.  
In : *WCET – Workshop on Worst-Case Execution Time Analysis*, 2015. (regular paper)
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## Languages

- English: fluent.  
French: native.  
Sinographs (Chinese characters): intermediate.