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 enthustiastic towards mentoring and cross-disciplinary learning.

Work

Research Engineer at StatInf (4 mo.)
then **Software Team Lead** at StatInf (2 y.) 2022/10 – 2025/02

– 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

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 at Université Toulouse III 2014/08

Thesis: Detecting infeasible paths on machine code
with Dr. Hugues Cassé
#C++ #ARM-assembly #OTAWA #static-analysis #abstract-interpretation

Internship at Université Toulouse III 2013/07

Co-inductive reasoning for the transformation of deterministic automata.
Complete formal proof of Brozowski's algorithm[1] in Coq.
with Dr. Ralph Matthes
#Coq #Haskell #formal-proofs #category-theory

[1] Based on the categorical proof by Bonchi et al., *Brzozowski's Algorithm (Co)Algebraically* (2012)

Education

Université Toulouse III

Masters in **Computer Science** 2012 – 2014
Second year: Critical Software & Distributed systems (ranked 2/8)
First year: Artificial Intelligence & Pattern Recognition (ranked 1/15)

Bachelor in **Fundamental Mathematics** 2009 – 2012
Bachelor in **Computer Science** 2009 – 2012
Parallel studies and simultaneous graduation from two bachelors.

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)

Languages

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