Thomas Rubiano

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Positions

2023- Starting Research Position at Inria (PEPR Arsene)
Security Code Annotation/Generation and Security Properties Verifications
in PACAP team with Erven Rohou, Damien Hardy and Ronan Lashermes.

2022-23 Research Engineer at CNRS
on the Squirrel Prover (proof assistant for cryptographic protocols)
in Spicy team with David Baelde.

2021 PostDoc, LIPN Sorbonne Paris Nord
MWP-Analysis and Loop optimizations implementations (prototype in Compcert)
Advisor: Thomas Seiller & Clement Aubert

2020 Starting Research Position, INRIA Rennes
WebAssembly Skeletal Semantics
Work on WebAssembly semantic for Necro. An interpreter/analyzer generator.
Advisor: Alan Schmitt & Thomas Jensen

2018-19 PostDoc, Université Rennes 1 - IRISA/INRIA
Postdoctoral position funded by the $Disc\phi ver$ ANR project
Working in the $Celtique$ team on analysis and certification techniques over intermediate representations using *CompcertSSA*: a certified compiler written in *coq/ocaml*.
Advisor: Delphine Demange

2017-18 ATER, Université Grenoble Alpes - VERIMAG
Limited-time Assistant Professor position
Advisor: David Monniaux

2014-17 PhD student, Sorbonne Paris Nord & University of Copenhagen
Implicit Computational Complexity and Compilers
Implementing resources/data-flow analyzers and optimizations in compiler (LLVM) using ICC theories.
Advisors: Jean-Yves Moyen, Virgile Mogbil & Jakob Grue Simonsen

2014 Intern Master, LIMSI, Sorbonne Paris Sud
Lexical-semantic pattern learning in a biomedical corpus

2013 Intern Engineer, Sopra Group (Information technology consulting), Paris
Evolution and maintenance of a virtual operator's information system

Diplomas

2017 Informatics PhD, Sorbonne Paris Nord & University of Copenhagen
Implicit Computational Complexity and Compilers

2014 Master of Science in Programming and Safe Software, Sorbonne Paris Nord
"Mention Bien" (cum laude), European notation: A

2010-13 Engineering degree in Computer Science (specialized in Information search and content analysis), Institut Galilée, Sorbonne Paris Nord

2008-9 Prépa CPES, Lycée Feyder

2008 Bachelor S-SVT, Lycée Gustave Monod

Post-Graduate Research Schools

2015	Oregon Programming Languages Summer School (Eugene)
2016	CEMRACS Numerical challenges in parallel scientific computing (Luminy)

Publications

2022	MWP-Analysis: "Improvement and Implementation: Realizing Implicit Computational Complexity" With Clément Aubert, Neea Rusch & Thomas Seiller *(FSCD 2022) Haifa*
2017	PhD thesis: "Implicit Computational Complexity and Compilers" *Department of Computer Science, Faculty of Science, University of Copenhagen*
2017	"Loop Quasi-Invariant Chunk Detection" With Jean-Yves Moyen & Thomas Seiller 15^{th} *International Symposium on Automated Technology for Verification and Analysis* (ATVA 2017) Pune
2017	"Loop Quasi-Invariant Chunk Motion by peeling with statement composition" With Jean-Yves Moyen & Thomas Seiller 5^{th} workshop DICE-FOPARA 2017 Uppsala
2016	"Detection of Non-Size Increasing Programs in Compilers" With Jean-Yves Moyen 7^{th} *International Workshop on Developments in Implicit Computational Complexity* (DICE 2016), Eindhoven

Unpublished documents

2022	"A Novel Loop Fission Technique Inspired by Implicit Computational Complexity" With Clément Aubert, Neea Rusch & Thomas Seiller
2021	"An implementation of flow calculus for complexity analysis (tool paper)" With Clément Aubert, Neea Rusch & Thomas Seiller
2021	"An extended and more practical mwp flow analysis" With Clément Aubert, Neea Rusch & Thomas Seiller
2019	SSAFire: "SSAFire: Formalizing Monadic Gated SSA and its Optimizations" With Delphine Demange
2014	Master's thesis: "Lexical-semantic pattern learning in a biomedical corpus"

Teaching

During my PhD and my ATER, I've asked a duty of 128+192 hours of computer science teaching. It has consisted mainly in labs and hands-on sessions of programming at various level and in various curricula. I also produced material for hands-on sessions, and also taught and prepared a full-class lecture two years in a row. I taught Operating System (*Bash/C/Assembly*), Algorithms and Functional programming (*Ocaml*), Basic Programming (*Python/C*)

Languages

French:	Mother tongue
English:	Spoken, read, written
Spanish:	Intermediate
German:	Rudiments

Implemented tools

2023 | Squirrel: Proof assistant for cryptographic protocols (Ocaml)
With David Baelde, Stephanie Delaune, Adrien Koutsos and others

2023 | JSquirrel: Squirrel online in JS (Typescript/Ocaml)
An online version of Squirrel Prover using CodeMirror6 editor.

2022 | Pyalp: Loop fission inspired by MWP-analysis (Python)
Performs clever loop fission for paralleling optimization of C programs.
With Clement Aubert, Neea Rusch, Thomas Seiller

2021 | Natverk: WebRTC framework implementation for fiktivengine (Typescript)
Signaling, clients, servers webRTC management of an homemade-in-browser video-game 3D engine and more...
With GJgears

2021 | Data-Flow analysis functor for CompcertSSA (Ocaml)
A functor which generates an analyzer over SSA intermediate representation of Compcert with a given Semi-ring and instructions rules

2021 | Pymwp: An implementation of flow calculus for complexity analysis (Python)
Performs 'data-size' analysis of 'AST' of C programs.
With Clement Aubert, Neea Rusch, Thomas Seiller

2020 | WebAssembly Skeletal semantic (Ocaml, Skel)
Describes WebAssembly semantic for Necro. An interpreter/analyzer generator.

2019 | SSAFire companion dev (Ocaml, Coq)
SSAFire is an intermediate representation. This companion provides an interpret, optimizer and oracle of SSAFire programs helping validating its semantic.
With Delphine Demange

2016 | lqicm_pass (C++, LLVM-IR)
A prototype LLVM pass implementing the loop optimization described in (2017)
With Jean-Yves Moyen & Thomas Seiller

2015 | LQICM_On_C_Toy_Parser (Python, C)
A proof-of-concept in python implementing the loop optimization described in (2017)
With Jean-Yves Moyen & Thomas Seiller

Interests and Activities

Music: Piano and Saxophone
Composition (Computer Music)
Sport: Finalist of the *Estivales de Volley des côtes d'armor* in *estivants* category (2016)
Casual swimmer (BNSSA level)
Casual cyclist
Bouldering (beginner)
Rowing (beginner)
Others: Free and Open-Sources Softwares
Privacy Protection (La Quadrature du Net)
Vimist (ex-regular at *TupperVim* event in Paris and Grenoble)
Board-games lover
Casual Admin-Sys for self-hosting and domotic (home-assistant) playing...

Communications

International Symposium

Oct 2017	ATVA 2017 - Fifteenth International Symposium on Automated Technology for Verification and Analysis (Pune)

International Workshops

Apr 2016	DICE 2016 - ETAPS' workshop (Eindhoven)
Apr 2017	DICE 2017 - ETAPS' workshop (Uppsala)
Jun 2017	LOLA 2017 - LICS' workshop (Reykjavik)

Major national events

Sep 2017	11^{th} annual meeting of the French Community of Compilation (Aussois)

Other invited communications

Jan 2015	ELICA Project Kick Off Meeting (Paris)
Nov 2015	LIPN Junior Seminar (Paris)
Mar 2016	Seminar in DIKU (Copenhagen)
Aug 2016	Numerical challenges in parallel scientific computing CEMRACS 2016 (Luminy)
Oct 2016	ELICA Project Meeting (Bologna)
Nov 2016	LIPN Programming and Logic Seminar (Paris)
Mar 2016	Seminar in DIKU (Copenhagen)
Feb 2018	Seminar in LAMA (Chambéry)
Jun 2018	Seminar in the Celtique Team at IRISA (Rennes 1)
Jul 2019	SAV Celtique Team (Vannes)
Jun 2020	Formalizing Monadic Gated SSA and its Optimizations (LIPN Paris Nord)