Alexandre Maréchal

Work Experience

2019-today **Postdoctoral researcher**, Verimag, Grenoble.

2018-2019 **Postdoctoral researcher**, Lip6, Paris.
Duration: 1 year

2014-2018 **Ph.D Thesis**, Verimag, Grenoble.
Duration: 3 years, 5 months

2014 **Magistère's traineeship**, Verimag, Grenoble.
Duration: 8 months
- Coq proof of a linearization algorithm by intervalization
- New linearization approach based on Handelman's theorem

2013 **Magistère's traineeship**, Verimag, Grenoble.
Duration: 4 months
Coq design of a linearization algorithm

2012 **Bachelor Traineeship**, Verimag, Grenoble.
Duration: 2 months
Loop acceleration and Craig interpolation for the verification of numerical programs

Teaching

2019-2020

L3	**Programmation orientée objet**	*36h - UGA*
L3	**Algorithmique**	*16h - UGA*
ISI - 2A	**Algorithmique et optimisation discrète**	*18h - Ensimag*

2018-2019

RICM - 1A	**Projet logiciel**	*20h - Polytech' Grenoble*
L1	**Éléments de programmation**	*38h - UPMC*
L3	**Logique**	*21h - UPMC*

2016-2017

L2	**Introduction à la logique**	*36h - UGA*
RICM - 2A	**Langages et Traducteurs**	*17h - Polytech' Grenoble*

2015-2016

L2	**Bases du développement logiciel**	*30h - UGA*
L1	**Algorithmique et Programmation Fonctionnelle**	*40h - UGA*

Distinctions

2018 **Accessit au prix de thèse GDR GPL**.

6 allée de Combeloup – 38610 Gières – France
06 75 94 68 98 • *marechalalex@gmail.com*
marechalalex.github.io

Skills

Languages

French	**native**
English	**level C1**

Computer Science

Languages	OCaml, C++, Python, Java, Coq, C
Scientific calculus	Sage, Matlab, Maple

Publications

In journals

- Sylvain Boulmé and Alexandre Maréchal. Refinement to certify abstract interpretations: Illustrated on linearization for polyhedra. *Journal of Automated Reasoning*, 62(4):505–530, Apr 2019 (**link**)

In international conferences

- Sylvain Boulmé, Alexandre Maréchal, David Monniaux, Michaël Périn, and Hang Yu. The Verified Polyhedron Library: an overview. In *International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC)*, pages 9–17. IEEE Computer Society, 2018(**link**)
- Sylvain Boulmé and Alexandre Maréchal. A coq tactic for equality learning in linear arithmetic. In *Interactive Theorem Proving (ITP)*, volume 10895 of *LNCS*, pages 108–125. Springer, 2018 (**link**)
- Alexandre Maréchal, David Monniaux, and Michaël Périn. Scalable minimizing-operators on polyhedra via parametric linear programming. In *Static Analysis Symposium (SAS)*, volume 10422 of *LNCS*. Springer, 2017 (**link**)
- Alexandre Maréchal and Michaël Périn. Efficient elimination of redundancies in polyhedra by raytracing. In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, volume 10145 of *LNCS*, pages 367–385. Springer, 2017 (**link**)
- Alexandre Maréchal, Alexis Fouilhé, Tim King, David Monniaux, and Michaël Périn. Polyhedral approximation of multivariate polynomials using Handelman's theorem. In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, volume 9583 of *LNCS*, pages 166–184. Springer, 2016 (**link**)
- Sylvain Boulmé and Alexandre Maréchal. Refinement to certify abstract interpretations, illustrated on linearization for polyhedra. In *Interactive Theorem Proving (ITP)*, volume 9236 of *LNCS*, pages 100–116. Springer, 2015 (**link**)

In French conferences

- Alexandre Maréchal and Michaël Périn. A Linearization Technique for Multivariate Polynomials Using Convex Polyhedra Based on Handelman-Krivine's Theorem. In *Journées Francophones des Langages Applicatifs (JFLA)*, January 2015

In workshops

- Ghiles Ziat, Alexandre Maréchal, Marie Pelleau, Antoine Miné, and Charlotte Truchet. Combination of Boxes and Polyhedra Abstractions for Constraint Solving. In *The 8th International Workshop on Numerical and Symbolic Abstract Domains*, Porto, Portugal, 2019 (**link**)

Education

2014-2017 **Ph.D**, *Verimag - Université Grenoble Alpes*, Grenoble.

2014 **Magistère d'Informatique**, *Université Joseph Fourier*, Grenoble, *with high honours*.

2014 **Master Research Mathématiques Informatique, specialty Informatique, option Recherche Opérationnelle, Combinatoire et Optimisation**, *Université Joseph Fourier*, Grenoble, *with high honours*.

2012 **Bachelor Informatique et Mathématiques Appliquées**, *Université Joseph Fourier*, Grenoble, *with high honours*.

2008 **Bac S Science de l'Ingénieur, specialty Mathématiques**, *Lycée Anna de Noailles*, Evian-les-bains, *with highest honours*.

Ph.D Thesis

Title *New Algorithmics for Polyhedral Calculus via Parametric Linear Programming*

Advisors Michaël Périn, David Monniaux

Link `https://hal.archives-ouvertes.fr/tel-01695086`

Jury
- Pr. Sylvain CONCHON, Université Paris-Sud, president
- Pr. Antoine MINÉ, Université Pierre et Marie Curie - Paris 6, reviewer
- Pr. Sriram SANKARANARAYANAN, University of Colorado Boulder
- Pr. Philippe CLAUSS, Université de Strasbourg, examiner
- Dr. Charlotte TRUCHET, Université de Nantes, examiner

Master Thesis

Title *Three linearization techniques for multivariate polynomials in static analysis using convex polyhedra*

Advisors Michaël Périn, David Monniaux

Link `http://www-verimag.imag.fr/TR/TR-2014-7.pdf`

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