

# Curriculum vitae

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## Education

- 1999** : Habilitation à diriger des recherches, Univ. Aix-Marseille II “Étude arithmétique et dynamique de suites algorithmiques”, under the direction of J.-P. Allouche.
- 1994** : Ph.D. in Pure Mathematics, Univ. Bordeaux I : “Fonctions de Carlitz et automates. Entropies conditionnelles” under the direction of J.-P. Allouche.
- 1992** : “Agrégation” in Mathematics.
- 1991** : DEA (Master Thesis) in Pure Mathematics, Paris XI.
- 1988-1989** : “Licence” and “Maîtrise” in Pure Mathematics, Paris VI.
- 1988-1993** : Scholarship at the École Normale Supérieure, Paris.

## Employment

- Full time researcher “Directrice de Recherches” (DR) at the “Centre National de la Recherche Scientifique” (CNRS) ; hired at CNRS in November 1993 as “Chargée de Recherches”.
- 2010–** : IRIF, Institut de recherche en informatique fondamentale, CNRS, UMR 8243, France.
  - 2002–2010** : LIRMM, Laboratoire d’Informatique, de Robotique et de Microélectronique de Montpellier, CNRS, UMR 5506, France. Chair of the project “Arithmétique Informatique”.
  - 93–2002** : IML, Institut de Mathématiques de Luminy, CNRS, UPR 9016, Marseille, France.

## Institutional responsibilities

- 2021–** : Member of Section 06 (Computer and Information Sciences : Foundations of Computer Science, Computation, Algorithms, Data and Knowledge Representation, Information Processing) of the Comité national de la recherche scientifique CoCNRS. Board member since November 2023.
- 2021–2023** Director of GDR (Groupement de recherche CNRS) Multifractal analysis and self-similarity.
- 2019–2022** : Member of the Comité de synthèse et prospective de la recherche mathématique française (Hcéres).
- 2013–2018** Board of the SMF (French Mathematical Society). Director of publications and associate director of the SMF (2016–2018).
- 2009– 2012** Board of Femmes et Mathématiques (Women in Mathematics).
- 2010–2015** Associate director of FSMP, Fondation Sciences Mathématiques de Paris  
<http://www.sciencesmaths-paris.fr/en/>  
The Foundation Sciences Mathématiques de Paris is a network of excellence created in 2006. Its members are large research institutions in the Paris area. It brings together close to 1200 researchers in mathematical sciences.

**2010–2015** Associate director of LIAFA, Laboratoire d’Informatique Algorithmique : Fondements et Applications, Univ. Paris Diderot-Paris 7. LIAFA has merged with PPS into IRIF.

**2007–2010** Scientific officer (Chargée de mission) at CNRS for Research Departments “Mathematics, Physics, Earth Sciences and Astronomy” and “Information and Engineering Science” in charge of the relations between mathematics and computer science.

**2010–2014** Co-head with G. Theyssier of the research group SDA2 “Systèmes Dynamiques, Automates et Algorithmes” of the GDR Informatique Mathématique (IM). Executive board of GDR Informatique mathématique (2015–2018) in charge of editorial policy.

**2018** I have been member of the mission on mathematics entrusted by the French Minister of National Education J.-M. Blanquer to a team of around 20 people led by Cédric Villani and Charles Torossian. The mission was tasked with assessing the current strengths and weaknesses of mathematics teaching in France, identifying potential bottlenecks and levers, before formulating concrete proposals based on best practices and international studies, in a 96-page report proposing 21 flagship measures with complementary measures to improve the effectiveness of mathematics teaching in France.<sup>1</sup>

## Committees

**2024–** Scientific council of the SMF (Société mathématique de France).

**2024–** Scientific council of the GDR Informatique Fondamentale et ses Mathématiques.

**2014–2018** Scientific council of the CNRS (Centre National de la Recherche Scientifique).

**2011–2021** Scientific council of the City of Paris.

**2015–2021** Steering committee “Ecole de Printemps d’Informatique Théorique” (EPIT).

**2018–** International Advisory Board of the doctoral program Discrete Mathematics, at TU and Univ Graz and MU Leoben, supported by the Austrian Science Fund FWF.

**2017–2021** Scientific council of DIM Math Innov. The DIM Math Innov federates all laboratories and teams in mathematical sciences in the Ile-de-France Region.

**2004–2013** Scientific council of the CIRM (Centre International de Rencontres Mathématiques).

**2011–2015** and **2000–2003** Member of the CNU (National Council of Universities), Section 25 (Mathematics). The CNU is a national council that decides on individual measures relating to the qualification, recruitment and career of university professors and lecturers.

## Decoration

Chevalier de la Légion d’honneur, 2013.

## Edition

Editorial board, Collection “Computer Science and information technology”, Computer Science and Information Technology, ISTE-Wiley, Theoretical computer science (2012–).

Editorial Board of the book series *Fractals and Dynamics in Mathematics, Science, and the Arts : Theory and Applications*, World Scientific Publishers (2017–).

I have edited 4 collaborative books :

N. Pytheas Fogg, Substitutions in Dynamics, Arithmetics and Combinatorics, Lecture Note Mathematical Series 1794, Springer-Verlag (2002), eds. V. Berthé, S. Ferenczi, C. Mauduit, A. Siegel.

Combinatorics, Automata and Number Theory, Encyclopedia of Mathematics and its Applications 135, Cambridge University Press (2010), eds. V. Berthé, M. Rigo.

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1. The report can be found at [http://cache.media.education.gouv.fr/file/Fevrier/19/0/Rapport\\_Villani\\_Torossian\\_21\\_mesures\\_pour\\_enseignement\\_des\\_mathematiques\\_896190.pdf](http://cache.media.education.gouv.fr/file/Fevrier/19/0/Rapport_Villani_Torossian_21_mesures_pour_enseignement_des_mathematiques_896190.pdf)

Combinatorics, Words and Symbolic Dynamics, Encyclopedia of mathematics and its applications, Cambridge University Press 159 (2016), eds. V. Berthé, M. Rigo.  
Sequences, groups and number theory, Birkhäuser/Springer, Trends in Mathematics (2018), eds. V. Berthé, M. Rigo.

## PhD Students supervised

**2015– 2019** : Paulina Cecchi Bernales (codavisor M. I. Cortez), IRIF, Univ. Paris Diderot Paris 7 and Univ. de Santiago du Chili.

**2015– 2018** : Pablo Rotondo (coadvisors B. Vallée, A. Viola), IRIF, Univ. Paris Diderot Paris 7 and Univ. de la Republica, Uruguay.

**2010– 2013** : Timo Jolivet (codavisor J. Kari), LIAFA, Univ. Paris Diderot Paris 7 and Univ. Turku, Finland.

**2008– 2012** : Sébastien Labbé (coadvisor S. Brlek), LIAFA, Univ. Paris Diderot Paris 7 and LACIM, UQAM, Canada. S. Labbé is now CR1 at CNRS.

**2004– 2007** : Thomas Fernique, LIRMM, Montpellier. Th. Fernique is now CR1 at CNRS.

**2003–2005** : Damien Jamet, LIRMM, Montpellier. D. Jamet is now Maître de Conférences.

**2002–2005** : Julien Bernat (coadvisor P. Arnoux), IML, Marseille. J. Bernat is now Maître de Conférences.

**2000–2002** : Boris Adamczewski, IML, Marseille. B. Adamczewski is now DR2 at CNRS.

**1998–2000** : Anne Siegel (coadvisor P. Arnoux), IML, Marseille. A. Siegel is now DR1 at CNRS.

## Projects

I have conducted or took part in several French grants (ANR<sup>2</sup>, previously called ACI projects) in mathematics or computer science :

ANR CODYS (2018–2023) “Computer orbits for dynamical systems” (main coordinator).

ANR DynA3S “Dynamical study of gcd algorithms : an algorithmic, analytic, arithmetic and symbolic approach” (2012–2018) (main coordinator).

ANR SubTile “Substitutions and Tilings” (2009–2012) (member).

ANR Kidico “Knowledge Integration for Digital convolution, Image Segmentation and Measurement” (2010–2015) (member).

ANR LAREDA “Lattice Reduction Algorithms : Dynamics, Probabilities, Experiments, Applications” (2007–2011) (coordinator for one of both poles).

ACI “Numeration” (2004–2006) (member).

ACI Jeunes chercheurs (2002–2004) “Combinatorics of multidimensional words, tilings and numeration” (main coordinator).

At the international level :

ANR-FWF SymDynAr (Austria) (Symbolic Dynamics and Arithmetic Expansions ) (2024–2027) (coordinator with J. Thuswaldner).

PHC<sup>3</sup> Amadeus (Austria) 2019 “Topology, Dynamics and number theory of fractal structures” (member).

ANR-FWF FAN (Austria) (fractals and numeration) (2012–2017) (coordinator with J. Thuswaldner).

STIC-AMSUD project EPAA (2024-) (member).

STIC-AMSUD (Argentina-France-Uruguay) 2016–2018 “AleaEnAmSud” (member). 2013–2015 “Dynalco, Advances in Analytic Combinatorics : dynamical combinatorics, and applications to number theory, information theory and cryptography” (member).

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2. The French National Research Agency (ANR) is a public administrative institution under the authority of the French Ministry of Higher Education, Research and Innovation. The agency funds project-based research carried out by public operators cooperating with each other or with private companies.

3. Hubert Curien (PHC) partnerships are part of the Ministry of Europe and Foreign Affairs’ policy to support international scientific and technological exchanges and are implemented with the support of the Ministry of Higher Education, Research and Innovation.

PHC Amadeus (Austria) 2010–2012 “Topology of fractals arising from dynamics and applications” (member).

PHC Amadeus (Austria) 2007–2009 “Fractals and topological structures arising from dynamics” (coordinator).

PHC Sakura (Japan) 2006–2008 “Number theory and discrete dynamical systems” (member).

PAI Van Gogh (Netherlands) 2001–2002 “Arithmetic, dynamical systems and word combinatorics” (coordinator).

## Research interests and publication activities

My research work focuses on the study of ergodic, probabilistic and combinatorial (in the sense of word combinatorics and symbolic dynamics) properties of dynamical systems of an arithmetic nature and their applications in theoretical computer science. Applications and motivation from computer science range from discrete geometry to word combinatorics, tiling spaces, cryptography, analysis of gcd and lattice reduction algorithms. Applications in mathematics range from Diophantine approximation and continuous fractions to numeration dynamics, symbolic dynamics, ergodic theory, topological dynamics and aperiodic order, number theory, formal power series with coefficients in a finite field, discrete mathematics.