

Nicolas MASCOT

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Born on Nov. 9th, 1988

in Lannion (France)

French nationality

Current employment

Since 2014

Postdoctoral researcher at the University of Warwick (UK)

supported by EPSRC Programme Grant “LMF : L-Functions and Modular Forms”

Education

2011–2014

Doctorate thesis in Bordeaux I University

Subject : Computing modular Galois representations

Supervised by Prs. Jean-Marc Couveignes and Karim Belabas

Funded by the ENS Ulm.

2007–2011

École Normale Supérieure de la rue d’Ulm (Paris)

2010 : Master’s thesis : “Fonctions zêta de courbes projectives sur un corps fini et cohomologie Weil-étale” Supervisor : Pr. Boas Erez (Bordeaux I university)

2009 : Agrégation de mathématiques, option algèbre et calcul formel (rank : 9th)

2008 : Short thesis for the first year of the Master’s degree : “Symétries de Lie des systèmes d’équations aux dérivées partielles et classification des actions locales de groupes de Lie”

Joint with Sylvain Arguillère.

Supervisor : Pr. Joël Merker (ENS Ulm).

2005–2007

Classes préparatoires in mathematics

Lycée Louis le Grand, Paris

2007 : Admitted to the École Normale Supérieure de la rue d’Ulm (ranked 8th) and to the École Polytechnique (ranked 15th).

2005

Baccalauréat S-SVT, spécialité mathématiques, option section européenne en anglais.

Lycée Félix le Dantec, Lannion (France).

Research articles

• Published :

- **Certification of modular Galois representations** (46 pages) To appear in *Math. Comp.*
- **Computing modular Galois representations** (43 pages) Published in *Rendiconti del Circolo Matematico di Palermo*, volume 62, issue 3, December 2013.
- **Calcul de représentations galoisiennes modulaires** (210 pages) PhD thesis, defended on July 15th, 2014.

• Submitted :

- **Companion forms and explicit computation of PGL_2 -number fields with very little ramification** (31 pages) arXiv preprint 1611.01464, November 2016.

• In preparation :

- **Certification of endomorphisms in Jacobians** joint with E. Costa (Dartmouth College), J. Sijsling (Universität Ulm) and J. Voight (Dartmouth College)
- **Enumeration of points of bounded degree on modular curves** joint with S. Siksek (University of Warwick)

• Planned :

- **Computing Galois representations attached to Hilbert modular forms** joint with A. Page (University of Warwick)

Cf. my research statement for more details.

Participation in conferences and seminars

- **Number theory seminar** in Beirut, October 2016, upon invitation from Pr. Kamal Khuri-Makdisi.
- **Number theory seminar** in Beirut, April 2016, upon invitation from Pr. Kamal Khuri-Makdisi.
- **Heilbronn seminar** in Bristol, January 2016, upon invitation from Dr. Jonathan Bober.
- **“Géométrie et algèbre effectives” seminar** in Rennes, December 2015, upon invitation from Pr. Xavier Caruso.
- **“Arithmétique et Théorie de l’Information” seminar** in Marseille (France), April 2015, upon invitation from Pr. David Kohel.
- **Number theory seminar** in Warwick (UK), November 2014
- **WaNDS seminar** in Sheffield (UK), September 2014, upon invitation from Dr. Haluk Şengün.
- **“Théorie des nombres et applications” conference** in CIRM (Marseille), March 2014.
- **Seminar** in Caen, January 2014, upon invitation from Pr. David Vauclair.
- **AriC seminar** in LIP (Lyon), January 2014, upon invitation from Pr. Bruno Salvy.
- **ANR PEACE meeting** in IRMAR (Rennes), December 2013.
- **Seminar** in Clermont-Ferrand, November 2013, upon invitation from Pr. Marusia Rebolledo.
- **“Méthodes algébriques et explicites” conference** in LMB (Besançon), September 2013.
- **“Explicit methods in number theory” workshop** in Oberwolfach, July 2013.
- **Doctor students’ seminar** in the Institut de Mathématiques de Bordeaux, May 2013.
- **Journées nationales de calcul formel** in CIRM (Marseille), May 2013.
- **LMB seminar** in Besançon, April 2013, upon invitation from Pr. Aurélien Galateau.
- **IRMAR seminar** in Rennes, January 2013, upon invitation from Pr. David Lubicz.
- **LFANT seminar** in the Institut de Mathématiques de Bordeaux, January 2013.
- **Doctor students’ seminar** in the Institut de Mathématiques de Bordeaux, October 2012.
- **Doctor students’ seminar** in the Institut de Mathématiques de Bordeaux, September 2012.
- **Doctor students’ seminar** in the Institut de Mathématiques de Bordeaux, April 2012.
- **LFANT seminar** in the Institut de Mathématiques de Bordeaux, February 2011.

Talks

- **Certification of modular Galois representations** in ICERM (Providence, US) in November 2015, in Bristol in January 2016, and in Beirut in October 2016.
- **Certification de représentations galoisiennes modulaires** in IRMAR (Rennes) in December 2015, and in IMB (Bordeaux) in May 2016.
- **Cohomological obstruction to deformation problems and Gouvêa’s dimension conjecture** in Warwick (UK), February 2015.
- **Construction and properties of modular Galois representations of any weight** in Warwick (UK), November 2014.
- **Computing modular Galois representations** in MFO (Oberwolfach) in July 2013, in LMB (Besançon) in September 2013, in CIRM (Marseille) in March 2014, in Sheffield (UK) in September 2014, in Warwick (UK) in November 2014, and in Beirut in April 2016.
- **Calculs de représentations galoisiennes modulaires** in the Institut de Mathématiques de Bordeaux in January 2013, then in IRMAR (Rennes) in January 2013, in LMB (Besançon) in April 2013, in CIRM (Marseille) in May 2013, in Clermont-Ferrand in November 2013, in IRMAR (Rennes) in December 2013, in LIP (Lyon) in January 2014, in Caen in January 2014, and in Marseille in April 2015.
- **Un peu de géométrie des surfaces algébriques** in the Institut de Mathématiques de Bordeaux, May 2013.
- **La constante de Khintchine** in the Institut de Mathématiques de Bordeaux, October 2012.
- **La jacobienne d’une surface de Riemann compacte** in the Institut de Mathématiques de Bordeaux, May 2012 and September 2012.
- **Plongements grassmanniens et arithmétique jacobienne rapide** in the Institut de Mathématiques de Bordeaux, February 2011.
- **La méthode de Chabauty et Coleman** in the École Normale Supérieure de la rue d’Ulm (Paris) in October 2010, then in the Institut de Mathématiques de Bordeaux, December 2010.
- **Fonctions zêta de courbes projectives sur un corps fini et cohomologie Weil-étale** Master’s thesis defense in Paris VI university, September 2010.
- **Introduction à la théorie de Galois et à la théorie de Kummer** in the École Normale Supérieure de la rue d’Ulm (Paris), October 2009.
- **Représentation informatique des flottants et problèmes d’arrondi** in the École Normale Supérieure de la rue d’Ulm (Paris), May 2009.
- **Symétries de Lie des systèmes d’équations aux dérivées partielles et classification des actions locales de groupes de Lie** Thesis defense for my first year of Master’s degree in the École Normale Supérieure de la rue d’Ulm, June 2008.

Research visits

- **Rennes** (planned) One week in February 2017, to give a 3h lecture on my work during a special week on algorithmic approaches to the p -adic Langlands correspondence.
- **Beirut** One week in April 2016 and another week in October 2016, upon invitation from Pr. Kamal Khuri-Makdisi.
- **Bordeaux** Ten days in May 2016, upon invitation from Pr. Jean-Marc Couveignes.
- **ICERM (Providence, USA)** Three months in autumn 2015 as a visiting research fellow on the occasion of the special term “Computational spaces of the Langlands program”.

Teaching

As a postdoctoral researcher at the University of Warwick :

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| 2017 | Supervision of a 3rd year student
On modern methods in integer primality proving and factoring. |
| 2016, 2017 | Algebraic number theory (3rd year module)
\approx 90 students. Joint with A. Page. My duties involve teaching the module, writing lecture notes, setting up exercise sheets, and setting up and marking the exam. |

During my thesis in Bordeaux I University (64h / year) :

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|------------------|---|
| 2013 | Computer science tutor
\approx 30 students. Basics of Linux, collaborative online tools, advanced office software. |
| 2011, 2012, 2013 | Mathematics for biology bachelor students
\approx 40 students. Single- and multivariate calculus and integration, linear ODEs, linear algebra. |
| 2011, 2012 | Calculus for mathematics and physics bachelor students
\approx 40 students. Real and vector calculus and integration, direct and inverse trigonometric and hyperbolic functions, linear ODEs. |

Before :

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| 2008, 2009 | Oral examiner in mathematics in classe préparatoire MP*
Lycée Louis le Grand, Paris. |
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Cf. my teaching experience statement for more details.

Languages

French (mother tongue), English fluently read, spoken and written, knowledge of German, Spanish and Chinese, basic notions of Arabic.

Computer skills

- System : Linux, Windows.
- Programming : C and C++, Python, notions of 386 assembly language. Vast experience in parallel computing on the Bordeaux and Warwick computer clusters.
- Vast experience in PARI-GP et SAGE, good knowledge of MAGMA, MAPLE and SCILAB.
- \LaTeX , Git, HTML.