

Born September 21st 1986

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# Romain Lebreton

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## Position

- Oct. 2013 – Postdoctoral Fellow at the Symbolic Computation Group of University of Waterloo, Canada
- Sept. 2012 – Sept. 2013 Postdoctorate on High performance algebraic computing, team ARITH, LIRMM, Université Montpellier II

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## Ph.D. Thesis (Sept. 2009 – Dec. 2012)

- Title *Contributions to relaxed algorithms and polynomial system solving*
- Supervisors Marc GIUSTI (CNRS & École polytechnique), Éric SCHOST (University of Western Ontario)
- Place *Computer Science Department, École polytechnique, Palaiseau*
- Grant International Gaspard Monge grant from École polytechnique (Sept. 2009 – Aug. 2012)
- Defense Defended on December 11th 2012. Members of the jury:
- |                       |                                       |            |
|-----------------------|---------------------------------------|------------|
| M. Richard Brent      | Australian National University        | Reviewer   |
| M. Marc Giusti        | CNRS & École polytechnique            | Supervisor |
| M. Bernard Mourrain   | Inria Sophia Antipolis - Méditerranée | Reviewer   |
| M. Jean-Michel Muller | École Normale Supérieure de Lyon      | Examinator |
| M. Éric Schost        | University of Western Ontario         | Supervisor |
| Ms. Annick Valibouze  | Université Paris 6                    | Examinator |
| M. Kazuhiro Yokoyama  | University of Rikkyo                  | Reviewer   |
| M. Paul Zimmermann    | Inria Nancy - Grand Est               | Examinator |

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## Education

- 2005 – 2009 **École Normale Supérieure of Paris**, *Mathematics then Computer Science department.*
- 2007 – 2008 **Parisian Master of Computer Science Research (MPRI)**, *summa cum laude.*
- July 2006 **Master 1 in Mathematics**, *École Normale Supérieure, Paris, magna cum laude.*
- July 2006 **B.S. in Mathematics**, *École Normale Supérieure, Paris.*

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## Publications

Reviewed international journals

- 2014 **Relaxed Hensel lifting of triangular sets**, *Journal of Symbolic Computation*, to appear, 34 pages, R. LEBRETON.

2014 **A simple and fast online power series multiplication and its analysis**, *Journal of Symbolic Computation*, accepted after minor revisions, 24 pages, R. LEBRETON and É. SHOST.

Proceedings of peer-reviewed international conferences

2014 **Online order basis algorithm and its impact on block Wiedemann algorithm**, *Accepted to ISSAC'14*, 8 pages, P. GIORGI and R. LEBRETON.

2013 **Structured FFT and TFT: symmetric and lattice polynomials**, *ISSAC'13*, 8 pages. J. VAN DER HOEVEN, R. LEBRETON and É. SHOST

2013 **On the complexity of solving bivariate systems: the case of non-singular solutions**, *ISSAC'13*, 8 pages, R. LEBRETON, E. MEHRABI and É. SHOST.

2012 **Relaxed  $p$ -adic Hensel lifting for algebraic systems**, *ISSAC'12*, 8 pages. J. BERTHOMIEU, R. LEBRETON

2012 **Algorithms for the universal decomposition algebra**, *ISSAC'12*, SIGSAM Best student paper award, 8 pages, R. LEBRETON, É. SHOST.

2012 **Power Series Solutions of Singular (q)-Differential Equations**, *ISSAC'12*, 8 pages. A. BOSTAN, M. CHOWDHURY, R. LEBRETON, B. SALVY and É. SHOST

Posters of peer-reviewed international conferences

2013 **Relaxing order basis computation**, *ISSAC'13*. P. GIORGI and R. LEBRETON

2012 **On the complexity of computing certain resultants**, *ISSAC'12*, Fachgruppe Computer Algebra Best Poster Award, R. LEBRETON, E. MEHRABI and É. SHOST.

2011 **Root lifting techniques and applications to list decoding**, *ISSAC'11*. M. F. I. CHOWDHURY and R. LEBRETON

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## Software

**Contributor to the Algebramix and Geomsolvex packages of the computer algebra and analysis system Mathemagix**, 3000 lines of C++, Relaxed algorithms for  $p$ -adic numbers, <http://www.mathemagix.org>.

**Contributor to the exact linear algebra library LinBox**, 5000 lines of C++, Integer and polynomial matrix multiplication, <http://www.linalg.org>.

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## Presentations

Communications at international symposiums

Aug. 3rd 2013 **Online Hensel lifting for dense, sparse and structured linear system solving**, *SIAM AG'13*, Fort Collins.

June 26th 2013 **Structured FFT and TFT: symmetric and lattice polynomials**, *ISSAC'13*, Boston.

June 4th 2013 **Relaxed Hensel lifting of triangular sets**, *MEGA'13*, Francfort.

July 24th 2012 **Algorithms for the universal decomposition algebra**, *ISSAC'12*, Grenoble.

Oct. 1st 2011 **Fast computation of absolute Lagrange resolvents**, *Colloque franco-maghrébin de Calcul Formel*, Kerkennah islands, Tunisia.

### Communications at national symposiums

- May 13th 2013 **Structured FFT and TFT: symmetric and lattice polynomials**, *JNCF'13*, Luminy.  
Nov. 16th 2011 **Algorithms for the universal decomposition algebra**, *JNCF'11*, Luminy.  
May 5th 2010 **Algorithms in algebras of invariant polynomial under a finite group**, *JNCF'10*, Luminy.

### Seminars

- March 21st 2014 **Online order basis algorithm and its impact on block Wiedemann algorithm**, *SCG Seminar*, University of Waterloo.  
Nov. 1st 2013 **Tutorial on TeXmacs presentations**, *SCG Seminar*, University of Waterloo.  
October 11th 2013 **Hensel lifting: Newton iteration and relaxed algorithms**, *SCG Seminar*, University of Waterloo.  
March 7th 2013 **Relaxed algorithms,  $p$ -lifting and polynomial system solving**, *LJK - CASYS seminar*, Université Joseph Fourier - Grenoble.  
February 4th 2013 **Relaxed algorithms,  $p$ -lifting and polynomial system solving**, *GALAAD seminar*, Inria Sophia Antipolis - Méditerranée.  
December 20th 2012 **Relaxed algorithms,  $p$ -lifting and polynomial system solving**, *ARIC seminar*, ENS Lyon.  
November 26th 2012 **Relaxed algorithms,  $p$ -lifting and polynomial system solving**, *PolSys seminar*, Université Paris 6.  
June 11th 2012 **Algorithms for the universal decomposition algebra**, *ALGO Seminar*, INRIA Rocquencourt.  
April 25th 2012 **Relaxed Hensel lifting for algebraic systems**, *ARITH Seminar*, LIRMM, Montpellier.  
March 9th 2012 **Relaxed Hensel lifting for algebraic systems**, *Joint Lab Meeting*, University of Waterloo, Canada.

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### Invitations

- Nov. 2009 **Invited Ph.D. candidate**, *Computer Science Department, University of Western Ontario*, London, Ontario, Canada.  
July 2010  
March 2011 Invited by Éric SCHOIST  
Feb. – March 2012

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### Experiences

- Sept. 2008 – Aug. 2009 **Long research internship**, *Complexity of computation in algebras of invariant polynomial under a finite group*, LIX, École polytechnique, Palaiseau.  
Under the supervision of Marc GIUSTI  
March 2008 – July 2008 **Master 2 research internship**, *Finding at least one representative point in each connected component of a real algebraic variety*, University of Bath, England.  
Under the supervision of Marc GIUSTI and Nicolai VOROBJOV

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## Teaching

- 2014 **Lecturer**, *University of Waterloo*.  
Data Structures and Data Management, CS 240, Spring term, 2 x 34h
- 2009 – 2012 **Teacher's assistant in Computer Science**, *École polytechnique*, Palaiseau.  
Web programming (INF441 - 36h);  
Algorithmic and programming (INF431 - 36h) ;  
Basics of programming and algorithmic (INF421 - 36h + 36h + 22h) ;  
Introduction to Computer Science (INF311 - 20h).

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## Miscellaneous

- 2013 – 2014 **Co-organizer of the LLL reading group**, University of Waterloo.
- 2010 – 2012 **Co-organizer of Computer Algebra Seminar Cal4Doc**, LIX, École polytechnique.
- 2008 – 2012 **Co-organizer of Max team Seminar**, LIX, École polytechnique.

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## Skills

- Science MAGMA, MAPLE, MATHEMAGIX
- Typing  $\LaTeX$ ,  $\TeX$ macs
- Programming C, C++, Java
- Web programming HTML, CSS, PHP, MySQL,  
Javascript (Jquery, Ajax)

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## Language

- English **Fluent**
- German **Notions**