Thibaut Verron

Post-doctoral researcher, Johannes Kepler University

Date of birth: 21 March 1991
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Employment

2017 – cur. **Post-doctoral researcher at JKU (Linz, Austria)**
Supervisor: Manuel Kauers (Institute for Algebra)
Keywords: computer algebra, algebraic combinatorics
Project: Algorithmic and Enumerative Combinatorics (AEC, FWF 5004)

2016 – 2017 **Post-doctoral researcher at INP-ENSEEIHT (Toulouse, France)**
Supervisors: Joseph Gergaud, Olivier Cots (Team *Parallel algorithms and optimization*)
Keywords: optimal control

Education

2012 – 2016 **Ph.D thesis, University Pierre et Marie Curie (Paris, France)**
Computer science

2011 – 2012 **Masters degree, University Paris-Sud 11 (Orsay, France)**
Pure and Applied Mathematics, specialty Algebra, Analysis and Geometry

2009 – 2013 **École Normale Supérieure de Paris (France)**
Diploma of the ENS, Major in Mathematics, minor in Computer Science

2007 – 2009 **Preparatory classes MPSI, MP*, Lycée Hoche (Versailles, France)**

2007 **A levels**

Ph.D. thesis

Dates September 2012 – September 2016 (defense: 26 September 2016)

Location PolSys team, LIP6, Université Pierre et Marie Curie (Paris, France)

Supervisors Jean-Charles Faugère, Mohab Safey El Din

Title Regularization of Gröbner basis computations for weighted and determinantal systems, and an application to medical imagery

Keywords polynomial systems; Gröbner bases; structured systems; weighted-homogeneous systems; determinantal systems; real algebraic geometry

Committee

Director	Jean-Charles Faugère	Research director, Inria
Advisor	Mohab Safey El Din	Professor, UPMC
Reviewer	Laurent Busé	Researcher, Inria, HdR
Reviewer	Bruno Salvy	Research director, Inria
Examiner	Bernard Bonnard	Professor, Université de Bourgogne
Examiner	Stef Graillat	Professor, UPMC

Publications and communications

Journal papers

- Maria Francis and Thibaut Verron. "A Signature-based Algorithm for Computing Gröbner Bases over Principal Ideal Domains". In: *Mathematics in Computer Science - Special issue on the ACA 2018 conference* (Feb. 2018). To appear. arXiv: 1802.01388 [cs.SC]
- Bernard Bonnard, Olivier Cots, Jérémy Rouot, and Thibaut Verron. "Time minimal saturation of a pair of spins and application in magnetic resonance imaging". In: *Mathematical Control and Related Fields* (2019). To appear. URL: https://hal.inria.fr/hal-01779377
- Jean-Charles Faugère, Mohab Safey El Din, and Thibaut Verron. "On the complexity of computing Gröbner bases for weighted homogeneous systems". In: *Journal of Symbolic Computation* 76 (2016), pp. 107–141. ISSN: 0747-7171. DOI: http://dx.doi.org/10.1016/j.jsc.2015.12.001. URL: https://hal.archives-ouvertes.fr/hal-01097316v2

Conference papers

- Xavier Caruso, Tristan Vaccon, and Thibaut Verron. "Gröbner bases over Tate algebras". In: *arXiv e-prints* (Jan. 2019). Accepted for ISSAC 2019. arXiv: 1901.09574 [math.AG]
- Tristan Vaccon, Thibaut Verron, and Kazuhiro Yokoyama. "On affine tropical F5 algorithms". In: *Proceedings of the 2018 International Symposium on Symbolic and Algebraic Computation*. ISSAC '18. Extended version to appear in *Journal of Symbolic Computation*. New York, USA, 2019. URL: https://arxiv.org/abs/1805.06183
- Bernard Bonnard, Jean-Charles Faugère, Alain Jacquemard, Mohab Safey El Din, and Thibaut Verron. "Determinantal set, singularities and application to optimal control in

medical imagery". In: *Proceedings of the 2016 International Symposium on Symbolic and Algebraic Computation*. ISSAC '16. Waterloo, Canada, 2016, pp. 103–110. URL: https://hal.archives-ouvertes.fr/hal-01307073v2

- Jean-Charles Faugère, Mohab Safey El Din, and Thibaut Verron. "On the complexity of computing Gröbner bases for quasi-homogeneous systems". In: *Proceedings of the 2013 International Symposium on Symbolic and Algebraic Computation*. ISSAC '13. Boston, USA: ACM, 2013, pp. 189–196. URL: https://hal.archives-ouvertes.fr/hal-00780388v2

Preprints and submitted papers

- Maria Francis and Thibaut Verron. "Signature-based Möller's algorithm for strong Gröbner bases over PIDs". In: *ArXiv e-prints* (Jan. 2019). arXiv: 1901.09586 [cs.SC]

Other documents

- *Why You Should Remove Zeroes Before Guessing*. Poster, International Symposium on Symbolic and Algebraic Computation, joint work with Manuel Kauers. Beihang University, Beijing, China, 2019

Conference talks

- *Algorithme de Möller avec signatures pour le calcul de bases de Gröbner fortes à coefficients dans un anneau principal*. Journées Nationales de Calcul Formel 2019. CIRM, Luminy, France, 2019
- *Signature-based criteria for computing weak Gröbner bases over PIDs*. 24th Conference on Applications of Computer Algebra (ACA 2018), session "Algorithms for zero-dimensional ideals". 2018
- *Méthodes algébriques pour le contrôle optimal en Imagerie à Résonance Magnétique*. 8^{e} Biennale Française des Mathématiques Appliquées et Industrielles (SMAI 2017), Mini-symposium "Contrôle et applications". La Tremblade, France, 2017
- *Determinantal set, singularities and application to optimal control in medical imagery*. International Symposium on Symbolic and Algebraic Computation (ISSAC). Wilfrid Laurier University, Waterloo, Canada, 2016
- *Algebraic classification related to contrast optimization for MRI*. Journées annuelles du GdR Mathématiques de l'Optimisation et Applications 2015. IMB, Université de Bourgogne, Dijon, France, 2015
- *Complexité du calcul de bases de Gröbner pour les systèmes homogènes avec poids*. Journées Nationales de Calcul Formel 2014. CIRM, Luminy, France, 2014

- *Bases de Gröbner et systèmes structurés*. Rencontres doctorales Henri Lebesgue 2014. IRMAR, Rennes, France, 2014
- *On the complexity of computing Gröbner bases for quasi-homogeneous systems*. International Symposium on Symbolic and Algebraic Computation (ISSAC). Northeastern University, Boston, USA, 2013
- *Complexité du calcul de bases de Gröbner pour les systèmes quasi-homogènes*. Journées Nationales de Calcul Formel 2013. CIRM, Luminy, France, 2013

Teaching and supervising activities

2018 – 2019 : Guest lecturer / teaching assistant in Mathematics, JKU, Linz (Austria)

- **Co-advisor for a bachelor thesis**, together with Manuel Kauers (in progress)
- **Special lecture**: *Computer Algebra 2*
  (Accessible from bachelor level, 15 lectures, 30h)
  Preparation of lecture notes, final evaluation on programming exercises as homework
- **Exercise sessions**: *Linear Algebra for computer scientists* (in progress)
  (Bachelor level, 30h)
  Grading of finals

2016 – 2017 : Teaching assistant in Applied Mathematics, INP Toulouse (France)

- **Programming sessions**: *Ordinary Differential Equations* (Python with Scipy, Matlab)
  (Bachelor level, 26h)
  Evaluation of mini-projects (based on a short interview and a written report)

2013 – 2016 : Teaching assistant in Computer Science, UPMC, Paris (France)

- **Exercise and programming sessions**: *Working environment*, *Databases*
  (Bachelor level, 129h)
  Participation in the preparation of the exams, setup of a framework for automated correction of the homework and exams, grading of homework throughout the semester and of finals, preparation and grading of short written tests
- **Programming sessions**: *Introduction to programmation* (Python), *Scientific computing* (C), *Computer Architecture* (Asm)
  (Bachelor level, 60h)
  Grading of homework throughout the semester

Additional activities

- **Poster chair** for the 6th International Congress on Mathematical Software (ICMS), 2018
- **Reviewer** for SODA, JSC, FPSAC

Other information

- **Languages**: French (native), English (fluent), German (advanced), Russian (basic)
- **Programming languages**: Python, C, C++, OCaml, Haskell, Bash, Emacs lisp