

# Clément Pernet

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**Born** November 8, 1980.

**French**

## CURRENT POSITION

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Associate professor (Maître de conférence habilité à diriger des recherches) in computer science at Université Grenoble-Alpes.

## PAST ACTIVITY AND QUALIFICATION

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- 2013–2016* **Visiting researcher**, CNRS, INRIA, AND OPENDREAMKIT  
Inria/LIP team AriC. *Calcul parallèle, calcul formel, théorie des codes.*
- Nov. 2014* **Habilitation à diriger des recherches**, UNIV. J. FOURIER, GRENOBLE 1  
“Calcul algébrique fiable et haute performance”. *Nov. 2014. Chair : B. Plateau. Referees : D. Augot, M. Giesbrecht, L. Grigori. Examiners : J-G. Dumas, J-C. Faugère, E. Kaltofen.*
- Since Dec. 2008* **Associate professor in Computer Science**, UNIV. J. FOURIER, GRENOBLE 1  
Équipe Inria/LIG MOAIS, then LJK-CASYS. *Parallel computing, computer algebra, coding theory.*
- 2008* **Acting Assistant Professor**, DEPT. OF MATHS, U. OF WASHINGTON, WA, USA  
superised by W. Stein. *Mathematical software (Sage) and computational number theory.*
- 2007* **Postdoc**, SYMBOLIC COMP. GROUP, U. OF WATERLOO, ON, CANADA  
supervised by G. Labahn. *Mathématique software (Maple) and exact linear algebra.*
- 2003–2006* **PhD. in applied Mathematics**, UNIV. GRENOBLE 1, J. FOURIER  
“Algèbre linéaire exacte efficace : le calcul du polynôme caractéristique”. *Sept. 06. Advisors : J-G. Dumas & D. Duval. Chair : J. Della-Dora. Referees : G. Villard, L. Giraud. Examiners : L. M. Pardo, J-L. Roch.*
- 2002–2003* **DEA (MSc) in applied Mathematics**, UNIV. GRENOBLE 1, J. FOURIER  
“Calcul du polynôme caractéristique dans un corps fini”. *Advisors : J-G. Dumas & D. Saunders.*
- 2000–2003* **Engineer diploma in Computer Sc. and applied Maths** ENSIMAG-INPG

## RESEARCH PROJECTS

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- 2015–2019* **H2020 OpenDreamKit : Open Dig. Research Env. Toolkit for the Adv. of Maths.** LEAD PI
- 2012–2015* **ANR HPAC : High Performance Algebraic Computing** INVOLVED AT 70%
- 2014–2016* **ADT Inria. Actis : Algorithmic Coding Theory in Sage** EXTERNAL PARTNER
- 2012–2014* **Inria associate team with NCSU, USA. QOLAPS** MEMBER
- 2010–2011* **PEPS CNRS Software tools for high performance algebraic computing.** LEADER
- 2008* **PIMS Postdoc fellowship award** PACIFIC INSTITUTE FOR MATHEMATICAL SCIENCES

## PHD. SUPERVISION AND COMITEES

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*2016–...* **D. Lucas,**

PHD. CO-SUPERVISOR, UJF

- 2012–2015 **Z. Sultan**, PHD. CO-SUPERVISOR, UJF  
*Algèbre linéaire parallèle adaptative et générique*
- 2013 **A. Zeh**, PHD. DEFENSE EXAMINER, UNIV. ULM, GERMANY  
*Algebraic Soft and Hard-decision decoding of Generalized Reed-Solomon and Cyclic Codes*
- 2012 **Z. Sultan**, *Adaptive Parallel Elimination for Algebraic attacks.* MSc INTERNSHIP, UJF
- 2009 **T. Stalinski**, *Calculs pair à pair sur machines non sûres.* MSc INTERNSHIP, UJF

## INTERNATIONAL COLLABORATIONS

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- NCSU (NC, USA)* with **E. Kaltofen**, within the Inria associate team QOLAPS 2012–2015.
- U. of Washington (USA)* with **W. Stein**, postdoc, 2008 (1 year).
- U. of Waterloo (Canada)* with **G. Labahn, A. Storjohann**, postdoc, 2007 (1 year).
- U. de Cantabria (Espagne)* with **L.M. Pardo, C. Beltràn**, PhD. mobility, 2004–2005 (2×3 months).
- U. of Delaware (DE, USA)* with **D. Saunders, Z. Wan**, MSc. internship, 2003 (4 months).

## ANIMATION AND RESEARCH COMMUNITY INVOLVMENT

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### Associate editor

ACM Transactions On Mathematical Software, since 2012

### Conference program committees

software committee member for ISSAC'16

PC member for ISSAC'09

Poster committee member for ISSAC'08

Referee of about 6-8 articles per year for journals and conferences including : ISSAC, J. Complexity, TCS, TC, AAEC, SPAA, ISPDC, AMC, STACS, PARCO ...

### Organizing committees

General Chair of PASCO'15 (Bath, UK)

Co-organiser of the Codes and Crypto. Days 2014 in Grenoble

Co-organiser of the minisym. *Exact linear algebra* at SIAM App. Algebraic Geometry 13 (CO, USA)

Co-organiser of the 2011 and 2013 editions of the National Computer Algebra Days (JNCF) in Luminy

Treasurer and local organiser of ISSAC'12 in Grenoble

Local co-organiser of PASCO'10 in Grenoble

## 1 Publications et production scientifique

Book chapters			<b>2</b>
	J. Symbolic Computation	2	
Journals	Parallel Computing	1	<b>5</b>
	J. Number Theory	1	
	ACM Trans. Math. Software	1	
Refereed international conferences of rank A	ISSAC	12	<b>13</b>
	Euro-Par	1	
Other refereed conferences			<b>6</b>

## Awards

- [A-4] J.-G. DUMAS, C. PERNET et Z. SULTAN. “Computing the Rank Profile Matrix”. In : *Proc ISSAC’15*. Distinguished paper award. Bath, United Kingdom : ACM, 2015, p. 149–156. DOI : [10.1145/2755996.2756682](https://doi.org/10.1145/2755996.2756682).

## Book chapters

- [B-9] A. CASAMAYOU, G. CONNAN, T. DUMONT, L. FOUSSE, F. MALTEY, M. MEULIEN, M. MEZZAROBBA, C. PERNET, N. M. THIÉRY et P. ZIMMERMANN. “Calcul mathématique avec Sage”. Français. In : Chap. 8 : Algèbre linéaire. Amazon, 2013, p. 468.
- [B-10] J.-G. DUMAS et C. PERNET. “Computational linear algebra over finite fields”. In : *Handbook of Finite Fields*. Sous la dir. de G. L. MULLEN et D. PANARIO. Discrete Maths and Its Applications. Chap. 13.4 : Linear algebra over finite fields. Chapman & Hall / CRC, 2013, p. 514–528.

## Refereed international journals

- [J-1] J.-G. DUMAS, C. PERNET et Z. SULTAN. “Fast Computation of the Rank Profile Matrix and the Generalized Bruhat Decomposition”. In : *Journal of Symbolic Computation* (2016). [hal-01251223](https://doi.org/10.1016/j.jsc.2013.04.004). Accepted.
- [J-3] J.-G. DUMAS, T. GAUTIER, C. PERNET, J.-L. ROCH et Z. SULTAN. “Recursion based parallelization of exact dense linear algebra routines for Gaussian elimination”. In : *Parallel Computing* (2015). DOI : [10.1016/j.parco.2015.10.003](https://doi.org/10.1016/j.parco.2015.10.003).
- [J-12] C.-P. JEANNEROD, C. PERNET et A. STORJOHANN. “Rank-profile revealing Gaussian elimination and the CUP matrix decomposition”. In : *Journal of Symbolic Computation* 56 (2013), p. 46–68. DOI : [10.1016/j.jsc.2013.04.004](https://doi.org/10.1016/j.jsc.2013.04.004).
- [J-19] C. PERNET et W. STEIN. “Fast computation of Hermite normal forms of random integer matrices”. In : *Journal of Number Theory* 130.7 (juil. 2010), p. 1675–1683. DOI : [10.1016/j.jnt.2010.01.017](https://doi.org/10.1016/j.jnt.2010.01.017).
- [J-22] J.-G. DUMAS, P. GIORGI et C. PERNET. “Dense Linear Algebra over Word-Size Prime Fields : the FFLAS and FFPACK Packages”. In : *ACM Transactions on Mathematical Software* 35.3 (2008), p. 1–42. DOI : [10.1145/1391989.1391992](https://doi.org/10.1145/1391989.1391992).

## Refereed international conference proceedings of rank A

- [A-2] C. PERNET. “Computing with Quasiseparable Matrices”. In : *Proc. ISSAC’16*. [hal-01264131](https://doi.org/10.1145/2930889.2930915). ACM, 2016. DOI : [10.1145/2930889.2930915](https://doi.org/10.1145/2930889.2930915).
- [A-4] J.-G. DUMAS, C. PERNET et Z. SULTAN. “Computing the Rank Profile Matrix”. In : *Proc ISSAC’15*. Distinguished paper award. Bath, United Kingdom : ACM, 2015, p. 149–156. DOI : [10.1145/2755996.2756682](https://doi.org/10.1145/2755996.2756682).
- [A-6] J.-G. DUMAS, T. GAUTIER, C. PERNET et Z. SULTAN. “Parallel Computation of Echelon Forms”. English. In : *Proc. Euro-Par 2014 Parallel Processing*. T. 8632. LNCS. Springer, 2014, p. 499–510. DOI : [10.1007/978-3-319-09873-9\\_42](https://doi.org/10.1007/978-3-319-09873-9_42).
- [A-7] E. L. KALTOFEN et C. PERNET. “Sparse Polynomial Interpolation Codes and Their Decoding Beyond Half the Minimum Distance”. In : *Proc. ISSAC’14*. Kobe, Japan : ACM, 2014, p. 272–279. DOI : [10.1145/2608628.2608660](https://doi.org/10.1145/2608628.2608660).
- [A-11] J.-G. DUMAS, C. PERNET et Z. SULTAN. “Simultaneous Computation of the Row and Column Rank Profiles”. In : *Proc. ISSAC’13*. ACM Press, 2013. DOI : [10.1145/2465506.2465517](https://doi.org/10.1145/2465506.2465517).
- [A-14] M. T. COMER, E. L. KALTOFEN et C. PERNET. “Sparse Polynomial Interpolation and Berlekamp/Massey Algorithm That Correct Outlier Errors in Input Values”. In : *Proc. ISSAC’12*. Juil. 2012. DOI : [10.1145/2442829.2442852](https://doi.org/10.1145/2442829.2442852).

- [A-18] M. KHONJI, C. PERNET, J.-L. ROCH, T. ROCHE et T. STALINSKI. “Output-sensitive decoding for redundant residue systems”. In : *ISSAC’10*. Munich, Germany : ACM Press, 2010, p. 265–272. DOI : [10.1145/1837934.1837985](https://doi.org/10.1145/1837934.1837985).
- [A-20] B. BOYER, J.-G. DUMAS, C. PERNET et W. ZHOU. “Memory efficient scheduling of Strassen-Winograd matrix multiplication algorithm”. In : *Proc. ISSAC’09*. Seoul, Corea : ACM Press, 2009. DOI : [10.1145/1576702.1576713](https://doi.org/10.1145/1576702.1576713).
- [A-21] J.-G. DUMAS, C. PERNET et D. SAUNDERS. “On finding multiplicities of characteristic polynomial factors of black-box matrices”. In : *Proc. ISSAC’09*. Seoul, Corea : ACM Press, 2009. DOI : [10.1145/1576702.1576713](https://doi.org/10.1145/1576702.1576713).
- [A-23] C. PERNET et A. STORJOHANN. “Faster algorithms for the characteristic polynomial”. In : *Proc. ISSAC’07*. Waterloo, ON, Canada : ACM Press, 2007, p. 307–314. DOI : [10.1145/1277548.1277590](https://doi.org/10.1145/1277548.1277590).
- [A-26] J.-G. DUMAS, C. PERNET et Z. WAN. “Efficient Computation of the Characteristic Polynomial”. In : *Proc. ISSAC’05*. Beijing, China : ACM Press, juil. 2005. DOI : [10.1145/1073884.1073905](https://doi.org/10.1145/1073884.1073905).
- [A-28] J.-G. DUMAS, P. GIORGI et C. PERNET. “FFPACK : Finite Field Linear Algebra Package”. In : *Proc. ISSAC’04*. Santander, Spain : ACM Press, juil. 2004. DOI : [10.1145/1005285.1005304](https://doi.org/10.1145/1005285.1005304).
- [A-29] J.-G. DUMAS, T. GAUTIER et C. PERNET. “Finite Field Linear Algebra Subroutines”. In : *Proc. ISSAC’02*. Lille, France : ACM Press, juil. 2002. DOI : [10.1145/780506.780515](https://doi.org/10.1145/780506.780515).

## Other refereed conference proceedings

- [O-5] B. BOYER, J.-G. DUMAS, P. GIORGI, C. PERNET et B. D. SAUNDERS. “Elements of Design for Containers and Solutions in the LinBox library”. In : *Proc. ICMS’2014*. LNCS. Springer, août 2014, p. 654–662. DOI : [10.1007/978-3-662-44199-2\\_98](https://doi.org/10.1007/978-3-662-44199-2_98).
- [O-8] M. BARBIER, C. PERNET et G. QUINTIN. “On decoding of quasi-BCH codes”. In : *Proc. WCC’13*. hal-00768566. Bergen, Norway, 2013.
- [O-13] A. KUMAR, J.-L. ROCH et C. PERNET. “Secured Outsourced Linear Algebra”. In : *SAFECOMP 2013 FastAbstract*. hal-00926445. Toulouse, France, sept. 2013.
- [O-16] M. ALBRECHT et C. PERNET. “Efficient Decomposition of Dense Matrices over GF(2)”. In : *Proc. of the Workshop on Tools for Cryptanalysis*. arXiv:cs.MS/1006.1744. Juin 2010.
- [O-17] J.-G. DUMAS, T. GAUTIER, C. PERNET et B. SAUNDERS. “LinBox Founding Scope Allocation, Parallel Building Blocks, and Separate Compilation”. In : *Proc. ICMS 2010*. LNCS. Springer, 2010, p. 77–83. DOI : [10.1007/978-3-642-15582-6\\_16](https://doi.org/10.1007/978-3-642-15582-6_16).
- [O-25] J.-G. DUMAS, C. PERNET et J.-L. ROCH. “Adaptive Triangular System Solving”. In : *Challenges in Symbolic Computation Software*. Dagstuhl Seminar Proceedings 06271. 2006.

## Tech. reports

- [T-15] M. ALBRECHT, G. BARD et C. PERNET. *Efficient Dense Gaussian Elimination over the Finite Field with Two Elements*. Rapp. tech. arXiv:cs.SC/1111.6549. Nov. 2011.
- [T-24] C. PERNET et A. STORJOHANN. *Frobenius form in expected matrix multiplication time over sufficiently large fields*. Rapp. tech. U. of Waterloo, Ontario, Canada., 2007.
- [T-27] C. PERNET, A. RONDEPIERRE et G. VILLARD. *Computing the Kalman form*. Rapp. tech. arXiv:cs/0510014. Laboratoire Jean Kuntzmann, Grenoble, oct. 2005.
- [T-30] C. PERNET. *Implementation of Winograd’s fast matrix multiplication over finite fields using ATLAS level 3 BLAS*. Rapp. tech. Laboratoire Informatique et Distribution, juil. 2001.

## Posters

- E. KALTOFEN, C. PERNET, A. STORJOHANN, C. WADDELL. , *Linear System Solving With Parametric Entries By Error Correction and Cabay Termination*, ISSAC 2015.

C. PERNET ET Z. WAN. ,

*LU Based Algorithms for the Characteristic Polynomial over a Finite Field*, ISSAC'03.

M. BRASSEL, C. PERNET ET P. GIORGI. ,

*LUDivine : A Symbolic Block LU Factorisation of Matrices over a Finite Field using BLAS*, ECCAD'03.

### **Invited plenary talks**

*Exact linear algebra algorithmic : theory and practice*, ISSAC'15 : tutorial speaker, 2015.

*Computing canonical forms in exact linear algebra*, Cours plénier à ECRYPT II, Grèce, 2012.

*Elimination and Echelon forms in exact linear algebra*, ECCAD'11, Waterloo. Canada, 2011.

*The LinBox library*, Combinatorial and Algebraic Topology, Sandia Labs, Santa Fe, USA, 2009.

*Calcul intensif, algèbre linéaire exacte et applications*, 1ère journée du GDR-IM, IHP, Paris, 2009.

*Parallel perspectives for the LinBox library*, Interactive Parallel Comp., MSRI, Berkeley, USA, 2007.

### **Invited talks in conferences and workshops**

*Parallel computation of echelon forms and rank profiles*, SIAM Parallel Processing, 2014.

*(Sparse) Interpolation with Outliers*, SIAM App. Algebraic Geometry, 2013.

*Elimination and Echelon forms in exact linear algebra*, SIAM Applied Algebraic Geometry, 2011.

*Parallel adaptive computing with Kaapi middleware*, 5th workshop of the Inria-Illinois joint lab. for petascale comp., Urbana-Champaign, USA, 2009.

*Exact linear algebra tools for computer assisted proofs*, Dagstuhl Seminar, Allemagne, 2009.