

# Sebastien VARRETTE, PhD



Software Engineer,  
Doctor in Computer Science,  
specialized in Distributed Platforms Security and HPC systems.

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Born on November 27th, 1979 (in France)  
Married (2004), two children (2007,2010)

ENGINEER EXPERTISE: High Performance Computing (HPC), Grid & Cluster Platforms.  
I'm administrating cluster-based HPC systems since 2003 (Linux environment)  
*Keywords:* HPC, Debian, Xen, Puppet, OpenLDAP, git

MAIN RESEARCH DOMAINS: Security and Evaluation of Distributed Computing Platforms (clusters, grids or clouds).  
Relevant contributions in which I'm involved:

- Design of CERTICLOUD, a Cloud IaaS secure platform [16, 33, 13]
- Crash/cheating faults analysis in grid platforms [31, 30, 26, 1, 22, 18, 14]
- Performance evaluation of computing clusters [25, 20]
- Design of the authentication system of Grid5000 [28]
- Developing security awareness by education [4, 6, 2]

## Education

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2007	PH.D. IN COMPUTER SCIENCE, University of Luxembourg (UL) & Institut National Polytechnique de Grenoble (INPG) Thesis: <i>Security in Large Scale Distributed Systems: Authentication and Result Checking</i> Advisors: Franck Leprévost (UL) & Jean-Louis Roch (INPG)	with honours ( <i>Excellent/Outstanding</i> )
2003	M.SC. IN COMPUTER SCIENCE Speciality: Cryptology, Security and Information Coding (CSCI), Institut National Polytechnique de Grenoble (INPG) & University Joseph Fourier (UJF)	with honours ( <i>TB/First Class</i> ) rank: 1st
2003	MASTER'S DEGREE IN ENGINEERING (Telecoms ENSIMAG) Speciality: Computer Sciences and Telecommunications	with honours ( <i>B/2.1</i> ) rank: top 10%
1997 – 2000	ADVANCED MATHEMATICS AND PHYSICS STUDIES For the competitive entrance to the French engineering schools	
1997	SCIENTIFIC "BACCALAURÉAT" (French "A" levels)	with honours ( <i>B/2.1</i> )

## Employment

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2007 – now	SCIENTIFIC COLLABORATOR (UL, Luxembourg)
2004 – 2007	RESEARCH ASSISTANT (UL, Luxembourg)
2003	SYSTEM ADMINISTRATOR (ID-IMAG, Grenoble, France)

## Teaching Experience

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2008 – now	PARALLEL & GRID COMPUTING, MIDDLEWARE	Master MICS2 (UL)
2004 – 2007	PROGRAMMING TECHNIQUES I ADVANCED PROGRAMMING IN C, C++ AND JAVA SYSTEM ADMINISTRATION AND NETWORK SECURITY	Bachelor I1/CUT1 (UL) Bachelor I2 (UL) Master CSCI2 (UJF)
2006	CRYPTOLOGY AND NETWORK SECURITY Master in Computer Science (Univ. of Yaoundé I, Cameroon)	

## Additional Information

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Languages	FRENCH (native language), ENGLISH (fluent) and GERMAN (basic knowledge)
Sports	Karate (Black belt – 2nd DAN, Federal Instructor Diploma (DIF)), Jogging, Badminton, Ski etc.

## Graduate Students Supervision

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<b>PhD.</b>	JAKUB MUSZYŃSKI (2011 – ) BENOÎT BERTHOLON (2010 – )	Integrity aspects on grid and cloud platforms Confidentiality & Integrity Issues over Cloud Computing Platforms
<b>Master</b>	FOTIS GEORGATOS (2012 – ) MATEUSZ GUZEK (2011) BENOÎT BERTHOLON (2009) CHRISTOPHE WEIS (2009) DOMINIC DUNLOP (2008 – 2009) ROMAIN CAVAGNA (2007 – 2008)	System administrator of the <a href="#">UL HPC facility</a> System administration of cluster-based HPC systems Integrity issues in distributed executions Optimizing hash functions and S-Box by GEP Using GAs to tune benchmarks for HPCs Deployment of a GForge platform
<b>Bachelor</b>	HYACINTHE CARTIAUX (2011 – ) BERNARD REICHERT (2008)	System administrator of the <a href="#">UL HPC facility</a> Collision detection implementation using CUDA

## Research Projects

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2011 – 2013	UL EvoPERF (UL contribution: 373 k€)
2010 – 2012	FNR CORE <a href="#">GREENIT</a> (Total: 1,5 M€, FNR contribution: 432 k€)
2010 – 2012	AFR PhD BERTHOLON (PHD-09-142; Scientific Advisor; Total/AFR contribution: 110 k€) Confidentiality and Integrity Issues over Cloud Computing Platforms
2009 – 2013	EU <a href="#">COST ACTION IC0804</a> : Energy efficiency in large scale distributed systems
2009 – 2013	EU <a href="#">COREGRID</a>
2006 – 2008	ANR <a href="#">SAFESCALE-BGPR</a> (ANR-05-SSIA-0005; ANR contribution: 68 k€)
2005 – now	<a href="#">GRID'5000</a> (technical committee)
2005 – 2007	FNR-SECOM TESEGRAD (FNR contribution: 300 k€)
2004 – 2007	<a href="#">CRYPTALPES</a>
2004 – 2006	<a href="#">RAGTIME</a> (Total: 545 k€, Rhône-Alpes Region contribution: 217 k€)

## Professional Development

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2009 – now	TECHNICAL ADVISOR for <a href="#">LCSB</a> and the <a href="#">MECO</a> Ministry on HPC projects
2007 – now	<a href="#">UL HPC</a> MANAGER. The current platform consists in: 151 computing nodes, 1556 cores, $R_{\text{peak}} = 14,245$ TFlops 59 servers (74,6% are Xen VMs) NFS and Lustre Storage (Total raw capacity: 511TB)
2006	<a href="#">EGIDE</a> mission for 3 weeks in Cameroon (master lecture – Univ. of Yaoundé I)
2005	EDITORIAL COMMITTEE for the definition of new <a href="#">UL</a> master and bachelor degrees
2005 – 2006	EDITORIAL COMMITTEE, <a href="#">UL</a> website (CMS selection & management)
2005 – 2006	FACULTY COUNCIL, elected member (assistant representative)
2000 – 2002	ENSIMAG JUNIOR ENTERPRISE, developer member

## Participation to the research community

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<b>Membership</b>	IEEE Computer and Computational Intelligence society
<b>Events</b>	GENERAL (CO-)CHAIR: <a href="#">LPWST 2010</a> (Luxembourg) PROGRAM OR ORGANIZATIONAL CHAIR: <a href="#">OPTIM 2011</a> (Istanbul, Turkey), <a href="#">SCALSOL 2011</a> (Pafos, Cyprus), <a href="#">OPTIM 2010</a> (Caen, France) INTERNATIONAL PROGRAM COMMITTEE MEMBER: <a href="#">PCGrid 2011</a> (Anchorage, USA), <a href="#">PCGrid 2010</a> (Melbourne, Australia)
<b>Reviews</b>	JOURNAL REVIEWER: <a href="#">FGCS</a> (Elsevier), <a href="#">J. of Supercomputing</a> (Springer), <a href="#">JPDC</a> (Elsevier), <a href="#">PARCO</a> (Elsevier), <a href="#">IJFCS</a> (WO), <a href="#">TPDS</a> (IEEE) INTERNATIONAL CONFERENCE REVIEWS (in addition to the above elements & events): <a href="#">EuroPar 2011</a> (Bordeaux, France), <a href="#">SiiS 2011</a> (Warsaw, Poland), <a href="#">MENS 2010</a> (Miami, USA) <a href="#">NAS 2010</a> (Macau, China) <a href="#">HPCS 2008</a> (Cyprus), <a href="#">MCO'08</a> (Metz, France) <a href="#">PSAI 2008</a> (Barcelona, Spain) <a href="#">GPC 2007</a> (Paris, France), <a href="#">HICSS-38</a> (Hawaii, USA)

## Publications

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Publication category	Quantity
PhD Thesis	1
Books	3
Magazine	1
Book Chapters	7
International journals	3
International conferences with proceedings and reviews	17
(French) national conferences with proceedings and reviews	4
International conferences with proceedings	1
International conferences with reviews	5
Masters Thesis	1
Technical Reports	8
<b>Total:</b>	<b>51</b>

[Publish or Perish:](#)

Papers:35	Citations:116	Years:10	h-index:7	g-index:9	hc-index:4,hI-index:2.23,hI-norm:4
AWCR:16.86	AW-index:4.11	AWCRpA:6.33	e-index:5.29	hm-index:3.95,"2012-03-06"	

### PhD Thesis (1)

- [1] S. Varrette. *Sécurité des Architectures de Calcul Distribué: Authentification et Certification de Résultats*. PhD thesis, INP Grenoble and Université du Luxembourg, Sept. 2007. In French.

### Books (3)

- [2] J.-G. Dumas, J.-L. Roch, E. Tannier, and S. Varrette. *Foundations of Coding: Compression, Encryption, Error-Correction*. Springer, 2012. 427 pages.
- [3] S. Varrette and N. Bernard. *Programmation avancée en C (avec exercices et corrigés)*. Collection Informatique et Systèmes d'Informations. Hermès, Fev. 2007. 416 pages, in French.
- [4] J.-G. Dumas, J.-L. Roch, E. Tannier, and S. Varrette. *Théorie des Codes : Compression, Cryptage et Correction*. Collection Sciences Sup. Dunod, Mars 2007. 352 pages, in French.

### Magazine (1)

- [5] S. Varrette and S. Gautier. Cryptographie et Signatures Électroniques. In *I-mag – Magazine de l'AAE ENSIMAG*, number 37 in Numéro spécial : La sécurité des systèmes d'information numérique, pages 12–19. Association des anciens élèves de l'ENSIMAG, May 2006.

### Book Chapters (7)

- [6] B. Bertholon, C. Cérin, C. Coti, J.-C. Dubacq, and S. Varrette. *Distributed Systems (volume 1); Design and Algorithms*, volume 1, chapter Practical Security in Distributed Systems, pages 243–306. Wiley and Son, 2011. Under publisher review. Release date pending.
- [7] C. Cérin, J.-C. Dubacq, T. Héroult, R. Keryell, J.-L. Pazat, J.-L. Roch, and S. Varrette. *Systèmes répartis en action : de l'embarqué aux systèmes à large échelle*, chapter Sécurité dans les grilles de calcul, pages 153–180. IC2 Informatique et systèmes d'information. Hermès, Nov 2008. 184 pages, in French.
- [8] P. Bouvry, J.-G. Dumas, R. Gillard, J.-L. Roch, and S. Varrette. *Sécurité Multimédia: Cryptographie et Sécurité Systèmes et Réseaux*, volume 2 of *Traité IC2 Informatique - Commande - Communication*, chapter Cryptographie à Clé Secrète, pages 23–101. Hermès, Fev 2006. In French.
- [9] J.-G. Dumas, F. Leprevost, J.-L. Roch, V. Savin, and S. Varrette. *Sécurité Multimédia: Cryptographie et Sécurité Systèmes et Réseaux*, volume 2 of *Traité IC2 Informatique - Commande - Communication*, chapter Cryptographie à Clé Publique, pages 103–196. Hermès, Fev 2006. In French.
- [10] J-G Dumas, F. Leprevost, J-L Roch, and S. Varrette. *Sécurité Multimédia: Cryptographie et Sécurité Systèmes et Réseaux*, volume 2 of *Traité IC2 Informatique - Commande - Communication*, chapter Architectures PKI, pages 187–210. Hermès, Fev 2006. In French.
- [11] N. Bernard, Y. Denneulin, and S. Varrette. *Sécurité Multimédia: Cryptographie et Sécurité Systèmes et Réseaux*, volume 2 of *Traité IC2 Informatique - Commande - Communication*, chapter Sécurité UNIX, pages 211–245. Hermès, Fev 2006. In French.

- [12] N. Bernard, Y. Denneulin, and S. Varrette. *Sécurité Multimédia: Cryptographie et Sécurité Systèmes et Réseaux*, volume 2 of *Traités IC2 Informatique - Commande - Communication*, chapter Sécurité Réseau, pages 247–298. Hermès, Feb 2006. In French.

### International journals (3)

- [13] B. Bertholon, S. Varrette, and P. Bouvry. CertiCloud: une plate-forme Cloud IaaS sécurisée. *Technique et Science informatiques (TSI)*, (2592):30, 2012. To appear.
- [14] J. Muszyński, S. Varrette, P. Bouvry, F. Seredyński, and S. U. Khan. Convergence Analysis of Evolutionary Algorithms in the Presence of Crash-Faults and Cheaters. *Intl. Journal. of Computers and Mathematics with Applications (CAMWA)*, 2012. To appear.
- [15] F. Leprevost, J. Monnerat, S. Varrette, and S. Vaudenay. Generating anomalous elliptic curves. *Information Processing Letters*, 93(5):225–230, March 2005.

### International conferences with proceedings and reviews (17)

- [16] B. Bertholon, S. Varrette, and P. Bouvry. CertiCloud: a Novel TPM-based Approach to Ensure Cloud IaaS Security. In *Proc. of the 4th IEEE Intl. Conf. on Cloud Computing (CLOUD 2011)*, Washington DC, USA, July 4–9 2011. IEEE Computer Society.
- [17] B. Bertholon, S. Varrette, and P. Bouvry. A Signature Scheme for Distributed Executions based on Control flow Analysis. In *Proc. of the 19th Intl. conference on Security and Intelligent Information Systems (SIIS 2011)*, LNCS, Warsaw, Poland, June 13–14 2011. Springer Verlag. Submitted, pending decision.
- [18] S. Varrette, E. Tantar, and P. Bouvry. On the Resilience of [distributed] Evolutionary Algorithms against Cheaters in Global Computing Platforms. In *Proc. of the 14th Intl. Workshop on Nature Inspired Distributed Computing (NIDISC 2011)*, part of the *25th IEEE/ACM Intl. Parallel and Distributed Processing Symposium (IPDPS 2011)*, Anchorage (Alaska), USA, May 16–20 2011. IEEE Computer Society.
- [19] J. Pecero, S. Varrette, and P. Bouvry. Scheduling DAG Applications on Multi-core Processor Packages Architectures. In *Proc. of the Intl. Conf. on Metaheuristics and Nature Inspired Computing (META'10)*, Oct. 27–31 2010.
- [20] D. Dunlop, S. Varrette, and P. Bouvry. Deskillig HPL - Using an Evolutionary Algorithm to Automate Cluster Benchmarking. In *Proc. of 8th Intl. Conf. on Parallel Processing and Applied Mathematics - Part II (PPAM 2009)*, volume 6068 of *LNCS*, pages 102–114, Wroclaw, Poland, Sept. 13–16 2009. Springer Verlag. Publication appeared in 2010.
- [21] G. Berhe, B. Peters, S. Varrette, and P. Bouvry. Parallel Implementation of Domain Decomposition Algorithm for Molecular Dynamics. In *Proc. of the 1st Intl. Conf. on Parallel, Distributed and Grid Computing for Engineering (PARENG 2009)*, volume CCP.90-8, Pécs, Hungary, Apr. 6–8 2009. Civil-Comp Press.
- [22] S. Guelton, T. Gautier, J.-L. Pazat, and S. Varrette. Dynamic Adaptation Applied to Sabotage Tolerance. In *Proc. of the IEEE 17th Euromicro Intl. Conf. on Parallel, Distributed, and Network-Based Processing (PDP 2009)*, pages 237–244, Weimar, Germany, Feb 18–20 2009. IEEE Computer Society.
- [23] S. Varrette, M. Ostaszewski, and P. Bouvry. Nature inspired Algorithm-Based Fault Tolerance on Global Computing Platforms. Application to Symbolic Regression. In *Proc. of the Intl. Conf. on Metaheuristics and Nature Inspired Computing (META'08)*, Hammamet, Tunisia, Oct. 29–31 2008.
- [24] S. Varrette, J.-L. Roch, G. Duc, and R. Keryell. Building Secure Resources to Ensure Safe Computations in Distributed and Potentially Corrupted Environments. In *Proc. of Euro-Par 2008, Workshop on Secure, Trusted, Manageable and Controllable Grid Services (SGS'08)*, volume 5415 of *LNCS*, pages 211–222, Las Palmas de Gran Canaria, Spain, Aug. 25–26 2008. Springer Verlag.
- [25] D. Dunlop, S. Varrette, and P. Bouvry. On the Use of a Genetic Algorithm in High Performance Computer Benchmark Tuning. In *Proc. of the IEEE Intl. Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS'08)*, pages 105–113, Edinburgh, UK, June 16–18 2008. IEEE Xplore.
- [26] J.-L. Roch and S. Varrette. Probabilistic Certification of Divide & Conquer Algorithms on Global Computing Platforms. Application to Fault-Tolerant Exact Matrix-Vector Product. In *Proc. of the ACM Intl. Workshop on Parallel Symbolic Computation'07 (PASCO'07)*, pages 88–92, London, Ontario, Canada, July 27–28 2007. ACM.
- [27] S. Varrette, J.-L. Roch, J. Montagnat, L. Seitz, J.-M. Pierson, and F. Leprévost. Safe Distributed Architecture for Image-based Computer Assisted Diagnosis. In *Proc. of the IEEE Intl. Conf. on Pervasive Services, Workshop on Health Pervasive Systems (HPS'06)*, Lyon, France, June 26–29 2006. IEEE Computer Society.

- [28] S. Varrette, S. Georget, J. Montagnat, J.-L. Roch, and F. Leprevost. Distributed Authentication in GRID5000. In *Proc. of OTM Confederated Int. Workshops on Grid Computing and its Application to Data Analysis (GADA'05)*, volume 3762 of *LNCS*, pages 314–326, Agia Napa, Cyprus, Nov. 1 2005. Springer Verlag.
- [29] N. Dagorn, N. Bernard, and S. Varrette. Practical Authentication in Distributed Environments. In *Proc. of the IEEE Intl. Computer Systems and Information Technology Conference (ICSIT'05)*, volume 1, Alger, Algeria, July 19–21 2005.
- [30] A. Krings, J.-L. Roch, S. Jafar, and S. Varrette. A Probabilistic Approach for Task and Result Certification of Large-scale Distributed Applications in Hostile Environments. In *Proc. of the European Grid Conference (EGC2005)*, volume 3470 of *LNCS*, pages 323–333, Amsterdam, Netherlands, Feb. 14–16 2005. Springer Verlag.
- [31] S. Varrette, J.-L. Roch, and F. Leprevost. FlowCert : Probabilistic Certification for Peer-to-Peer Computations. In *Proc. of the 16th Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 2004)*, pages 108–115, Foz do Iguacu, Brazil, Oct. 2004. IEEE Computer Society.
- [32] S. Jafar, S. Varrette, and J.-L. Roch. Using Data-Flow Analysis for Resilience and Result Checking in Peer to Peer Computations. In *Proc. of the 1th Intl. Workshop on Grid and Peer-to-Peer Computing Impacts on Large Scale Heterogeneous Distributed Database Systems (GLOBE'04)*, pages 512–516, Zaragoza, Spain, Sept. 2004. IEEE Computer Society.

#### **(French) national conferences with proceedings and reviews (4)**

- [33] B. Bertholon, S. Varrette, and P. Bouvry. Certicloud: une plate-forme cloud iaas sécurisée. In *Proc. des 20ème rencontres francophones du parallélisme (RenPar'20)*, St Malo, France, May 10–13 2011.
- [34] S. Guelton and S. Varrette. Une approche génétique et source à source de l'optimisation de code. In *Proc. des 19ème rencontres francophones du parallélisme (RenPar'19)*, Toulouse, France, Sept. 9–11 2009.
- [35] S. Varrette, S. Georget, J.-L. Roch, and F. Leprevost. Authentification Distribuée sur Grille de Grappes basée sur LDAP. In *Proc. des 16èmes rencontres francophones du parallélisme (RenPar'16)*, Le Croisic, France, April 6–8 2005. ASF - Ecole des Mines de Nantes.
- [36] S. Varrette and J.-L. Roch. Certification logicielle de Calcul Global avec dépendances sur grille. In *Proc. des 15èmes rencontres francophones du parallélisme (RenPar'15)*, pages 169–176, La-Colle-Sur-Loup, France, Oct. 15–17 2003.

#### **International conferences with proceedings (1)**

- [37] S. Varrette, J.-L. Roch, Y. Denneulin, and F. Leprevost. Secure Architecture for Clusters and Grids. In *Proc. of the 2nd Int. Conf. on Critical Infrastructures (CRIS 2004)*, Grenoble, France, October 2004. IEEE.

#### **International conferences with reviews (5)**

- [38] B. Bertholon, S. Varrette, and P. Bouvry. TPM-based Approaches to Improve Cloud Security. In *2011 Grande Region Security and Reliability Day (SecDay 2011)*, Trier, Germany, Mar. 25 2011.
- [39] S. Varrette, B. Bertholon, and P. Bouvry. A Signature Scheme for Distributed Executions based on Macro-Dataflow Analysis. In *2nd Intl. Workshop on Remote Entrusting (Re-Trust 2009)*, Riva del Garda, Italy, Sept 2009.
- [40] S. Varrette, J.-L. Roch, and A. Krings. Result Certification Against Massive Attacks in Distributed Computations. In *1th Int. Workshop on Remote Entrusting (Re-Trust 2008)*, Trento, Italy, Oct 2008.
- [41] S. Varrette. Security of Global Computing Platforms: Authentication and Computed Results Integrity. In *Conference on Cryptology and Digital Content Security (CRM 07)*, Barcelona, Spain, may 2007.
- [42] S. Varrette, J.-L. Roch, and F. Leprevost. Applicative solutions for safe computations in distributed environments. In *Workshop "Trustworthy Software"*, Saarbrücken, Germany, May 2006. Dagstuhl Research Online Publication Server (DROPS). Version électronique uniquement.

#### **Masters Thesis (1)**

- [43] S. Varrette. Sécurisation de calculs pairs à pairs sur une grille de grappes. Rapport de Projet de Fin d'Etude, ENSIMAG, Laboratoire ID-IMAG UMR CNRS/INPG/INRIA/UJF 5132, June 2003. In french.

#### **Technical Reports (8)**

- [44] S. Varrette. Urban Terror [Server] Guide. Technical report, 2009.
- [45] Sébastien Varrette. Programmation de l'algorithme A.E.S. (Advanced Encryption Standard). Technical report, University of Luxembourg, 2005.

- [46] S. Varrette. Programmation de l'algorithme D.E.S. (Data Encryption Standard). Technical report, University of Luxembourg, 2005.
- [47] S. Varrette. Tutorial LaTeX - Comprendre et écrire un document en LaTeX. Technical report, Laboratoire ID-IMAG, Mai 2005. Version 0.3.
- [48] S. Varrette. Tutorial d'installation d'un lecteur de cartes à puce usb sous linux. Technical report, Laboratoire ID-IMAG/Université du Luxembourg, Juin 2005. Version 0.1 - a compléter.
- [49] S. Varrette. Introduction aux réseaux de tri tolérants aux fautes. Technical report, Laboratoire ID-IMAG, Aug. 2005. Draft version.
- [50] S. Varrette. Tutorial OpenLDAP: Installation et configuration, Migration NIS → LDAP dans GRID5000, Sécurisation par SSL et optimisations. Technical report, Laboratoire ID-IMAG, Septembre 2005.
- [51] S. Varrette. Tutorial d'installation de la distribution debian. Technical report, Laboratoire ID-IMAG, Septembre 2005. Extrait d'un TP proposé en Master 2 CSCI.