

# Sebastien VARRETTE, PhD

## Research Associate

specialized in Distributed Platforms Security and HPC/Cloud systems.

**10 years of experience in Linux 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) [4], Grid, Cluster & Cloud 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 per domains:

- Code Obfuscation , CERTICLOUD, a Cloud IaaS secure platform
- Crash/cheating faults analysis in grid platforms
- Performance & Energy efficiency of HPC/Cloud platforms
- Design of the authentication system of Grid'5000
- Developing security awareness by education

## Education

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

## Employment

|             |  |
|-------------|--|
| 2011 – now  | RESEARCH ASSOCIATE ( <a href="#">UL</a> , Luxembourg)              |
| 2007 – 2010 | SCIENTIFIC COLLABORATOR ( <a href="#">UL</a> , Luxembourg)         |
| 2004 – 2007 | RESEARCH ASSISTANT ( <a href="#">UL</a> , Luxembourg)              |
| 2003        | SYSTEM ADMINISTRATOR ( <a href="#">ID-IMAG</a> , Grenoble, France) |

## Teaching Experience

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

## Additional Information

|           |   |
|-----------|---|
| Languages | FRENCH (native language), ENGLISH (fluent) and GERMAN (basic knowledge)   |
| Sports    | Karate (Black belt – 2nd DAN, Federal Instructor Diploma ( <a href="#">DIF</a> )), Jogging, Badminton, Ski etc. |

## Graduate Students Supervision

|                 |                                |  |
|-----------------|--------------------------------|--|
| <b>PhD.</b>     | JAKUB MUSZYŃSKI (2011 –)       | Integrity aspects on grid and cloud platforms  |
|                 | BENOÎT BERTHOLON (2010 – 2013) | CertiCloud & JShadObf: Toward Integrity and Software Protection in Cloud Computing Platforms |
| <b>Master</b>   | LUDOVIC SCHOEPPS (2014)        | Design a REST API service to Monitor UL HPC Resources  |
|                 | ANNA GIANNAKOU (2013)          | Energy Efficiency in HPC environments  |
|                 | VALENTIN PLUGARU (2012 –)      | Energy Efficiency of Hypervisors and Cloud middleware  |
|                 | SÉBASTIEN MARTINEZ (2012)      | Source Code Obfuscation by mean of Evolutionary Algorithms                                   |
|                 | FOTIS GEORGATOS (2012 – 2014)  | System administrator of the <a href="#">UL HPC facility</a>                                  |
|                 | MATEUSZ GUZEK (2011)           | System administration of cluster-based HPC systems   |
|                 | BENOÎT BERTHOLON (2009)        | Integrity issues in distributed executions   |
|                 | CHRISTOPHE WEIS (2009)         | Optimizing hash functions and S-Box by GEP   |
|                 | DOMINIC DUNLOP (2008 – 2009)   | Using GAs to tune benchmarks for HPCs  |
|                 | ROMAIN CAVAGNA (2007 – 2008)   | Deployment of a GForge platform  |
| <b>Bachelor</b> | HYACINTHE CARTIAUX (2011 –)    | System administrator of the <a href="#">UL HPC facility</a>                                  |
|                 | BERNARD REICHERT (2008)        | Collision detection implementation using CUDA  |

## Research Projects

|             |   |
|-------------|---|
| 2007 – now  | <a href="#">UL HPC</a> (UL cumulative contribution: <b>5.7 M€</b> )   |
| 2014 – now  | EU <a href="#">COST ACTION IC1305</a> : Network for Sustainable Ultrascale Computing (NESUS)  |
| 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€)<br>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

|             |   |
|-------------|---|
|             | IEEE Computer and Computational Intelligence society member<br>Organizer of various conferences   |
| 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.<br><b>Cumulative Project Investment: 5.7 M€</b> (as of 2013).<br>368 computing nodes, 4112 cores, $R_{\text{peak}} = 43.52$ TFlops<br>150 servers (74,6% are Xen VMs)<br>NFS and Lustre Storage (Total raw capacity: 1996TB)<br>2 system administrators + 1 student assistant |
| 2007 – now  | Manager of various IT services ( <a href="#">Gforge @ Uni.lu</a> , Jabber etc.)   |
| 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   |

## Publications

| Publication category                                       | Quantity  |
|--|-----------|
| PhD Thesis   | 1         |
| Books  | 4         |
| Magazine   | 1         |
| Book Chapters  | 7         |
| International journals                                     | 5         |
| International conferences with proceedings and reviews     | 36        |
| (French) national conferences with proceedings and reviews | 4         |
| International conferences with proceedings                 | 1         |
| International conferences with reviews                     | 7         |
| Masters Thesis   | 1         |
| Technical Reports  | 8         |
| Miscellaneous  | 1         |
| <b>Total:</b>  | <b>76</b> |

|                                   |                                |   |   |  |                               |
|-----------------------------------|--------------------------------|---|---|--|-------------------------------|
| <a href="#">Publish or Perish</a> | Papers:76<br>Cites/year: 16.18 | Citations:178,Years:11<br>Cites/paper: 2.34/0.0/0 | <b>h-index:8</b> ,g-index:11<br>Cites/author: 69.78 | hc-index:6,hI-index:2.56,hI-norm:5<br>Papers/author: 29.24 | Query date: <b>2014-03-25</b> |
|-----------------------------------|--------------------------------|---|---|--|-------------------------------|

## Selected Publications

- [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.
- [2] J.-G. Dumas, J.-L. Roch, E. Tannier, and S. Varrette. *Théorie des Codes : Compression, Cryptage et Correction*. Collection Sciences Sup. Dunod, 2nde edition, Mars 2014. 384 pages, in French.
- [3] 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)*, 64(12):3805–3819, Dec 2012.
- [4] S. Varrette, P. Bouvry, H. Cartiaux, and F. Georgatos. Management of an Academic HPC Cluster: The UL Experience. In *Proc. of the 2014 Intl. Conf. on High Performance Computing & Simulation (HPCS 2014)*, Bologna, Italy, July 2014. IEEE.
- [5] S. Varrette, M. Guzek, V. Plugaru, X. Besson, and P. Bouvry. HPC Performance and Energy-Efficiency of Xen, KVM and VMware Hypervisors. In *Proc. of the 25th Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 2013)*, pages 89–96, Porto de Galinhas, Brazil, Oct. 2013. IEEE Computer Society.
- [6] J. Muszynski, S. Varrette, and P. Bouvry. Expected Running Time of Parallel Evolutionary Algorithms on Unimodal Pseudo-Boolean Functions over Small-World Networks. In *Proc. of the IEEE Congress on Evolutionary Computation (CEC'2013)*, Cancún, Mexico, June 2013. IEEE.
- [7] M. Jarus, S. Varrette, A. Oleksiak, and P. Bouvry. Performance Evaluation and Energy Efficiency of High-Density HPC Platforms Based on Intel, AMD and ARM Processors. In *Proc. of the Intl. Conf. on Energy Efficiency in Large Scale Distributed Systems (EE-LSDS'13)*, LNCS, Vienna, Austria, Apr 2013. Springer Verlag.
- [8] 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.
- [9] 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.
- [10] 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.