Martin Quinson — Full Professor, École Normale Supérieure de Rennes (ENS Rennes)

Expert in **Experimentation Methodologies for Distributed Computing**
Simulation, Formal methods, Ad-hoc virtualization, Performance evaluation.

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French: mother tongue;   English: fluent;

46 years old, French citizen.
Married, 3 children.
German: spoken.

PROFESSIONAL EXPERIENCE

Since 2015 Full professor at ENS Rennes (master school for top future academics) and IRISA laboratory.

2005 – 2015 Tenured Associate Professor at Université de Lorraine, LORIA laboratory.

2004 Postdoc at UCSB, California; Temporary Assistant Professor at Université de Grenoble, France.

EDUCATION

Habilitation: *Computational Science of Computer Systems,* Université de Lorraine, France, 2013.

Ph.D.: *Automatic discovery of characteristics and capacity of distributed computing platforms,* ENS Lyon, 2003.

M.S.: *Models of heterogeneous clusters of parallel machines for numerical algorithms*, ENS Lyon, France, 2000.

RESEARCH INTERESTS

I work on experimental methodologies for large-scale infrastructures such as cloud, fog or HPC systems. As with computational science, **I use computers to understand and improve computer systems at scale**. I build scientific instruments for the co-evaluation of the performance and correctness of infrastructures. I successfully collaborate with specialists of diverging communities to achieve my research goals. I am a **specialist of the simulation of distributed applications, of their instrumentation, and of their formal verification**. My tools combine sound theoretical foundations with efficient technical implementation.

PROFESSIONAL ACTIVITIES

Leadership

- *Since 2021.* Director of the CS teaching department at ENS Rennes (5 faculty, 80 students).
- *2016-2020.* Leader of the *Large-Scale Systems* department of the IRISA lab (5 teams, 40 tenured)
- *2013-2015.* Leader of a joint research team (U. Lorraine – Inria – CNRS), 20 members, 5 tenured.
- *2013-2015.* Elected member of the academic council of 6 laboratories and 450 faculty members.
- Scientific leader on several projects around the SimGrid project (total funding over 4.3M€).
- Advisor of 3 Post-Doc students, 7 PhD students, 25 graduate students, and 10 Research Engineers.

Scientific Expertise

Book chapter	1		Selective conferences	5		Citations	2277
International journals	10		Other refereed conferences	24		H-index	21
Tutorials & keynotes	14		Refereed workshops	13		i10	33

Broad scope (SIGSIM, SIGCSE, SIGOPS, SIGHPC); Highly cited publications (up to 615 and 482).

Teaching Expertise

- *Domains:* Programming and algorithms, Operating systems, Distributed algorithms and systems.
- Author of scientific outcome activities; member of a working group on computer science education.

Technical Expertise

- **Software architect** of several projects, from a research tool enjoying thousands of users (*SimGrid*) to a complete pedagogical platforms, alongside to an infrastructure element for Linux distributions.
- Official Debian Developer since 2005.

REFERENCES

Prof. Henri Casanova: Univ. of Hawaii at Manoa, USA.

Prof. Gene Cooperman: Northeastern University, Boston, USA.

Stephan Merz: Inria, France.

Detailed Curriculum Vitæ

Main Research Works

My research is on design and performance evaluation of distributed applications in the context of High Performance Computing and Cloud computing. The broad challenge is to ensure that the analysis tools remain on par with the ever increasing complexity of real IT infrastructures, to ensure that these systems remain practically tractable. My approach is pragmatic and bottom-up: I strive to propose robust methodologies served by ready to use tools toward the actual needs of the analysts.

Research conducted before 2015

Several **experimental methodologies** can be leveraged to study distributed systems at scale. I compared and combined *direct experimentation of real systems* with their *emulation* (providing more experimental control at the price of a tedious setup) and with their *simulation* (convenient to users, but raising many challenges concerning the coherence of results obtained on simulator with the ones on real platforms, as well as the tool scalability and usability) [GNQ13, GJQ09].

Simulation of distributed applications. I have a leading role in the SimGrid project [CGL+14], both on the scientific and technical side. I was the coordinator of several projects funded by the french national research agency, gathering a large collaborative scientific community around this project. In two decades, **SimGrid became the de-facto standard tool for the simulation of large-scale distributed systems,** thanks to its accurate but highly scalable prediction models. It was used as a scientific instrument in about 50 PhD thesis, 130 journals and almost 300 conference and workshop articles.

This project federates a large body of my research work: simulation performance [QRT12], usability [GNQ13, DMQ+11, BQS10], realism [BDG+13, CSG+11], applicability [LAM+12]. I also used this tool to study distributed algorithms [QV09] or network tomography algorithms [ELQV07, EDQ07].

Dynamic verification of distributed applications. Studying the application correctness requires exhaustive testing. To this end, I implemented a prototypical model-checker in SimGrid that allows the joint study of the performance and the correctness of distributed applications. The approach is to explore all possible evolutions of a real application, to detect *e.g.* potential invariant violations. SimGrid can now assess *safety* or *liveness* properties on unmodified MPI applications. Several reduction techniques are proposed: DPOR (with safety properties only) or a system state equality reduction [GQC15, GQ14].

Orthogonally, I proposed with S. Merz an algorithmic language dedicated to parallel algorithms that can be compiled into a TLA$^+$ specification, for the verification of formal properties [AMQ10a, AMQ10b].

Ad-hoc virtualization of distributed applications and operating system. To achieve my research goals, I often built technical and low-level system artifacts. This was the case for the virtualization of MPI applications [CSG+11] or of arbitrary applications [GNQ11], for the memory introspection of arbitrary applications in C or Fortran [GQC15], or to predict the application performance [CDQ+04, Qui02b].

Recent research (since 2015)

Modeling the performance of modern IT systems. In collaboration with A.-C. Orgerie, I had several contributions to the modeling of the energy consumption of modern IT systems, including the CPU, wifi and wired networks [GAO+19, CDOQ18, ROQ+18, OLH+17, ROQ16]. We also worked on the co-simulation of complex cyber-physical systems (such as the electrical grid along with its steering IT infrastructure) by interfacing SimGrid with the PandaPower and ns-3 simulators [COQ18]. We proposed a semi-automatic solution toward the simulation of micro-service applications from execution traces [COQ21]. In collaboration with astrophysicists and CPU architects, I contribute to the design of the computational infrastructure handling the data produced by the international SKA radio-telescope.

Formal study of distributed applications. I work on the model checker included in SimGrid to make it production ready. With T. Jéron, I adapted an innovative technique to the computational model of asynchronous distributed applications, allowing to steer the DPOR algorithm with state unfolding structures in this context [PJQ19, PJQ17]. I proposed with G. Cooperman a solution for the verification of unmodified multithreaded C applications with SimGrid [CQ20]. I introduced with E. Saillard a complete benchmark suite toward the fair comparison of the many existing bug finding tools for MPI [LSQ21].

Virtualization of complex distributed applications. I proposed a SimGrid extension called Remote-SimGrid to simplify the virtualization of arbitrary applications, and demonstrated its ability with the OpenMPI runtime. I am currently working with L. Rilling (DGA) to interconnect SimGrid with the QEMU virtual machine, to enable the study of malicious code that uses the network conditions to detect and evade the analysis.

TECHNICAL CONTRIBUTIONS

Personal contributions to Open Source projects over the years, by language
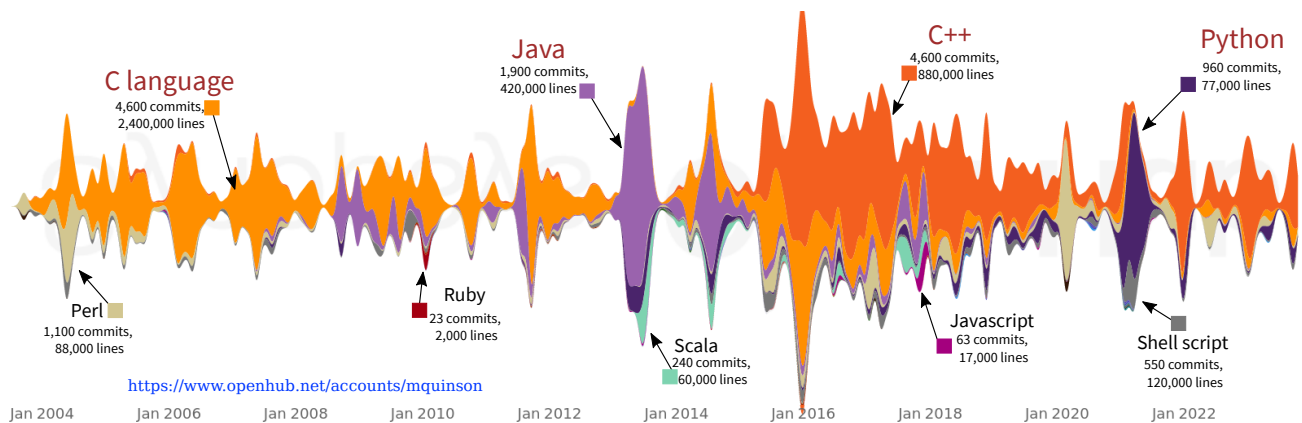
Only my code is represented here. In particular, the code written by my students is excluded from this figure. Some rare contributions remained closed-sourced and are thus excluded from this representation.

Main projects

SimGrid. I am since 2004 the main software architect of this software initiated by H. Casanova in 1998. It counts 150k lines, mostly in C++ and C, with parts in assembler. Fortran, Python and Java bindings are provided. It is ported to Linux, Mac, Windows and FreeBSD. Its original architecture, inspired of OSes design, is the key to simulate and verify applications in the same framework. The community gathers thousands of users and dozens of contributors around the world. We have several releases per year, leveraging a rich CI infrastructure, along with static and dynamic analyzers for software quality.

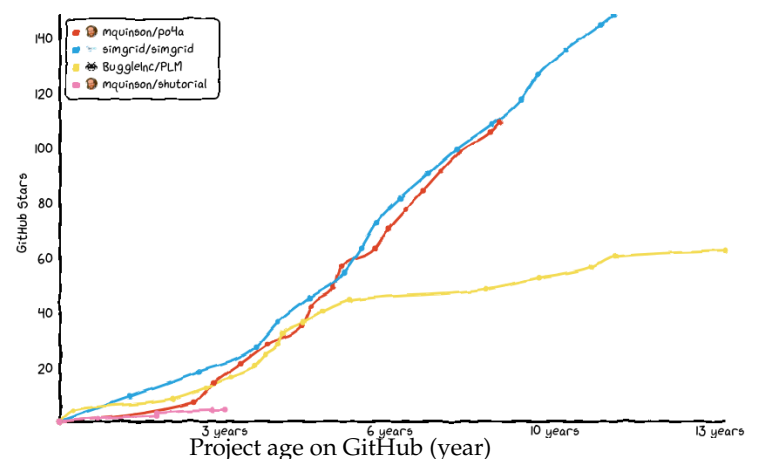**Projects' popularity,** by age on GitHub

PLM I am the main author (with G. Oster) of this pedagogical platform for the teaching of programming through interactive and graphical exercises (30k lines, mostly in Java and Scala, + some python).

shutorial I wrote this other pedagogical platform for the interactive teaching of the terminal day-to-day usage and shell scripting (1k lines in shell and python).

po4a (po for anything). I was the original author of this project easing the translation maintenance in documentation written in Perl. Largely adopted by the community, it is now a key component of several renowned open source projects including Debian and F-droid.

Debian. I am the maintainer of several packages since 2005.

APPENDIX: COMPLETE LIST OF ACADEMIC CONTRIBUTIONS

Authored Publications. All publications are available online. My five major contributions are in bold.

Book chapter

[CDF⁺02] Eddy Caron, Frédéric Desprez, Eric Fleury, Frédéric Lombard, Jean-Marc Nicod, Martin Quinson and Frédéric Suter. *Calcul réparti à grande échelle*, chapter *une approche hiérarchique des serveurs de calculs*. Hermès Science Paris, 2002. ISBN 2-7462-0472-X. **Cited 17 times.**

Journals

[CQ20] Gene Cooperman, Martin Quinson. *Sthread: In-Vivo Model Checking of Multithreaded Programs.* The Art, Science, and Engineering of Programming, Vol. 4, Issue 3, 2020.

[GCQ18] Marion Guthmuller, Gabriel Corona, Martin Quinson. *System-level State Equality Detection for the Formal Dynamic Verification of Legacy Distributed Applications.* Journal of Logical and Algebraic Methods in Programming, 2018.

[ROQ⁺18] Issam Raïs, Anne-Cécile Orgerie, Martin Quinson, Laurent Lefèvre. *Quantifying the Impact of Shutdown Techniques for Energy-Efficient Data Centers.* Concurrency and Computation: Practice and Experience, 2018. Cited 6 times.

[DLM⁺17] **Augustin Degomme, Arnaud Legrand, Mark Markomanolis, Martin Quinson, Mark Stillwell, Frédéric Suter.** *Simulating MPI applications: the SMPI approach.* IEEE Transactions on Parallel and Distributed Systems (TPDS), February 2017. **Cited 66 times**.

[CGL⁺14] **Henri Casanova, Arnaud Giersch, Arnaud Legrand, Martin Quinson, Frédéric Suter.** *Versatile, Scalable, and Accurate Simulation of Distributed Applications and Systems.* Journal of Parallel and Distributed Computing (JPDC), Volume 74(10):2899–2917. **Cited 482 times.**

[RMQ10] Cristian Rosa, Stephan Merz and Martin Quinson. *A Simple Model of Communication APIs – Application to Dynamic Partial-order Reduction.* Electro. Comm. of European Association of Soft. Science and Techno. (ECEASST), 35(1), 2010 (Special Issue of AVOCS'10). Cited 8 times.

[GJQ09] Jens Gustedt, Emmanuel Jeannot and Martin Quinson. *Experimental Validation in Large-Scale Systems: a Survey of Methodologies.* Parallel Proc. Letters, 19(3):399–418, 2009. **Cited 107 times.**

[CDQ⁺04] Eddy Caron, Frédéric Desprez, Martin Quinson and Frédéric Suter. *Performance Evaluation of Linear Algebra Routines.* International Journal of High Performance Computing Applications, 18(3):373-390, 2004. Special issue on Clusters and Computational Grids for Scientific Computing (CCGSC'02). Cited 5 times.

[Qui02b] Martin Quinson. *Un outil de prédiction dynamique de performances dans un environnement de metacomputing.* Technique et Science Informatique, 21(5):685–710, 2002. Special issue.

[CCC⁺01] Eddy Caron, Serge Chaumette, Sylvain Contassot-Vivier, Frédéric Desprez, Eric Fleury, Claude Gomez, Maurice Goursat, Emanuel Jeannot, Dominique Lazure, Frédéric Lombard, Jean-Marc Nicod, Laurent Philippe, Martin Quinson, Pierre Ramet, Jean Roman, Franck Rubi, Serge Steer, Frédéric Suter, Gil Utard. *Scilab to Scilab//, the OURAGAN Project*. Parallel Computing, 11(27):1497–1519, 2001. **Cited 27 times.**

Highly selective conferences.

In my research community, highly selective conferences are more prestigious than many journals. See B. Meyer, *et Al.. Research Evaluation in Computer Science*. CACM, April 2009.

[TCD⁺17] **Christian Heinrich, Tom Cornebize, Augustin Degomme, Arnaud Legrand, Alexandra Carpen-Amarie, Sascha Hunold, Anne-Cécile Orgerie and Martin Quinson.** *Predicting the Energy Consumption of MPI Applications at Scale Using a Single Node.* IEEE Intl Conference Cluster Computing (CLUSTER – rate 47/216=21.8%), Hawai'i, USA, 2017. **Cited 57 times**.

[QRT12] Martin Quinson, Cristian Rosa, Christophe Thiéry. *Parallel Simulation of Peer-to-Peer Systems.* 12th ACM/IEEE Intl Symposium on Cluster Computing and the Grid (CCGrid'12 – rate 83/302=27.5%), Canada, May 2012. **Cited 34 times.**

[LAM+12] Laurent Bobelin, Arnaud Legrand, David Marquez, Pierre Navarro, Martin Quinson, Frédéric Suter, Christophe Thiéry. *Scalable Multi-Purpose Network Representation for Large Scale Distributed System Simulation.* 12th ACM/IEEE Intl Symposium on Cluster Computing and the Grid (CCGrid'12 – rate 83/302=27.5%), Canada, May 2012. **Cited 32 times.**

[CSG+11] Pierre-Nicolas Clauss, Mark Stillwell, Stéphane Genaud, Frédéric Suter, Henri Casanova, Martin Quinson. *Single Node On-Line Simulation of MPI Applications with SMPI.* 25th IEEE International Parallel & Distributed Processing Symposium (IPDPS'11 – rate 112/571=19.6%), May 16-20, 2011, Anchorage (Alaska) USA. **Cited 61 times.**

[ELQV07] Lionel Eyraud Dubois, Arnaud Legrand, Martin Quinson and Frédéric Vivien. *A First Step Towards Automatically Building Network Representations.* 13th International EuroPar Conference (rate 89/333=26.7%), France, August 2007, LNCS 4641:160–169. **Cited 22 times.**

Other refereed conferences

[PQQR23] Joseph Paturel, Clément Quinson, Martin Quinson, Simon Rokicki. *SmolPhone: a smartphone with energy limits.* 14th International conference on Green and Sustainable Computing (IGSC'23), October 2023. Best paper award in the "work-in-progress" track.

[COQ23] Clément Courageux-Sudan, Loic Anne-Cécile Orgerie, Martin Quinson. *A Wi-Fi Energy Model for Scalable Simulation.* 24th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM'23), June 2023.

[CGOQ22] Clément Courageux-Sudan, Loïc Guegan, Anne-Cécile Orgerie, Martin Quinson. *A Flow-Level Wi-Fi Model for Large Scale Network Simulation.* International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM'22), Octobre 2022.

[COQ21] Clément Courageux-Sudan, Anne-Cécile Orgerie, Martin Quinson. *Automated performance prediction of microservice applications using simulation.* 29th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS'21 – rate 25/76=33%), November 2021.

[PJQ19] The Anh Pham, Thierry Jéron, Martin Quinson. *Unfolding-based Dynamic Partial Order Reduction of Asynchronous Distributed Programs.* 39th International Conference on Formal Techniques for Distributed Objects, Components and Systems (FORTE'19), Jun 2019. Cited once.

[GAO+19] Loïc Guegan, Betsegaw Lemma Amersho, Anne-Cécile Orgerie, Martin Quinson. *A Large-Scale Wired Network Energy Model for Flow-Level Simulations.* The 33rd International Conference on Advanced Information Networking and Applications, March 2019. Cited 4 times.

[CDOQ18] Benjamin Camus, Fanny Dufossé, Anne-Cécile Orgerie, Martin Quinson. *Network-aware energy-efficient virtual machine management in distributed Cloud infrastructures with on-site photovoltaic production.* International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD), September 2018. Cited 3 times.

[COQ18] Benjamin Camus, Anne-Cécile Orgerie, Martin Quinson. *Co-simulation of FMUs and Distributed Applications with SimGrid.* SIGSIM Principles of Advanced Discrete Simulation (PADS), May 2018. Cited once.

[ROQ16] Issam Raïs, Anne-Cécile Orgerie, Martin Quinson. *Impact of Shutdown Techniques for Energy-Efficient Cloud Data Centers.* International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP), December 2016. **Cited 13 times.**

[DMQ+15] Marie Duflot, Florent Masseglia, Martin Quinson, Didier Roy, Julien Vaubourg, Thierry Viéville. *Sharing computer science with everyone also helps avoiding digital prejudices.* 7th international Scratch conference, Amsterdam, August 2015. Cited once.

[QO15] **Martin Quinson, Gérald Oster.** *A Teaching System To Learn Programming: the Programmer's Learning Machine.* 20th SIGCSE Conference on Innovation and Technology in Computer Science Education, Lituania, July 2015. **Cited 18 times.**

[GQ14] Marion Guthmuller, Martin Quinson. *System-level State Equality Detection for the Dynamic Verification of Distributed Applications.* **Accepted as a poster** at 9th European Conference on Computer Systems (ACM EuroSys'14), Amsterdam (Netherlands), April 2014.

[MQR11]   Stephan Merz, Martin Quinson, Cristian Rosa. *SimGrid MC: Verification Support for a Multi-API Simulation Platform.* Electronic Communication of the European Association of Software Science and Technology, 31st IFIP International Conference on Formal Techniques for Networked and Distributed Systems (FMOODS/FORTE 2011), June 2011, Reykjavik, Iceland. Lecture Notes in Computer Science 6722, pp. 274-288. **Cited 22 times.**

[GNQ11]   Marion Guthmuller, Lucas Nussbaum, Martin Quinson. *Émulation d'applications distribuées sur des plates-formes virtuelles simulées.* Rencontres francophones du Parallélisme (RenPar'20), May 10-13, 2011, Saint Malo, France. Cited 3 times.

[AMQ10b] Sabina Akhtar, Stephan Merz and Martin Quinson. *A High-Level Language for Modeling Algorithms and their Properties.* 13th Brazilian Symposium on Formal Methods, Natal, Rio Grande do Norte, Brazil, Nov 8-12, 2010. Cited 5 times.

[BQS10]   Laurent Bobelin, Martin Quinson and Frédéric Suter. *Synthesizing Generic Experimental Environments for Simulation.* 5th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC'10), Fukuoka, Japan, Nov 4-6 2010. Cited 7 times.

[QV09]   Martin Quinson and Flavien Vernier. *Byte-Range Asynchronous Locking in Distributed Settings.* 17th Euromicro Intl Conf. on Parallel, Distributed and network-based Processing (PDP'09), Weimar, Germany, Feb 18-20 2009. Cited 5 times.

[CLQ08]   Henri Casanova, Arnaud Legrand and Martin Quinson. *SimGrid: a Generic Framework for Large-Scale Distributed Experiments.* 10th IEEE International Conference on Computer Modeling and Simulation, Cambrige, UK, 2008. **Cited 615 times.**

[Qui06]   Martin Quinson. *GRAS: a Research and Development framework for Grid services.* 18th IASTED Intl Conf. on Parallel and Distributed Computing and Systems (PDCS06). **Best paper award, Cited 31 times**.

[CLQS02]   Philippe Combes, Frédéric Lombard, Martin Quinson and Frédéric Suter. *A Scalable Approach to Network-Enabled Servers*. 7th Asian Computing Science Conference, Dec. 2002. **Cited 18 times.**

[CDL+02]   Eddy Caron, Frédéric Desprez, Frédéric Lombard, Jean-Marc Nicod, Martin Quinson and Frédéric Suter. *A Scalable Approach to Network-Enabled Servers*. 8th International EuroPar Conference, Paderborn, Germany, August 2002, LNCS 2400:907–910 (Springer-Verlag). **Cited 120 times.**

[DQS01]   Frédéric Desprez, Martin Quinson and Frédéric Suter. *Dynamic Performance Forecasting for Network Enabled Servers in a Metacomputing Environment*. Intl Conf. on Parallel and Distributed Processing Techniques and Applications (PDPTA'01), June 2001. CSREA Press 3:1421–1427. **Cited 37 times.**

[LQS01]   Frédéric Lombard, Martin Quinson and Frédéric Suter. *Une approche extensible des serveurs de calcul*. 13th Rencontres du parallélisme des archis et des systèmes (RenPar'01), France, 2001.

[Qui01]   Martin Quinson. *Un outil de modélisation de performances dans un environnement de metacomputing.* 13th Rencontres du parallélisme des archis et des systèmes (RenPar'01), France, 2001.

Refereed workshops

[LSQ21]   Mathieu Laurent, Emmanuelle Saillard, Martin Quinson. *The MPI Bugs Initiative: a Framework for MPI Verification Tools Evaluation.* Fifth International Workshop on Software Correctness for HPC Applications (Correctness'21), associated to SuperComputing'21, November 2021.

[CLQS18]   Henri Casanova, Arnaud Legrand, Martin Quinson, Frédéric Suter. *SMPI Courseware: Teaching Distributed-Memory Computing with MPI in Simulation.* EduHPC-18 - Workshop on Education for High-Performance Computing, associé à SC'18. Cited twice. **Best paper award**.

[OLH+17] Anne-Cécile Orgerie, Betsegaw Lemma Amersho, Timothée Haudebourg, Martin Quinson, Myriana Rifai, Dino Lopez Pacheco, Laurent Lefèvre. *Simulation Toolbox for Studying Energy Consumption in Wired Networks.* Intl Conf on Network and Service Management (CNSM'17), November 2017. **Cited 10 times.**

[PJQ17] **The Anh Pham, Thierry Jéron, Martin Quinson.** *Verifying MPI Applications with Mc Sim-Grid.* First International Workshop on Software Correctness for HPC Applications (Correctness'17) associated to SuperComputing'17, November 2017. Cited 7 times.

[GQC15] Marion Guthmuller, Martin Quinson, Gabriel Corona. *System-level State Equality Detection for the Formal Dynamic Verification of Legacy Distributed Applications.* Workshop on Formal Approaches to Parallel and Distributed Systems (4PAD), help with the 23rd Euromicro Intl Conf on Parallel, Distributed and Network-based Processing (PDP'15), Turku (Finland), March 2015. Cited 4 times.

[CGL⁺13] Henri Casanova, Arnaud Giersch, Arnaud Legrand, Martin Quinson, Frédéric Suter. *SimGrid: a Sustained Effort for the Versatile Simulation of Large Scale Distributed Systems.* First Workshop on on Sustainable Software for Science: Practice and Experiences (WSSSPE'13). Held as part of SuperComputing'13, Denver, Colorado, USA. **Cited 18 times.**

[BDG⁺13] Paul Bedaride, Augustin Degomme, Stéphane Genaud, Arnaud Legrand, George Markomanolis, Martin Quinson, Mark L. Stillwell, Frédéric Suter, Brice Videau. *Improving Simulations of MPI Applications Using A Hybrid Network Model with Topology and Contention Support.* 4th Intl Workshop on Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems (PMBS 2013). Held as part of SuperComputing'13, Denver, Colorado, USA. **Cited 34 times.**

[GNQ13] Maximiliano Geier, Lucas Nussbaum, Martin Quinson. *On the Convergence of Experimental Methodologies for Distributed Systems: Where do we stand?* Fourth International Workshop on Analysis Tools and Methodologies for Embedded and Real-time Systems (Waters 2013). Cited twice.

[DMQ⁺11] Frédéric Desprez, George S. Markomanolis, Martin Quinson, Frédéric Suter. *Assessing the Performance of MPI Applications Through Time-Independent Trace Replay.* Second International Workshop on Parallel Software Tools and Tool Infrastructures (PSTI 2011). Held in conjunction with ICPP 2011, the 40th International Conference on Parallel Processing, Taipei, Taiwan, September 13-16, 2011. **Cited 14 times.**

[AMQ10a] Sabina Akhtar, Stephan Merz, Martin Quinson. *Extending PlusCal: A Language for Describing Concurrent and Distributed Algorithms.* Actes des deuxièmes journées nationales du GDR CNRS du Génie de la Programmation et du Logiciel, March 2010, Pau, France. Cited once.

[EDQ07] Lionel Eyraud-Dubois and Martin Quinson. *Assessing the Quality of Automatically Built Network Representations.* Workshop on Programming Models for Grid Computing, associated to CCGrid'07. Cited 4 times.

[LQ04] Arnaud Legrand and Martin Quinson. *Automatic deployment of the Network Weather Service using the Effective Network View.* High-Performance Grid Computing Workshop, associated to IPDPS'04. **Cited 15 times.**

[Qui02a] Martin Quinson. *Dynamic Performance Forecasting for Network-Enabled Servers in a Metacomputing Environment.* Intl Workshop on Performance Modeling, Evaluation, and Optimization of Parallel and Distributed Systems (PMEO-IPDS'02), associated to IPDPS'02, April 15-19 2002. **Cited 62 times.**

Invited Presentations and Tutorials

16. *Simulating clouds with SimGrid.* Invited presentation to the Cloud days of GDR RSD, 2020.

15. *How to FAIL your Experimental section.* Doctoral seminar at IRISA, Large-Scale system dpt, 2018.

14. *Experimental methodologies for large scale distributed systems.* Doctoral seminar at the spring school on energetic efficiency of networks and distribued systems (E3-RSD), 2016.

13. *Experimental methodologies for large scale distributed systems.* Doctoral seminar at ENS Cachan, 2014.

12. *Using Simulation to study HPC codes.* **Half-day Tutorial** at INRIA-Illinois-ANL Joint Laboratory for Petascale Computing summer school, 13 juin 2014.

11. *Introduction to SimGrid.* **Tutorial** at Conférence d'informatique en Parallélisme, Architecture et Système (Compas'14), 22 avril 2014.

10. *Modeling large-scale systems. Why? How?* **Invited talk** at Journées Scientifiques Inria et Journée des Responsables d'équipes, June 24th, 2013.

9. *Introduction to SimGrid.* **Half-day Tutorial** at Conférence d'informatique en Parallélisme, Architecture et Système (Compas'13), January 15th, 2013.

8. *Simulation of Next Generation Systems.* **Invited talk** at the INGI Fall 2012 Doctoral School Day in Cloud Computing. Université Catholique de Louvain, November 2012.

7. *H*C: Performance Everywhere (or, computing getting high),* **Invited talk** to the workshop "Challenges & Pitfalls of Performance Assurance", associated to CECMG'11, Munchen, Germany, March 2011.

6. *Experimenting HPC Systems with Simulation.* **Tutorial** at the 8th ACM/IEEE International Conference on High Performance Computing & Simulation (HPCS'10), Caen, France, June 28 2010.

5. *Performance Assesment of Distributed Scientific Applications,* **Invited talk** to workshop "Challenges & Pitfalls of Performance Assurance", associated to CECMG'10, Darmstadt, Germany, March 2010.

4. *SimGrid: a Generic Framework for Large-Scale Distributed Experiments.* **Invited talk** to the 9th ACM/ IEEE International conference on Peer-to-peer computing (P2P'09), Seattle, USA, Sept 2009.

3. *The SimGrid Framework for Research on Large-Scale Distributed Systems.* **Tutorial** at the 9th Intl Conf. on Parallel and Distributed Computing, Applications and Technologies (PDCAT'08), Dunedin, New-Zeeland, Dec 2008.

2. *Simulation for Large-Scale Distributed Computing Research.* **Tutorial** at the 8th ACM/IEEE Intl Symposium on Cluster Computing and the Grid (CCGrid'08), Lyon, France, May 2008.

1. *Simulation for Large-Scale Distributed Computing Research.* **Tutorial** at the 19th IASTED Intl Conf. on Parallel and Distributed Computing and Systems (PDCS'07), Boston, MA, USA, Oct 2007.

RESEARCH PROJECTS

- **ANR Dark-Era** (2021-2025 – 1M€ in total, 150k€ for my group)
  Description: Cosimulation of HPC accelerators for the dimensionning of the SKA radiotelescope.
- **Inria Hub Mc SimGrid** (2019-2021 – 130k€)
  Description: Technical maturation of the model checker integrated in SimGrid.
- **Inria associated team FogRein** with NorthEastern University, Boston (2019-2021 – 35k€)
  Description: Steering Efficiency for Distributed Applications
- **SAD project,** Britany council (2017-2018 – 70k€)
  Description: Live conversion from real execution to simulation
- **Inria Hub SimGrid as a Platform (SaaP)** (2017-2018 – 148k€)
  Description: Make SimGrid usable in production in industrial and teaching settings
- **Inria IPL Hac Specis** (2016-2020 – 700k€ in total, 200k€ for my group)
  Description: Combining the study of performance and correctness for HPC applications in SimGrid
- **SONGS (Simulation Of Next Generation Systems)** (2012–2016 – 1,800,000 €)
  Description: Simulating applications in the context of Grids, P2P, Clouds and HPC.
- **Ultra Scalable Simulation with SimGrid** (2009–2011 – 840,000 €)
  Description: ANR project federating the research around the SimGrid tool
- **Experimentations and large-scale distributed computation** (2010–2013 – 500,000 €)
  Description: Federation of the regional research efforts on clusters and computational grids
- **Simulating Data-Intensive Grid Applications** (2010 – 5,000 €)
  Description: Model large data storage facilities in collaboration with a CERN team
- **Large-Scale Discrete-Event Simulation of Distributed Systems** (2010–2011 – 2,000 €)
  Description: Study the distribution of the SimGrid tool; collaboration with Antwerp U., Belgium.
- **SimGrid Usability** (2009–2011 – 80,000 €); Co-Principal Investigator with A. Legrand
  Description: ADT INRIA project providing engineering forces to the SimGrid tool
- **Model-checking distributed applications for Grids and P2P** (2009–2010 – 12,000 €)
  Description: Exploration of the abilities to add model-checking facilities to SimGrid

- **Software Development Operation on SimGrid** (2006–2008 – 80,000 €)
  Description: ODL INRIA project providing engineering forces to the SimGrid tool
- **Virtual Lab Room for Distributed Applications and Systems** (2008 – 40,000 €)
  Description: Setup and maintenance of a cluster for teaching purposes

RESEARCH ADVISING EXPERIENCE

Postdoctoral advising

3. Millian POQUET: *Converting System-Level Checkpoints of HPC Applications for their Simulation and Verification*, Jan 2018 – Jun 2019.
2. Pierre-Nicolas CLAUSS: *Simulation of HPC applications with SMPI*, Dec 2009 – Dec 2011.
1. Lionel EYRAUD-DUBOIS: *Reconstruction Algorithms of the Platform Topology*, Oct 2006 – Oct 2007.
   Advising: 33%, with F. Vivien (ENS-Lyon) and A. Legrand (CNRS/LIG).

Doctoral advising

6. Clément Courageux-Sudan: *Reducing the energy consumption of Internet of Things*, since Oct 2020 co-advised with A-C Orgerie (CNRS).
5. Adrien GOUGEON: *Communication networks and electrical grids*, since Oct 2019, with A-C Orgerie.
4. Loïc GUEGAN: *Scalable end-to-end models for the time and energy performance of Fog infrastructures*, 2017 – 2020, with A-C Orgerie.
3. The Anh PHAM: *POR reduction for the verification of MPI applications*, 2016 – 2019, with T. Jéron (Inria Rennes).
2. Marion Guthmuller: *Dynamic Verification of MPI legacy applications*, 2011 – 2014.
1. Cristian ROSA: *Model-checking and parallel simulation in SimGrid*, 2008 – 2011, with Stephan Merz (Inria Nancy).

Graduate student advising

20. J. ALHAJJ *Data Locality in Hadoop: A Systematic Analysis of the Roles of Data Placement, Task and Job scheduling*, 2021 with S. Ibrahim and T. Lambert.
19. C. COURAGEUX-SUDAN *Modeling the electric consumption of WiFi interfaces for IoT at scale*, 2020 with A-C Orgerie.
18. B. LEMMA *Simulating energy-aware networks*, 2017 with AC Orgerie.
17. L. BESSAD *Emulating arbitrary applications*, 2015.
16. G. SANTOS *Quantifying Reliability Properties of Cloud Systems*, 2015 with S. Merz and M. Duflot.
15. E. LOPEZ *Parallel simulation of distributed applications*, 2014.
14. C. MACUR *Emulation of legacy distributed applications*, 2014.
13. S. CASTELLI *Simulation of Neighborhood Collectives over Torus Network*, 2014.
12. G. SERRIÈRE *Parallel Simulation of Distributed Applications*, 2013.
11. M. GEIER: *Leveraging multiple experimentation methodologies to study P2P broadcast*, 2012 (with L. Nussbaum).
10. M. GUTHMULLER: *Verifying Liveness Properties*, 2011 (with S. Merz).
9. D. MARQUEZ: *Scalable Network Representation in SimGrid*, Jul–Oct 2010 (with A. Legrand).
8. M. CHIMENTO: *Model-Checking Distributed Algorithms with PlusCal*, 2010 (with S. Merz).
7. C. ROSA: *Verification of Grid and P2P Algorithms*, 2008 (with S. Merz).
6. S. AKHTAR: *Model-checking of distributed applications*, 2008 (with S. Merz).
5. H. LIU: Model-checking of distributed applications, 2007 (with S. Merz).
4. M. FRINCU: *Synthetic yet realistic platform descriptions*, 2008 (with F. Suter).
3. S. MOUELHI: *Verification of distributed algorithms with TLA$^+$*, 2007 (with S. Merz).
2. A. HARBAOUI: *Reconstruction Algorithms of the Platform Topology*, 2006.
1. B. VAN HEUKELOM: *Development of strategies for the integration of parallel applications into DIET by example of a program for genome sequence analysis.* 2003. With E. Caron and F. Desprez.

Research engineer advising

- R&D on SimGrid: E. Azimi (Dec 2019 – Oct 2021), T. Boubehziz (March 2017 – Oct 2018), G. Corona (Dec 13 – Dec 15), P. Bedaride (Sept 12 – Oct 14), C. Thiéry (Oct 10 – Feb 12), M. Fekari (Oct 10 – Feb 11), M. Cherier (Oct 06 – Sept 08).

- R&D on Grid'5000: X. Delaruelle (Oct 05 – Sept 07).

I also advised numerous undergraduate students during research and development internships.