



Keywords

High Performance Computing
Experimental Method
Performance Evaluation
Statistical Modeling
Data Analysis

Programming

Python ★★★★★
R ★★★★★
L^AT_EX ★★★★★
Linux ★★★★★
C ★★★★★
Bash ★★★★★
MPI ★★★★★
C++ ★★★★★
Java ★★★★★
SQL ★★★★★

Language

French ★★★★★
English ★★★★★
German ★★★★★

Education

2017 – 2021
Grenoble (FR)

PhD in Computer Science

Université Grenoble Alpes

High Performance Computing: Towards Better Performance Predictions and Experiments

- Developed a new technique for predicting the performance of parallel non-trivial applications through simulation, achieving unprecedented accuracy at low cost.
- Carried experimental campaigns with rock-solid methods, allowing to unveil highly unexpected phenomena.
- Implemented systematic performance non-regression testing, detected many significant issues with the clusters.
- Main results published at a top conference [CLH19] and currently under review for publication in a top journal [CL21].
- Presented my work in multiple international conferences, workshops or seminars.

2015 – 2017
Grenoble (FR)

M.Sc. & Eng. degree in Computer Science (M1-M2)

Ensimag

Graduate specialization in parallel and distributed systems.

Obtained a Master of Science, with highest honor, ranked 2nd/88.

2013 – 2015
Lyon (FR)

B.Sc. in Theoretical Computer Science (L3-M1)

ENS Lyon

Undergraduate and postgraduate intensive program in theoretical computer science.

Obtained a Bachelor of Science, with great honor.

Experience

Jan/18 – Mar/20
Grenoble (FR)

Graduate teaching assistant

Université Grenoble Alpes

- Gave lectures, tutorials and practical works
- Taught all levels from 1st year (L1) to 4th year (M1)
- Courses: introduction to Python, software development, operating systems, algorithmics, data analysis.

Oct/17 – Dec/17
Chicago (US)

Performance Variability in Supercomputers

Argonne Laboratory

- Carried experiments and statistical analyses to characterize performance variability.

Feb/17 – Jul/17
Grenoble (FR)

Efficient Simulation of Large-Scale MPI Applications

Inria

- Modified the simulator and the simulated application to enable large scale simulations.
- Outcome: simulate executions several orders of magnitude larger.
- Obtained results for the large scale experiment of a conference article [Hei+17].

May/16 – Aug/16
Walldorf (DE)

Multicast Communication in SAP HANA

SAP

- Analyzed several multicast algorithms.
- Implemented these algorithms in C++, using HANA codebase.

May/15 – Aug/15
Grenoble (FR)

Job Isolation in Fat Tree Topologies

Bull

- Designed several algorithms to prevent the leak of sensitive information in a cluster.
- Results published in a conference article [PC17].

Jun/13 – Jul/13
Grenoble (FR)

Monitoring of Distributed Systems

Université Grenoble Alpes

- Designed an algorithm for decentralized monitoring of distributed systems.
- Results published in a conference article [FCF14].

Software Projects

Jul/19 – May/21	G5K tests Performance tests on Grid'5000. <ul style="list-style-type: none">• On a near-daily basis, run micro-benchmarks on hundreds of Grid'5000 nodes.• Statistical tests on several metrics (e.g. CPU performance, frequency, temperature).• Detected several events affecting significantly the nodes performance and went unnoticed by both the staff and the users (e.g. cooling issue, faulty memory, power instability).	cornebize.net/g5k_test
Aug/18 – now	Peanut Experiment engine for Grid'5000. <ul style="list-style-type: none">• Experiments written as readable and concise Python scripts.• Common tasks (e.g. node deployment, resource monitoring) factorized in the engine.• Experiment data and meta-data automatically collected in an archive.	github.com/Ezibenroc/peanut
Mar/18 – now	Pycewise Python module to compute a segmented linear regression. Implemented using a two-phase greedy algorithm. Several objective functions are available: <ul style="list-style-type: none">• Ordinary Least Square, Weighted Least Square (implemented with a closed formula),• Logarithmic Least Square (implemented with a gradient descent).	github.com/Ezibenroc/pycewise
Feb/17 – now	Contribution to Simgrid Simulation of distributed computer systems. <ul style="list-style-type: none">• Implemented several features to improve the simulation efficiency.• Greatly improved the calibration procedure for modeling an existing platform.	simgrid.org
May/16 – now	Contribution to Roaring bitmap Fast and lightweight set for unsigned 32 bits integers. <ul style="list-style-type: none">• Contributed to CRoaring, the C library (repo: github.com/roaringBitmap/CRoaring).<ul style="list-style-type: none">– Implemented range constructor, selection and subset queries. Fixed several bugs.• Developed PyRoaring, a Python wrapper (repo: github.com/Ezibenroc/PyRoaringBitMap).<ul style="list-style-type: none">– Similar API than the built-in Python set, but several orders of magnitude faster.– Used the Cython programming language.– Extensive tests caught several bugs of the C library.	roaringbitmap.org

Publications

Conference Articles

- [CLH19] Fast and Faithful Performance Prediction of MPI Applications: the HPL Case Study
Cornebize, T.; Legrand, A., and Heinrich, F. C.
URL: <https://hal.inria.fr/hal-02096571>
2019 IEEE International Conference on Cluster Computing (CLUSTER), 2019, Albuquerque, United States
- [Hei+17] Predicting the Energy Consumption of MPI Applications at Scale Using a Single Node
Heinrich, F. C.; Cornebize, T.; Degomme, A.; Legrand, A.; Carpen-Amarie, A.; Hunold, S.; Orgerie, A.-C., and Quinson, M.
URL: <https://hal.inria.fr/hal-01523608>
2017 IEEE International Conference on Cluster Computing (CLUSTER), 2017, Honolulu, United States
- [PC17] Isolating Jobs for Security on High-Performance Fabrics
Perotin, M. and Cornebize, T.
2017 IEEE 3rd International Workshop on High-Performance Interconnection [...] (HiPINEB), 2017, Austin, United States
- [FCF14] Efficient and Generalized Decentralized Monitoring of Regular Languages
Falcone, Y.; Cornebize, T., and Fernandez, J.-C.
URL: <https://hal.archives-ouvertes.fr/hal-00972559>
34th Formal Techniques for Networked and Distributed Systems (FORTE), 2014, Berlin, Germany

Preprints

- [CL21] Simulation-based Optimization and Sensibility Analysis of MPI Applications: Variability Matters
Cornebize, T. and Legrand, A. (submitted at JPDC, currently under review)
URL: <https://hal.inria.fr/hal-03141988>
- [CL19] DGEMM performance is data-dependent
Cornebize, T. and Legrand, A.
URL: <https://hal.inria.fr/hal-02401760>

Thesis

- [Cor21] High Performance Computing : towards better Performance Predictions and Experiments
Cornebize, T.
URL: <https://tel.archives-ouvertes.fr/tel-03328956>