Tom Cornebize

R&D Engineer in High Performance Computing

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Skills

Advanced
Python
R
C
Bash
MPI
LaTeX
GNU / Linux
Git
CI / CD

Intermediate
C++
Java
SQL
OCaml

Free software

Roaring Bitmaps
Simgrid

Language

French (native)
English (advanced)

Education

2017 – 2021, Grenoble (FR) — **PhD in Computer Science** — **Université Grenoble Alpes**

High Performance Computing: Towards Better Performance Predictions and Experiments.

- Developed a new approach for emulating the execution of complex MPI applications at large scale and predict their performance. Used Simgrid simulator and statistical models. Achieved unprecedented accuracy ($\sim 5\%$ error) at very low cost.
- Carried experimental campaigns on hundreds of compute nodes with rock-solid methodology. Unveiled highly unexpected phenomenons. Implemented an experiment engine with Python (packages: fabric, requests). Analyzed and visualized experiment results with R (packages: ggplot2, dplyr, tidyr) and Python (packages: pandas, plotnine, statsmodels) using Jupyter notebooks.
- Implemented systematic performance non-regression testing for Grid'5000 machines with automated measures and statistical analyzes. Detected many significant issues unnoticed by both the staff and the users. Micro-benchmarks in C, automation in Python.
- Implemented a Python package to compute a piecewise linear regression, returning much better fits than the existing alternatives.
- Wrote several articles, published in top conferences and journals.
- Presented my work in multiple international gatherings.

2015 – 2017, Grenoble (FR) — **M.Sc. & Engineering Degree in Computer Science** — **Ensimag**

Specialization in parallel and distributed systems.
Obtained a Master of Science, with the highest honor, ranked $2^{nd}/88$.

2013 – 2015, Lyon (FR) — **B.Sc. in Theoretical Computer Science** — **ENS Lyon**

Broad and intensive program in computer science.
Obtained a Bachelor of Science, with great honor.

Experience

2018 – 2020, 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 and visualization (in R).

2017, Chicago (US) — **Performance Variability in Supercomputers** — **Argonne Laboratory**

Three month research internship.

- Carried experiments and statistical analyses to characterize computer performance variability, using micro-benchmarks.

2017, Grenoble (FR) — **Efficient Simulation of Large-Scale MPI Applications** — **Inria**

Six month research internship.

- Modified the simulator (C++) and the simulated application (C) to enable large scale simulations.
- Outcome: simulate executions several orders of magnitude larger.

2016, Walldorf (DE) — **Multicast Communication in SAP HANA** — **SAP**

Three month R&D internship.

- Implemented multicast algorithms in C++ in HANA codebase.
- Implemented functional and performance tests in Python.

2015, Grenoble (FR) — **Job Isolation in Fat Tree Topologies** — **Bull**

Three month R&D internship.

- Designed algorithms preventing information leaks in clusters.
- Implemented a proof of concept in Python, worked on its integration in Bull's software stack.