Tom Cornebize
R&D Engineer in High Performance Computing

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Skills

Advanced
Python
R
C
Bash
MPI
LATEX
GNU / Linux
Git

Intermediate
Cython
C++
Java
SQL
CI / CD

Language

French (native)
English (fluent)

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).
- 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.

2016 – now
Side project

Contribution to Roaring Bitmaps — **roaringbitmap.org**
Fast and lightweight set of integers. Widely used library.
- Contributed to CRoaring, the C library. Implemented multiple features, reported and fixed several critical bugs.
- Developed PyRoaring, a Python wrapper, several orders of magnitude faster than the alternatives. Used the Cython programming language.