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

Dec/21 – now — Remote (FR)
HPC R&D Engineer — **Intel**
Work on the performance prediction of MPI application.

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 – 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.