

# Tom Cornebize

PhD student in computer science

## Contact

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## Web

cornebize.net  
github.com/Ezibenroc

## Skills

Python ★★★★★  
L<sup>A</sup>T<sub>E</sub>X ★★★★★  
GNU/Linux ★★★★★  
C ★★★★★  
C++ ★★★★★  
Java ★★★★★  
MPI ★★★★★  
R ★★★★★  
SQL ★★★★★

## Languages

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

## Education

- 2017 – 2020  
Grenoble (FR) **PhD in Computer Science** [Grenoble Alps University](#)  
Under the supervision of Arnaud Legrand.  
Topics of interest: high performance computing, distributed systems, performance evaluation.
- 2015 – 2017  
Grenoble (FR) **Master's & Engineering Degrees in Computer Science** [Ensimag](#)  
Graduate specialization in parallel and distributed systems.  
Obtained a Master of Science, with highest honor.
- 2013 – 2015  
Lyon (FR) **Bachelor's Degree in Theoretical Computer Science** [ENS Lyon](#)  
Undergraduate and postgraduate intensive program in theoretical computer science.  
Obtained a Bachelor of Science, with great honor.
- 2011 – 2013  
Grenoble (FR) **Undergraduate program** [Joseph Fourier University](#)  
Undergraduate program in computer science and mathematics.

## Internships

- Oct/17 – Dec/17  
Chicago (US) **Performance variability in supercomputers** [Argonne Laboratory](#)  
Under the supervision of Swann Perarnau.
  - Performed several experiments and statistical analyses to characterize performance variability.
- Feb/17 – Jul/17  
Grenoble (FR) **Efficient simulation of large scale MPI applications** [Inria](#)  
Under the supervision of Arnaud Legrand.
  - Profiled and generated traces of the simulator's execution.
  - Modeled the expensive functions to inject their expected duration in the simulation.
  - Replaced large allocations by fake allocations.
  - Used huge pages to decrease the page table size.
  - Outcome: simulate executions several orders of magnitude larger while keeping a small error.
- May/16 – Aug/16  
Walldorf (DE) **Multicast communication in SAP HANA** [SAP](#)  
Under the supervision of Norman May.
- May/15 – Aug/15  
Grenoble (FR) **Job isolation in fat tree topologies** [Bull](#)  
Under the supervision of Matthieu Perotin.
- Jun/14 – Jul/14  
Sophia-Antipolis (FR) **Modelisation and verification of concurrent systems** [Inria](#)  
Under the supervision of Robert de Simone.
- Jun/13 – Jul/13  
Grenoble (FR) **Monitoring of distributed systems** [Joseph Fourier University](#)  
Under the supervision of Yliès Falcone.
- Jun/12  
Grenoble (FR) **Monitoring of distributed systems** [Joseph Fourier University](#)  
Under the supervision of Yliès Falcone.

## Teaching

- Jan/18 – May/18  
Grenoble (FR) **Introduction to Python** [Grenoble Alps University](#)  
First year students (L1) in Earth Science.
  - 64 hours, including courses, exercises and practicals.
  - Correction and grading of the midterm and final assessments.

## Software projects

- May/16 – now **Contribution to Roaring bitmap** [roaringbitmap.org](http://roaringbitmap.org)  
Fast and lightweight set for unsigned 32 bits integers.
- Implemented several functionalities of the C library.
    - Implemented range constructor.
    - Implemented select query.
    - Implemented subset test.
    - Fixed several bugs.
    - Repository: [github.com/roaringBitmap/CRoaring](https://github.com/roaringBitmap/CRoaring)
  - Developed a Python wrapper for the C library.
    - Functionalities of the C library directly usable in Python.
    - Implementation made using Cython.
    - Several order of magnitude faster than the builtin set.
    - Extensive tests caught several bugs of the C library.
    - Repository: [github.com/Ezibenroc/PyRoaringBitMap](https://github.com/Ezibenroc/PyRoaringBitMap)
  - Analyzed the performance of Roaring bitmap union.
    - Conducted a full factorial experiment for the C library.
    - Modeled and analyzed the duration of the operation as a function of the size and densities of the sets, for both the Python and the C libraries.
    - Repository: [github.com/Ezibenroc/roaring\\_analysis](https://github.com/Ezibenroc/roaring_analysis)
- Sep/14 – Dec/14 **Platypus** [askplatyp.us](http://askplatyp.us)  
Modular and open source question answering framework.
- Developed a question parsing module in Python, with a grammatical approach (Stanford CoreNLP and NLTK libraries).
  - Framework currently used and valorized by Lexistems SAS.

## Publications

### Conference articles

- [3] 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>  
*Cluster*, 2017
- [4] Isolating Jobs for Security on High-Performance Fabrics  
Perotin, M. and Cornebize, T.  
*2017 IEEE 3rd International Workshop on High-Performance Interconnection Networks in the Exascale and Big-Data Era (HiPINEB)*, 2017
- [5] 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

### Unpublished articles

- [2] Emulating High Performance Linpack on a Commodity Server at the Scale of a Supercomputer  
Cornebize, T.; Heinrich, F. C.; Legrand, A., and Vienne, J.  
URL: <https://hal.inria.fr/hal-01654804>

### Thesis

- [1] Capacity Planning of Supercomputers: Simulating MPI Applications at Scale  
Cornebize, T.  
URL: <https://hal.inria.fr/hal-01544827>  
*June 2017*