

## Curriculum vitae

Paolo Giosué Giarrusso, MSc in Computer Science, PhD student.  
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General attitudes in programming, work and research:

- good problem solving ability, about both computer science, mathematics and mathematical modeling
- good architectural design abilities, thanks to my experience (also as project leader) in Open Source projects
- very careful coder
- good at mediating between different people
- quite fast at learning languages
- able find my way in big source trees: optimum, started hacking Jext in one-two days
- peeking through documentation: optimum, even read some specifications

Open Source Projects I worked on:

- Linux kernel (mainly UserModeLinux code, but also elsewhere, especially Virtual Memory code)
  - on UserModeLinux, I did a lot of release management work, and I maintained a stable UserModeLinux branch, as well as debugging a lot of bug reports.
- Jext
- StGit

**Past projects:**

- During my semester in Aarhus University, I worked on two software projects, both graded with a 12 (maximum mark in the Danish scale):
  - a compiler for Joos2 (a Java subset) in the dOvs course with two other colleagues (as de facto group leader)
  - and with one colleague on a Python interpreter written in C, featuring a garbage collector and a very fast interpreter (some feature limitations, but 2-3x faster than stock Python). The course was held by Lars Bak from Google, lead developer for Google V8.
- I was hired for a 3 months summer job by Intel Corp. to work on UserModeLinux, in summer 2005. Highlights:
  - participation at KernelSummit 2005 (<http://lwn.net/Articles/KernelSummit2005/>) on invitation (one of the youngest invitees)
  - in that summit, I talked with kernel "god" hacker Ingo Molnar and picked up some work he had never finished, which was about modifying the Linux virtual memory subsystem to support better UserModeLinux. I worked a whole month on the Linux VM to complete the first of his patches (<http://marc.theaimsgroup.com/?t=112508114800003&r=1&w=2>) - I improved and re-engineered it a lot. Unfortunately, I never found the time to work enough on that code to get it merged.
- For my Bachelor thesis, I have been working on a project to "compile" pre- and post-conditions, written in a OCL-like language, to AspectC++ source code which checks whether they are verified.
- Currently, I am working on a research project, with a target similar to J-Orchestra and Addistant (the latter by Shigeru Chiba), which uses his Javassist library. The aim is to modify a Java program (in bytecode form) to turn it into a distributed program, as if RMI had been used, with no source code modification. It is challenging both from the point of

view of bytecode transformation (our approach to remote proxies, while having some advantages, is much more complicated to implement), from the one of concurrent programming (here I've been implementing special concurrent collections, connection pools, and experimented with various concurrency utilities from Java), and from the performance one, as profiling the project has been important; it was also an interesting experience in tuning a program to get good results, as one has to often do on some kind of papers - the ones which include benchmarks.

Some peculiar features are the focus on load balancing strategies, the idea of analyzing the bytecode to try guessing whether it is CPU- or I/O- bound, and the approach to remote proxies (our proxy classes are not a subtype of the represented class, so they do not inherit any field - instead, we modify the client code).

- I designed, together with Prof. Marco Russo, University of Catania, a clustering algorithm combining ideas from ELBG (by Prof. Marco Russo himself) and gaussian mixture clustering. ELBG is not so famous maybe, but achieves one of the best performance in its field.
- I was hired for another 3 months summer job by TvBlob S.r.l. (which is working to produce a video on demand set-top box) to work on R&D on various low-level issues (Linux driver work, use of high resolution timers and integration of Secure RTP into an existing RTP streaming server), in summer 2006.
  - There, I worked with a colleague on a paper about reputation and trust, which was published in the ACM SAC '07 conference (in the TRECK track, about these topics). I would not claim it was an excellent work (it would have needed more time, at least).
- hired for a new summer job of 3 months by TvBlob S.r.l., to continue the work on integration of Secure RTP started previously, in summer 2007.
- hired by TvBlob S.r.l. again, in August 2009, to work on multimedia software, to mux audio/video encoded streams into MPEG-TS format and to improve support for the RTMP protocol.

### **Known programming languages:**

- C: optimum
- x86 assembly: basic knowledge
- Linux kernel hacking: (used to be) good. Working on UserModeLinux allowed me to start learning from the Linux core, rather than from how to write a driver, which is a big bonus. I've been among the almost 90 invitees to KernelSummit 2005 in Ottawa, and I've been acting as UserModeLinux co-maintainer since a couple of years (see <http://www.ohloh.net/accounts/Blaisorblade/>). I have not been working on this field recently.
- Linux driver hacking: I've been working on some existing drivers and improving them, though that's not my focus.
- Java : good (basic knowledge of AspectJ as well, studied in Italy).
- C++: good, never hacked big projects, but deeply used C++ STL, and some template metaprogramming (including Boost MetaProgramming Library). Also used AspectC++.
- concurrent programming: very good (experience in Java and in the Linux kernel, good understanding of various issues)
- Unix scripting (bash, sed, awk): good;
- Perl: basics;
- Python: basics, have contributed to little nice projects (StGit); also some experience with the internals of the CPython interpreter;
- functional programming: studied lambda calculus, and an introduction to Scheme and Haskell (I really like Haskell). Never worked with the ML family.
- XML: learned bases of it, SAX, some XSLT (time ago). I wrote a little SAX-based parser

- for a plugin update hand-made "web-service", when working within Jext.
- HTML - CSS - PHP basics.

### Studies:

- learned programming by the age of 8 years with QBASIC, learned Turbo Pascal and Delphi by the age of 13-14 years, and then C when I was 16 year old.
- Scientific studies at upper school starting at 2000 and ending at 2004; meantime, various good results (national victories) at Latin, Maths, Physics and Informatics Olympics; participation in 2004 Athens International Maths Olympiads; 5th place in selections for the 4 members of the Italian team for International Olympiads in Informatics.
- 2nd place at the admission selection of "Scuola Normale Superiore di Pisa" (in English, it would be called "Superior Normal School of Pisa"), the most selective Italian University, at least for Maths and Physics.  
I turned this offer down because my interests were in different areas than the main Pisa focus; among my interests there was UserModeLinux.
- BSc degree in Computer Science, with 110/110 cum laude (maximum mark in Italy).
- Msc degree in Computer Science, expected on 29 April.
- Both degrees were taken in the University of Catania plus some advanced courses in the "Superior School of Catania - Scuola Superiore di Catania" college, with access restricted by a challenging selection.
  - All my marks were either 30/30 or 30/30 cum laude (maximum mark).
- Some advanced topics or experience I had, during my courses, were:
  - Peer-to-Peer systems and simulation of network protocols with NS2
  - Proving security properties with the Isabelle interactive theorem prover and the inductive approach from L. Paulson.
  - Aspect Oriented Programming
  - "Structured Operational Semantics of a fragment of language Scheme" (a big-step one, by Furio Honsell et al.)
  - Denotational Semantics of a recursive, functional programming language
  - Cryptography (with the "provable security" approach)
  - Pattern Recognition, Artificial Neural Networks, Fuzzy logic, Data clustering
  - Montecarlo methods
  - Quantum information processing
  - Real-time systems (basics)
  - Elliptic curve cryptography
- I have studied for a semester (5 months) in Aarhus, Denmark, passing with 12 (the maximum mark) all the courses I took, which were:
  - Compilation (dOvs)
  - Design and Implementation of Virtual Machines for Object Oriented Languages (with Lars Bak)
  - Concurrency (about model checking for concurrent programs, and Java concurrency semantics)