

## Personal information

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Nationality(-ies) Spanish  
Date of birth April 27th, 1982

## Summary

I am a passionate compiler engineer with more than **10 years of experience** in compiler development.

My background includes parallel programming models, high performance computing and computer architecture. I have contributed to the development of research and prototype implementations of several language constructs that have ultimately been incorporated into the OpenMP industrial standard for parallel programming.

I have recently shifted my career from research to product compiler development.

## Experience

ARM Limited Apr 2016 – present Senior software engineer

Working as a software engineer in the Compilation Team of the Development Solutions Group in Cambridge, UK. This team works on the ARM Compiler 6, based in the open source LLVM compilation infrastructure. This compiler is targeted at customers of ARM-based embedded solutions.

My main contributions have been in the area of integration of features that help customers of the previous ARM Compiler 5 in the migration to ARM Compiler 6. Some of the work has been contributed to the open source LLVM project.

**Skills:** C, C++, LLVM compilation framework, clang front end, ARM assembler, ARM architecture

Barcelona Supercomputing Center Dec 2005 – Apr 2016 Lead compiler designer and developer

Lead designer and developer of the Mercurium C11/C++11/Fortran 95 source-to-source compiler in the Programming Models group (<http://pm.bsc.es>). Mercurium is a compilation infrastructure for fast prototyping in research of parallel programming models and High Performance Computing.

My main contributions and achievements in Mercurium have been:

- Design and implementation of a common intermediate representation to support at the same time C11, C++11 and Fortran 95 while retaining the source-to-source capability
- A prototype implementation of compiler support for OpenMP 3.0 tasks
- Implementation of dependences in OmpSs (included in OpenMP 4.0)
- Implementation of an analysis phase for OpenMP 4.0 tasks aimed at detecting a common correctness issue
- A prototype implementation of OpenMP 4.0 user-defined reductions
- Design and implementation of a multifile mechanism for single-source compilation for heterogeneous architectures (GPUs, Xeon Phi, Clusters, FPGAs)
- Implementation of OpenMP support for Intel OpenMP RTL, GNU GOMP and Nanos++ (<http://pm.bsc.es/nanox>) runtimes
- Extend the internal representation to accommodate vectorization for an implementation of the OpenMP 4.0 SIMD constructs and backends for Intel Xeon Phi and a research architecture with long vectors.

**Skills:** C, C++, Fortran, Python, HPC, OpenMP, OpenCL, compiler development, parallel programming, algorithms, parallel programming models, compiler front end, source-to-source compiler transformations, compiler analyses, data flow, performance analysis

## Education

- 2006 – 2008 Master in Computer Architecture, Network and Systems. Departament d'Arquitectura de Computadors (DAC, *Computer Architecture Department*). Universitat Politècnica de Catalunya (UPC, *Technical University of Catalonia*), Spain.
- 2000 – 2005 5-year Degree in Computer Engineering, Facultat d'Informàtica de Barcelona (FIB, *Barcelona School of Informatics*). Universitat Politècnica de Catalunya (UPC, *Technical University of Catalonia*), Spain.

## Spoken languages

English: Advanced

Spanish: Native

Catalan: Native

## Academic Publications

- ICS 2015 Optimizing Overlapped Memory Accesses in User-directed Vectorization  
CF 2015 Compiler analysis for OpenMP tasks correctness  
IWOMP 2010 A Proposal for User-Defined Reductions in OpenMP  
ICPP 2009 BOTS: Barcelona Openmp Tasks Suite. A set of benchmarks targeting the exploitation of task parallelism in OpenMP  
IJPP 2009 A Proposal to Extend the OpenMP Tasking Model with Dependent Tasks  
LCPC 2009 Unrolling Loops Containing Task Parallelism

## Other

- At BSC, I trained my department about Fortran 95 and C++11
- Knowledge of x86 assembler
- Knowledge of ARM assembler  
I have a blog on this topic at <http://thinkingeek.com/arm-assembler-raspberry-pi/>
- Experience with GCC plugins  
<https://github.com/rofirrim/gcc-plugins>
- Experience with GCC front ends  
<http://thinkingeek.com/gcc-tiny/>
- At BSC, I reported several actual bugs in the C++ and Fortran front ends of GCC along with testcases and patches.  
<https://goo.gl/rzzGSJ>
- I am the author of *Eiciel* a graphical plugin for *GNOME Files* (formerly *Nautilus*)  
<http://rofi.roger-ferrer.org/eiciel>  
<https://github.com/rofirrim/eiciel>

*References available upon request*