

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.

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.

Experience

Barcelona
Supercomputing Center

June 2018 – present Senior Researcher

I work as the coordinator of the compiler and programming model activities at BSC part of the European Processor Initiative. This task involves a team of other engineers and researchers working on LLVM, OpenMP and RISC-V.

Skills: C++, LLVM compilation framework, OpenMP, RISC-V, compiler development, team coordination

Arm Limited

Apr 2016 – May 2018 Senior Software Engineer

I worked as a software engineer in the Arm Compiler team of the Development Solutions Group in Cambridge, UK. This team worked on the Arm Compiler 6, based on the open source LLVM compilation infrastructure, and the legacy Arm Compiler 5. These compiler solutions were targeted at customers of Arm-based embedded and bare-metal solutions.

I was the team lead of the product team of the Arm Compiler team. The role involved facilitating the day-to-day activities of the team, making sure no obstacles hindered the team members, arranging the Scrum-related events and artifacts and interacting with the project stakeholders during the compiler release process.

My main technical contributions were in the area of integration of features that helped customers of the previous Arm Compiler 5 in the migration to Arm Compiler 6. Some of the work was contributed to the open source LLVM project.

Skills: C, C++, LLVM compilation framework, clang front end, Arm assembler, Arm architecture, Scrum, team leading, releases

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 of 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

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