

Rui Carlos A. Gonçalves

Curriculum Vitae

Personal Information

Name Rui Carlos Araújo Gonçalves
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Nationality Portuguese

Education

09/2009 – 04/2015 **PhD in Computer Science**, Universidades do Minho, Aveiro, e Porto, Portugal.
09/2003 – 12/2008 **BSc in Mathematics and Computer Science (5 years degree)**, Universidade do Minho, Portugal, Final grade: 17/20 (ECTS grade: A).

PhD Thesis

Title *Parallel Programming by Transformation*
Supervisors Prof. João L. Sobral, Prof. Don Batory

Work Experience

02/2017 – present **OLAP Engine Technical Director**, LeanXcale, Portugal.
Design and development of distributed query engine, with focus on analytical processing.
Technologies used: Java, Apache HBase, Apache Zookeeper, Apache Derby.

08/2016 – 01/2017 **Software Developer**, LeanXcale, Portugal.
Optimization of a distributed query engine, with focus on analytical processing.
Technologies used: Java, Apache HBase, Apache Zookeeper, Apache Derby.

05/2015 – 07/2016 **Senior Researcher**, Distributed System Group, HASLab / INESC TEC, Portugal.
Optimization of a distributed query engine, with focus on communication middleware for analytical processing.
Development of a tool for visualization of analytical queries execution.
Technologies used: Java, Apache HBase, Apache Zookeeper, Apache Derby, Java Sockets, RDMA Verbs/jVerbs.

06/2010 – 12/2013 **Researcher**, Project *GAsPar*, Universidade do Minho, Portugal.
Improvement of methodology and tools to support the derivation of optimized parallel implementations of applications, adding support for modeling Software Product Lines.
Technologies used: Java, Eclipse, Epsilon Languages, Eclipse Modeling Framework, Eclipse Graphical Editing Framework, ANTLR, SAT4J, AHEAD Tool Suite, C++, OpenMP, MPI, Java Concurrency API.

03/2012 – 08/2012 **Visiting Researcher**, The University of Texas at Austin, USA.
Study of parallelization and optimization strategies for Dense Linear Algebra algorithms, Database operations, and a Fault-Tolerant distributed system.
Technologies used: libFLAME/Elemental, C++, UpRight, AHEAD Tool Suite, Java.

- 03/2011 – 08/2011 **Visiting Researcher**, The University of Texas at Austin, USA.
Study of parallelization and optimization strategies for Dense Linear Algebra algorithms and Database operations.
Technologies used: libFLAME/Elemental, C++, Java.
- 06/2009 – 05/2011 **Researcher**, Project *PRIA*, Universidade do Minho, Portugal.
Development of a methodology and tools to support the derivation of optimized parallel implementations of applications, using an MDE approach.
Technologies used: Java, Eclipse, Epsilon Languages, Eclipse Modeling Framework, Eclipse Graphical Editing Framework.
- 12/2007 – 12/2009 **Research Assistant**, Project *AspectGrid*, Universidade do Minho, Portugal.
Development of tools to adapt applications for distributed and grid environments.
Technologies used: Java, AspectJ, Java Concurrency API, MPIJava.
- 03/2007 – 11/2007 **Research Assistant**, Project *PPC-VM*, Universidade do Minho, Portugal.
Adaptation of applications for parallel architectures, using aspect oriented techniques.
Technologies used: Java, AspectJ/AOP, Java Concurrency API.

Publications (Selected)

- R. C. Gonçalves, J. Pereira, and R. Jiménez-Peris, "An RDMA middleware for asynchronous multi-stage shuffling in analytical processing," in *DAIS '16: Proceedings of the 16th IFIP International Conference on Distributed Applications and Interoperable Systems*, pp. 61–74, 2016.
- R. C. Gonçalves, D. Batory, J. L. Sobral, and T. L. Riché, "From software extensions to product lines of dataflow programs," *Software and Systems Modeling*, vol. 16, no. 4, pp. 929–947, 2017.
- R. C. Gonçalves, *Parallel Programming by Transformation*. PhD thesis, Universidades do Minho, Aveiro, e Porto, 2015.
- R. C. Gonçalves, D. Batory, and J. L. Sobral, "ReFIO: an interactive tool for pipe-and-filter domain specification and program generation," *Software and Systems Modeling*, vol. 15, no. 2, pp. 377–395, 2016.
- D. Batory, R. Gonçalves, B. Marker, and J. Siegmund, "Dark knowledge and graph grammars in automated software design," in *SLE '13: Proceeding of the 6th International Conference on Software Language Engineering*, pp. 1–18, 2013.
- T. L. Riché, R. C. Gonçalves, B. Marker, and D. Batory, "Pushouts in software architecture design," in *GPCE '12: Proceedings of the 11th International Conference on Generative Programming and Component Engineering*, pp. 84–92, 2012.
- T. L. Riché, D. Batory, R. C. Gonçalves, and B. Marker, "Architecture design by transformation," Tech. Rep. TR-10-39, The University of Texas at Austin, Department of Computer Science, 2010.
- R. C. Gonçalves and J. L. Sobral, "Pluggable parallelization," in *HPDC '09: Proceedings of the 18th ACM international symposium on High Performance Distributed Computing*, pp. 11–20, 2009.
- E. Sousa, R. C. Gonçalves, D. T. Neves, and J. L. Sobral, "Non-invasive gridification through an aspect-oriented approach," in *Ibergrid '08: Proceeding of the 2nd Iberian Grid Infrastructure Conference*, pp. 323–334, 2008.

Talks

- 09/2016 **Quantum computing simulation**, Workshop on Quantum Materials and Quantum Technologies, INL, Portugal.
- 07/2016 **CumuloNimbo: A Cloud Scalable SQL Database**, Encontro Técnico Porto Linux, UPTEC, Portugal.

11/2012 ***Design by Transformation: Encoding Domain Knowledge to Derive Optimized Program Architectures***, Universidad Jaume I, Spain.

Complementary Training

- 06/2016 **International Conference on Distributed Applications and Interoperable Systems**, Greece.
Topics: Decentralized Systems; Data Processing and Computing; Byzantine Fault Tolerance; Resource Management; Complex Event Processing.
- 06/2014 **International Summer School on Parallel High Performance Computing using Accelerators**, Universidade do Minho / Portugal.
Topics: Algorithm styles suitable for accelerators; Architectural and compiling performance considerations for accelerators; Thinking skills for accelerating applications in science and engineering.
- 10/2012 **International Conference on Model Driven Engineering Languages & Systems 2012**, Austria.
Topics: Modeling languages, techniques and tools; Quality assurance (analysis, testing, verification) for models and model transformations.
- 05/2011 **Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing 2011**, USA.
Topics: FLASH Framework for high-performance computing; Heterogeneous parallelism with domain specific languages; Sustainable software model for scientific simulation.
- 01/2011 **Winter Advanced Computing Seminars**, Universidade do Minho / Portugal.
Topics: Overview of parallel applications and algorithms; Irregular Applications on GPU; State of the Art in Parallel Languages; GPU programming, as a co-processor device; Towards a science of parallel programming.
- 07/2010 **SciPy 2010**, USA.
Topics: High Performance and Parallel Computing in Python; GPUs and Python: PyCuda, PyOpenCL, Advanced NumPy.
- 01/2010 – 05/2010 **Software Design course**, The University of Texas at Austin / USA.
Final grade: A.
- 01/2010 – 05/2010 **Parallel Systems course**, The University of Texas at Austin / USA.
Final grade: A-.
- 01/2010 – 05/2010 **Introduction to Mathematical Logic course**, The University of Texas at Austin / USA.
Final grade: A.
- 07/2009 **Summer School on Generative and Transformational Techniques in Software Engineering 2009**, Portugal.
Topics: Software Product Line Refactoring; TXL Source Transformation Cookbook; Chasing Diagrams in the Mapping Forests of Model Transformations; Generating Language Tools with JastAdd; Model Driven Language Engineering with Kermeta; Rascal Meta-programming; Slicing and Dicing Open Source Code; Theory and Practice of Modeling Language Design for Model-Based Engineering.
- 06/2009 **Advanced Seminar on Multicore Platforms**, Universidade do Minho / Portugal.
Topics: Dense linear algebra libraries: deriving high performance from abstraction; Parallelism in irregular algorithms; Data parallel programming and the hierarchically tiled arrays; Introduction to PGAS programming paradigm with UPC; Parallel computing on manycore GPUs; and Employing Intel Threading Building Blocks to utilize multi-core processors.

- 05/2009 **Spring School in Advanced Computing TACC @ UP**, Universidade do Porto / Portugal.
Topics: Advanced MPI programming; Hybrid programming with OpenMP and MPI; Profiling, optimization and debugging of code; Advanced visualization techniques; and Visualizing very large datasets.

Academic Activities

- 2014 Sub-reviewer for *Euro-Par 2014*.
2013,2014 Reviewer for *Science of Computer Programming*.
2012 Program Committee member of the *3rd Workshop on Modularity In Systems Software*.

Languages

- Portuguese Native language
English Understanding: C1 (Proficient user)
Speaking: C1 (Proficient user)
Writing: C1 (Proficient user)
TOEFL iBT: 94/120
Spanish Understanding: B1 (Independent user)
Speaking: A1 (Basic user)
Writing: A1 (Basic user)
French Understanding: A2 (Basic user)
Speaking: A1 (Basic user)
Writing: A2 (Basic user)

Organization skills and competences

- Students' delegate of the Mathematics and Computer Science degree, in the academic year 2007/2008, at Universidade do Minho.
- Member of the General Assembly of the Escola de Ciências of Universidade do Minho, from 09/2007 to 07/2008.
- Students' deputy delegate of the Mathematics and Computer Science degree, in the academic year 2006/2007, at Universidade do Minho.
- Supported the organization of events (*JOIN 2007*, *ETAPS 2007*, *Programar 2013 @ Lisboa*).

Awards

- 2009 **PhD Fellowship**, Fundação para a Ciência e a Tecnologia.
2009 **Universidade do Minho Award**, Universidade do Minho.
2008 **Best Student Paper Award**, IBERGRID 2008.
2008 **Scholar Merit Award**, Universidade do Minho.
2007 **Scholar Merit Award**, Universidade do Minho.
2006 **Scholar Merit Award**, Universidade do Minho.
2005 **Scholar Merit Award**, Universidade do Minho.