

# Curriculum Vitae - Sergio Castro

September 2014

## Professional Objective

Research and application of advanced software engineering techniques for analysing and manipulating (verifying, testing, mining, measuring, evolving, refactoring and transforming) object-oriented program source code and other kinds of software artefacts.

## Personal Data

**Last Name:** Castro  
**First Name:** Sergio  
**Professional Address:** Place Sainte-Barbe, 2. B-1348 Louvain-la-Neuve, Belgium.  
**Mobile:** (++32) 4 85 93 46 59  
**Professional E-mail:** sergio.castro@uclouvain.be  
**Personal E-mail:** sergioc78@yahoo.com  
**Nationality:** Ecuadorian  
**Place of residence:** Brussels, Belgium (Permanent residence permit).  
**Website & Programming Portfolio:** <http://www.info.ucl.ac.be/~sergio/>

## Education

### Post-Graduate Studies

Université catholique de Louvain (UCL) Louvain-la-Neuve - Belgium  
**PhD. in Engineering Sciences. Computer Science.**  
2014

Vrije Universiteit Brussel (VUB) Brussels - Belgium  
Ecole des Mines de Nantes (EMN) Nantes – France  
(double diploma program)  
**Master of Science in Computer Science:** “*European Master in Object-, Component-, Aspect-, Oriented Software Engineering Technologies (EMOOSE)*”.  
Mention: Great Distinction.  
2006

Ecole des Mines de Nantes Nantes – France  
**Certificate of specialised formation in the field of Computer Science.**  
2006

### Engineering Studies

Escuela Superior Politécnica del Litoral (ESPOL) Guayaquil – Ecuador  
**Engineering degree** in Electricity and Computer Science.  
Specialisation in Information Technology Systems (ITS).  
2004

## Research Work

### ARTICLES IN SCIENTIFIC MAGAZINES

S.CASTRO, K. MENS & P. MOURA. *Automatic Integration of Hybrid Java-Prolog Entities with LogicObjects*. To appear in the Association for Logic Programming (ALP) Newsletter. Out of Left Field track. September Issue. 2014.

### JOURNALS

S. CASTRO, K. MENS & P. MOURA. *JPC: A Library for Categorising and Applying Inter-Language Conversions Between Java and Prolog*. Science of Computer Programming: Experimental Software and Toolkits (EST 6). Elsevier North-Holland, Inc. (Under Evaluation).

S. CASTRO, C. De ROOVER, A. KELLENS, A. LOZANO & K. MENS. *Diagnosing and Correcting Design Inconsistencies in Source Code with Logical Abduction*. Science of Computer Programming: Special Issue on Software Evolution, Adaptability and Variability. V.76 N. 12 P. 1113-1129. Elsevier North-Holland, Inc. 2011.

J. BRICHAU, A. KELLENS, S. CASTRO & T. D'HONDT. *Enforcing Structural Regularities in Software using IntensiVE*. Science of Computer Programming: Experimental Software and Toolkits (EST 3). V. 75. P. 232-246. Elsevier North-Holland, Inc. 2010.

### CONFERENCES AND SYMPOSIUMS

S.CASTRO, K. MENS & P. MOURA. *Customisable Handling of Java References in Prolog Programs*. Proceedings of the International Conference on Logic Programming (ICLP) (ICLP 2014). Technical Communication. Computing Research Repository (CoRR). V. abs/1405.2693. Vienna, Austria. 2014.

S.CASTRO, K. MENS & P. MOURA. *LogicObjects: Enabling Logic Programming in Java Through Linguistic Symbiosis*. Proceedings of the 15th International Symposium on Practical Aspects of Declarative Languages (PADL 2013). V. 7752. P. 26-42. Springer Berlin Heidelberg. Rome, Italy. 2013. (Acceptance rate: 50%).

S. CASTRO, J. FABRY, K. MENS & T. D'HONDT. *A Unified Mechanism for Improving Advanced Transaction Management in Web Services*. International Conference of the Chilean Computer Science Society (SCCC 2007). P. 30-39. Chilean Society of Computer Science. Iquique, Chile. 2007. (Acceptance rate: 35%).

### PUBLISHED WORKSHOP PAPERS

S. CASTRO. *LogicObjects: A Portable and Extensible Approach for Linguistic Symbiosis between an Object-Oriented and a Logic Programming Language*. International Conference on Logic Programming (Doctoral Consortium). Theory and Practice of Logic Programming (TPLP). Special Issue 04-05. V. 13. Istanbul, Turkey. 2013.

S. CASTRO, K. MENS & P. MOURA. *LogicObjects : A Linguistic Symbiosis Approach to Bring the Declarative Power of Prolog to Java*. Proceedings of the Workshop on Reflection, AOP and Meta-Data for Software Evolution (RAM- SE'12). Co-located with the European Conference in Object-Oriented Programming (ECOOP 2012). P. 11-16. Beijing, China. 2012.

S. CASTRO, S. GONZALEZ, K. MENS & M. DENKER. *DynamicSchema: A Lightweight Persistency Framework for Context-Oriented Data Management*. Proceedings of the Workshop on Context-Oriented Programming (COP'12). Co-located with the European Conference in Object-Oriented Programming (ECOOP 2012). Beijing, China. 2012.

S. CASTRO, A. KELLENS, C. De ROOVER & K. Mens. *Generation and Composition of Corrective Actions to Structural Design Problems in Code with Heal*. Proceedings of the 9th Belgian-Netherlands Software Evolution Seminar (BENEVOL 2010), Lille, France. 2010.

J. BRICHAU, A. KELLENS, S. CASTRO & T. D'HONDT. *Enforcing Structural Regularities in Software using IntensiVE*. International Workshop on Advanced Software Development Tools and Techniques (WASDeTT 2008). Co-located with the European Conference in Object-Oriented Programming

(ECOOP 2008). Paphos, Cyprus. 2008.

S. CASTRO, J. BRICHAU & K. MENS. *Diagnosis and Semi-automatic Correction of Detected Design Inconsistencies in Source Code*. Proceedings of the International Workshop on Smalltalk Technologies (IWST 2009). Brest, France. 2009.

S.CASTRO, K. MENS & J. BRICHAU. *Towards a Taxonomy of Tools for Documenting Code Design*. Proceedings of the workshop on Query Technologies and Applications for Program Comprehension (QTAPC 2008). Co-located with the IEEE International Conference on Program Comprehension. (ICPC 2008). Amsterdam, The Netherlands. 2008.

## UNPUBLISHED WORKSHOP PAPERS

S. CASTRO, K. MENS & P. MOURA. *JPC: A Library for Modularising Inter-Language Conversion Concerns between Java and Prolog*. International Workshop on Advanced Software Development Tools and Techniques (WASDeTT 2013). Co-located with the European Conference in Object-Oriented Programming (ECOOP 2013). Montpellier, France. 2013.

S. CASTRO, A. KELLENS, C. De ROOVER & K. MENS. *Diagnosis and Correction of Structural Design Inconsistencies in Software*. 8th Belgian-Netherlands Software Evolution Seminar (BENEVOL 2009), Louvain-la-Neuve, Belgium. 2009.

S. CASTRO and J. BRICHAU & K. MENS. *Towards an Automated Tool for Correcting Design Decay*. 7th Belgian-Netherlands Software Evolution Seminar (BENEVOL 2008), Eindhoven, The Netherlands. 2008.

## TECHNICAL REPORTS

A. HUBAUX, A. CLEVE, P. SCHOBBERNS, A. KELLER, O. MULIAWAN, S. CASTRO, K. MENS, D. DERIDDER & R. VAN DER STRAETEN. *Towards a Unifying Conceptual Framework for Inconsistency Management Approaches: Definitions and Instantiations*. Research report. FUNDP, Namur. Faculté d'Informatique. 2009.

## SEMINARS AND DEMONSTRATIONS

S. CASTRO, K. MENS & P. MOURA. *Towards a Software Ecosystem for Java-Prolog Interoperability*. SATToSE: Seminar on Advanced Tools & Techniques for Software Evolution. Bern, Switzerland. 2013.

S.CASTRO. *Generation of corrective actions to code design problems*. SATToSE: Seminar on Advanced Tools & Techniques for Software Evolution. Koblenz, Germany. 2011.

S.CASTRO. *Diagnosis and Correction of Structural Design Inconsistencies in Software*. SATToSE: Seminar on Advanced Tools & Techniques for Software Evolution. Clapiers, France. 2010.

S.CASTRO. *Inconsistency Management in Source Code with Abductive Logic Programming*. SATToSE: Seminar on Advanced Tools & Techniques for Software Evolution. Baie de Somme, France. 2009.

J. BRICHAU, A. KELLENS, K. MENS & S. CASTRO. *The Intensive Tool Suite*. Working Conference on Reverse Engineering (WCRE). Antwerp, Belgium. 2008.

S.CASTRO. *Towards Semi-automatic Inconsistency Management Between Design Regularities and Source Code*. SATToSE: Seminar on Advanced Tools & Techniques for Software Evolution. Waulsort, Belgium. 2008.

## Dissertations

### PhD thesis

*A Portable Approach for Bidirectional Integration between a Logic and a Statically-Typed Object-Oriented Programming Language.*

Université catholique de Louvain, Belgium. September 2014.

Promoter: Prof. Dr. Kim Mens.

Jury:

Prof. Dr. Charles Pecheur (President). UCL, Belgium

Prof. Dr. Anthony Cleve (Secretary). UNamur, Belgium.

Prof. Dr. Paul Tarau. University of North Texas, USA.

Dr. Jan Wielemaker. Vrije Universiteit Amsterdam, the Netherlands.

### Master thesis

*ACTA Dependencies as a Unified Mechanism for Compensation, Activities Synchronization and Functional Replication in BPEL4WS.*

Vrije Universiteit Brussel, Belgium. August 2006.

Promoter: Prof. Dr. Theo D'Hondt. Advisor: Prof. Dr. Johan Fabry.

Score: 18/20.

### Engineering thesis

*Analysis, Design and Implementation of a Code Generator System for the Interpretation of Distinct Call Detail Records (CDRs) Formats.*

Escuela Superior Politécnica del Litoral, Ecuador. December 2004.

Promoter: Prof. Dr. Xavier Ochoa.

This software was conceived as the initial module of a complex Convergent Mediation system and was successfully deployed in an Ecuadorian Telecom company. The main technologies involved in the system were Java and XML related specifications.

Score: 10/10.

## Programming Portfolio

- **Java-Prolog Connectivity (JPC)** (<https://github.com/java-prolog-connectivity/jpc>)  
JPC is a Java-Prolog interoperability library providing different levels of integration abstractions. One of the core JPC components consists of a module in charge of inter-language conversions between Java and Prolog artefacts. In many aspects, the implementation of this module is inspired by Google's Gson, a state of the art library for accomplishing conversions between Java and JSON artefacts. JPC is currently compatible with three of the most popular open-source Prolog engines: SWI, YAP and XSB Prolog.
- **LogicObjects** (<https://github.com/java-prolog-connectivity/logicobjects>)  
LogicObjects extends JPC by providing the necessary means for the automatic integration of hybrid Java and Prolog entities. In this way, routines between the two worlds can be invoked transparently and foreign language artefacts can be referenced as local ones.
- **JConverter** (<https://github.com/jconverter/>)  
JConverter generalises the inter-language conversion techniques originally defined in JPC. It defines an architectural pattern for accomplishing type-guided conversions between arbitrary artefacts in Java.
- **JGum** (<https://github.com/jgum/>)  
JGum allows to create and manipulate different kinds of categorisations in Java. The notion of categories plays a major role in computer programming. However, for statically-typed languages it is often not trivial (or not possible at all) to modify at runtime the properties of existing categories or create new categories on the fly. With JGum, a programmer can define and manipulate ad hoc categorisations, as well as easily organise categories relying on existing Java categorisation

mechanisms, such as classes and packages. JGum categorisations are at the core of other libraries implemented in the context of this dissertation.

- **Heal** (<http://soft.vub.ac.be/SOUL/applications/heal-diagnose-and-correct-program-irregularities/>)  
Heal is a SOUL library for diagnosing and correcting design inconsistencies in Smalltalk by means of logic abductive reasoning and inter-language reflection.

## Professional Experience

### **From September 2008 until present**

Université catholique de Louvain, Belgium. (<http://www.uclouvain.be/en-icteam.html>).

*Role:* Teaching and research assistant (**from 2007 to 2008** I had an academic grant).

*Responsibilities:* Ranged from developing and supervising exercises in situ for the students to the design and evaluation of homeworks and major projects.

The courses where I was assistant were part of the bachelor (in French) and master (in English) programs. They typically had 20 to 50 students registered.

*Covered subjects:* software metrics, logic programming, object-oriented programming design and implementation, requirements engineering, data structures and databases.

*Programming languages and platforms:* Smalltalk (Pharo and VisualWorks), Java, Android, and web development technologies.

### **From December 2006 to February 2007**

Inter-American Center of Tax Administrations, Panama (<http://www.ciat.org/in/index.asp>).

*Role:* Software consultant (programmer).

*Project goal:* Last stage of the implementation of a Customs software system for the Guatemala Government. Accelerated software development program.

*Technologies involved:* the project was related to JEE technologies and frameworks, Workflow Management and Business Document Administration.

### **From February 2002 to December 2004**

Yoveri S.A., Ecuador (<http://yoveri.com/>).

*Role:* Due to the outsourcing nature of this Ecuadorian company, I was involved in the design and implementation of software solutions for several Ecuadorian enterprises (mainly TELECOMS), some of them were:

#### **LINKOTEL S.A. (from February 2004 to December 2004)**

Implementation of a code generator system for the interpretation of distinct Call Detail Records (CDRs) formats. Since my employer and my university had cooperation programs, I developed this system both as part of my professional work and as my engineering thesis.

#### **CONECEL S.A. (from October 2002 to January 2004)**

Technical analysis, implementation leader and software cycle support for a CRM system based in N layers architecture. The involved technologies were: Oracle 9i Data Base and an OracleAS10G Application Server. The system was based on the JEE specification.

#### **PACIFICTEL S.A. (from February 2002 to September 2002)**

Implementation of billing applications using technologies and products related to Oracle like ORACLE DEVELOPER 6i and ORACLE DESIGNER. The work also involved the manipulation of huge volumes of data using PL/SQL programming and occasionally the development of C software modules.

## Additional Activities During Academic Life

### During Doctoral training

Student volunteer chair at the International Conference on Aspect-Oriented Software Development (AOSD 2008). Brussels, Belgium.

Co-organization chair of the following academic events:

- Seminar on Advanced Tools & Techniques for Software Evolution (SATToSE), Waulsort, Belgium. February 2008.
- BELgian-NEtherlands EVOLution Workshop (BENEVOL). Louvain-la-Neuve, Belgium. December 2009.

During my PhD I also served as a co-advisor or reader of the following master theses:

- *Implementing Context-Aware Mobile Applications through Dynamic Reification of a Database Model*. Espoir Gahungere. Université catholique de Louvain. Promoter: Prof. Kim Mens, Sergio Castro. 2013.
- *Un Outil d'Analyse de la Qualité du Code Destiné aux Étudiants de Première Année de Baccalauréat*. Nicolas Muller. Université catholique de Louvain. Promoter: Prof. Kim Mens. 2010.
- *Definition and Verification of Structural Regularities in Enterprise Java Beans Applications*. Laurent Lantsoght. Université catholique de Louvain. Promoter: Prof. Kim Mens. 2009.

### During Master training

Student volunteer chair at the European Conference on Object-Oriented Programming (ECOOP 2006). Nantes, France.

### During Engineering training

Teaching assistant in the subjects of “Data Structures” and “Programming Fundamentals”.

## Grants

DESAFIOS scholarship (<http://www.becadesafios.com>).

Scholarship offered to Latin American engineers to take part in Master degree programs in Europe.  
Covered: EMOOSE master training tuition fees (10000 Euros).

Grant on the MoVES project sponsored by the Belgian Science Policy.

(<http://www.belspo.be/belspo/fedra/proj.asp?l=en&COD=P6/39>).

Covered: First fifteen months of my doctoral training.

## Languages Competences

Language	Observation
English	Fluent (English spoken at home).
Spanish	Native.
French	Advanced reading skills. Upper-intermediate written and oral communication. (French speaking working environment).

## Other Competences

- Strong background in software engineering in general and object-oriented programming in particular.
- Genuinely passionate and curious about software engineering research.
- Experience in several programming languages: Java, Prolog, Logtalk, Smalltalk, SQL, JavaScript. Some knowledge of Scala and previous experience (may need refreshing) in C, C++, PL/SQL.
- Quick learner of new programming languages and programming paradigms.
- Persistence and imagination in solving nontrivial unstructured problems.
- Well-travelled international background and being used to work in a multi-cultural heterogeneous environment.

## Personal Interests

On the personal side I am often enthusiastic about travelling, backpacking and seeing the world. Interacting with new cultures and learning about different ways of perceiving life and interpreting reality are among my most valued memories.

## References

Prof. Dr. Paul Tarau  
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Department of Computer Science and Engineering  
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Phone: ++1-940-565-2806  
E-mail: [tarau@cs.unt.edu](mailto:tarau@cs.unt.edu)  
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École Polytechnique de Louvain (EPL)  
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Phone: +32 10 47 91 11  
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URL: <http://www.info.ucl.ac.be/~km>