

# Mauricio Toro-Bermúdez

Address: 351, cours de la Libération. Talence . France.  
Phone : +33(0)5 4000 24 84 Fax : +33(0)5 400 66 69.

mauriciotorob \*[at] gmail.com  
<http://www.labri.fr/perso/mtoro/>  
27th September 2012.

## Research Interests

Ecological Models, Process Calculi, Multimedia Interaction, Semantics of Signal Processing Languages, Concurrent Constraint Programming, Temporal Constraint Programming, and Formal Verification of Computer Software

## Education

- **University of Bordeaux 1 / LaBRI** Bordeaux, France  
*Ph.D. in Computer Science. Thesis: "Structured Interactive Scores"* 2009 – 2012
  - **Summa cum laude** distinction (*mention très honorable*).
  - Under supervision of Prof. Myriam Desainte-Catherine and Prof. Camilo Rueda.
  - **Stay abroad:** Two three-month visits to the AVISPA team, U. Javeriana Cali, Colombia.  
One week visit to the Comète team, LIX, École Polytechnique, France.
- **Pontificia Universidad Javeriana de Cali** Cali, Colombia  
*Computer Science and Engineering* 2003– 2009
  - 5 years of courses + research thesis + 1 year internship.
  - Eng. thesis "Extension to the Concurrent Constraint Factor Oracle Model for Music Improvisation" under supervision of Prof. Camilo Rueda and Dr. Gerardo Sarria.
  - **Honor mention.** Rank 1 out of 15. Cumulative GPA: 4.5 (out of 5.0).
- **Legacy High School** Broomfield, CO, USA  
*High school exchange student. Honorary diploma. GPA: 3.8 (out of 4.0).* 2002– 2003

## Work Experience

- **ENSEIRB Engineering School** Bordeaux, France  
*Lecturer* 2009 – 2011
  - **Courses:** Object-oriented programming, C++ programming, and C programming.
  - Conducted problem solving of selected exercises in class; graded assignments and quizzes.
- **Pontificia Universidad Javeriana de Cali** Cali, Colombia  
*Junior Researcher* 2009
  - Developing interpreters and automatic verification tools for Concurrent Constraint Programming (CCP).
- **Institut de Recherche et Coordination Acoustique/Musique (IRCAM)** Paris, France  
*Intern. Under supervision of Prof. Camilo Rueda and Dr. Gérard Assayag* 2008
  - Real-time interpreter for the Non-deterministic timed concurrent constraint (NTCC) calculus.
  - Interfaces for the interpreter for OpenMusic, Pure Data and Max/Msp.
  - Concurrent constraint models for music improvisation.
  - Wrapper for the constraint solving Gecode library to Common Lisp to solve music constraint problems (Gelisip).
- **Pontificia Universidad Javeriana de Cali** Cali, Colombia  
*Teaching Assistant* 2004 – 2007
  - **Courses:** Introduction to computer programming, Data structures, Object-oriented programming, Formal verification, Software engineering and Artificial intelligence.

## Selected Publications

- M. Toro-Bermúdez, M. Desainte-Catherine and C. Rueda. Formal semantics for interactive music scores: A framework to design, specify properties and execute interactive scenarios. *Journal of Mathematics and Music*. Accepted. To be published in late 2012.
- M. Toro-Bermúdez, M. Desainte-Catherine and J. Castet. An Extension of Interactive Scores for Multimedia Scenarios with Temporal Relations for Micro and Macro Controls. In Proc. of SMC '12, Copenhagen, Denmark, July 2012.

- A. Allombert, M. Desainte-Catherine, and Toro-Bermúdez. Modeling temporal constraints for a system of interactive scores. In G. Assayag and C. Truchet, editors, *Constraint Programming in Music*, Chapter 1, pages 1-23. Wiley, Hoboken, NJ, USA., 2011.
- C. Olarte, C. Rueda, G. Sarria, Toro-Bermúdez, and F. Valencia. Concurrent constraints models of music interaction. In G. Assayag and C. Truchet, editors, *Constraint Programming in Music*, Chapter 6, pages 133-153. Wiley, Hoboken, NJ, USA., 2011.
- M. Toro-Bermúdez and M. Desainte-Catherine. Concurrent Constraints Conditional-Branching Timed Interactive Scores. In *Proceedings of SMC 2010*, Barcelona, Spain. July, 2010. Download
- M. Toro-Bermúdez. Structured Interactive Musical Scores. In *Proceedings of ICLP Doctoral Consortium 2010*, Edinburgh, Scotland. July, 2010. Download
- M. Toro-Bermúdez, C. Rueda, G. Assayag, C. Agón. Ntcrcrt: A Concurrent Constraint Framework for Real-time Interaction. In *Proceedings of ICMC 2009*, Montreal, Canada. August, 2009. Download
- J. Aranda, C. Olarte, J. Pérez, C. Rueda, M. Toro-Bermúdez, F. Valencia. An Overview of FORCES: An INRIA Project on Declarative Formalism for Emergent Systems. *Proc. of the 25th International Conference on Logic Programming (ICLP 2009)*, volume 5649 of *Lecture Notes in Computer Science*, pages 509-513, Springer, July 2009. Download

## Attended Conferences and Talks

- **Full paper presentation** in the Sound and Music Conference (SMC) 2012 at Copenhagen, Denmark. Talk title: “An Extension of Interactive Scores for Multimedia Scenarios with Temporal Relations for Micro and Macro Controls”. Expected July, 2012.
- **Invited speaker** at University of California Santa Barbara and Griffith University, Brisbane. Talk title: “What are Interactive Scores?”. August, 2011.
- **Assisted** to the International Conference on Mathematics and Music (MCM) 2011 at Paris, France. June, 2011.
- **Full paper presentation** in the SMC 2010 at Barcelona, Spain. Talk title: “Concurrent Constraints Conditional-Branching Timed Interactive Scores”. July, 2010.
- **Extended abstract presentation** in the International Conference in Logic Programming (ICLP) Doctoral Consortium 2010 at Edinburgh, Scotland. Talk title: “Structured Interactive Musical Scores: Towards a Computational Modeling of a Heterogeneous System”. July, 2010.
- **Full paper presentation** in the Journées d’Informatique Musicale at Rennes, France. Talk title: “A Model for Interactive Scores with Temporal Constraints and Conditional Branching”. May, 2010.
- **Speaker** in the internal workshop of the Modeling and Verification Team at LABRI, at Bordeaux, France. Talk title: “Towards a Computational Modeling of an Heterogeneous System for Interactive Scores”. February, 2010.
- **Short paper presentation** in the International Computer Music Conference (ICMC) 2009 at Montreal, Canada. Talk title: “Ntcrcrt: A Concurrent Constraint Framework for Real-time Interaction”. August, 2009.
- **Speaker** in the seminar of mathematics, music and its relation with other disciplines: MaMux at Paris, France. Talk title: “Ntcrcrt: A Concurrent Constraint Framework for Signal Processing Languages”. 2008.

## Software

- Model checker for the Non-deterministic timed concurrent constraint (NTCC) calculus. Download
- Real-time interpreter for NTCC and interfaces to OpenMusic, Pure Data and Max/Msp. Download
- Wrapper for Gecode library to Common Lisp (Gelisp). Download

## Other Academic Activities

- I participated in the writing of Colciencias REACT+, and ANR INEDIT and OSSIA projects, which started in 2012.
- I was **reviewer** for the Sound and Music Computing (SMC) conference in 2012.
- I was **reviewer** of an Engineering thesis defense at Universidad del Valle in 2011.
- I **supervised** Software Engineering Master student internships at Université de Bordeaux in 2010.

## Scholarships, Honors and Awards

- French ministry of Research and Education (MENRT) grant for Ph.D. 2009.
- Honor mention for leadership and academic achievements. Engineering graduation ceremony. 2009.
- Ranked top 10% (within approx. 8000 CS graduates) at the Colombian Compulsory Engineering Exam. 2009.
- Scholarship for having highest GPA in 2005 among all computer science students. 2005.

## Skills

**Programming:** C/C++, Java, Python, Common Lisp, Pure Data, OpenMusic, L<sup>A</sup>T<sub>E</sub>X, Faust and HTML.

**Formalisms:** Concurrent Constraint Programming, Context-sensitive grammars, Finite State Automata, Linear-time Logic, CSP, Pi-Calculus, Temporal Constraint Programming, Constraint Satisfaction and Timed Event Structures.

**Languages:** Spanish (Native), English (Fluent), French (Advanced), Italian and German (Basic).

## Student activities

- **Université de Bordeaux Waterpolo club** Bordeaux, France  
*Member* 2009 – 2012
  - Player.
- **Association de la formation doctorale en informatique de Bordeaux** Bordeaux, France  
*Member* 2009 – 2011
  - Helped organizing coffee breaks and meetings.
- **Pontificia Universidad Javeriana Fusion-Music Band: Ensemble** Cali, Colombia  
*Member* 2009
  - Guitarrist.
- **Pontificia Universidad Javeriana Cali Linux Enthusiast Users** Cali, Colombia  
*Member* 2006 – 2009
  - Coordinated a project to donate computers for a limited-resources school; participated in seminars and opensource software installation workshops; coordinated fund-raising activities.
- **Pontificia Universidad Javeriana Jazz Band: JazzTa** Cali, Colombia  
*Member* 2005 – 2007
  - Guitarrist.
- **Pontificia Universidad Swimming Team** Cali, Colombia  
*Member* 2003 – 2009
  - Sprinter. Classified to Colombian Swimming University National Championship in 2006.

## References

Upon request.