

JAIME ARIAS

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<https://himito.github.io>

Personal Information

Given Name: Jaime Eduardo
Last Name: Arias Almeida

Birth Date: 15/04/1989
Birthplace: Cali, Colombia

Citizenship: Colombian
Marital Status: Married

Research Interests

Formal specification and verification of timed and reactive concurrent systems, interactive multimedia systems, concurrent constraint programming, and embedded systems.

Experience

- **R&D Engineer** at *Inria Grenoble Rhône-Alpes* **2016 - Present**
Montbonnot, France
My main objective is to improve the functional MRI inference software `PyHRF` in order to make it user-friendly and usable by non experts and clinicians. To this end, I work in a multidisciplinary group composed of statisticians from the research team `MISTIS` and neuroscientists from `GIN`.
- **R&D Engineer** at *Inria Bordeaux Sud-Ouest* **2015 - 2016**
Bordeaux, France
I was in charge of developing in `HASKELL` a formal framework for writing and executing interactive systems. For that, I worked with computer scientists from `LaBRI` and artists from `SCRIME`. Moreover, I developed in collaboration with `Shlomo Dubnov`, a system to create interactive music pieces from a formal specification.
- **Teaching Assistant** at *Grande École d'Ingénieurs ENSEIRB-MATMECA* **2014 - 2015**
Bordeaux, France
I supervised students during the development of the projects in the courses of compilers and programming languages (in C).
- **Ph.D. Student** at *Université de Bordeaux* **2013 - 2015**
Bordeaux, France
I developed a complete framework for the specification and automatic verification of interactive multimedia scenarios using formal methods such as Timed Automata, Synchronous Languages, Colored Petri Nets, and Linear Logic. Moreover, I proposed a true parallel implementation of these scenarios on a reconfigurable hardware (FPGAs) for their low-latency and real-time interpretation.
- **Young Researcher** at *AVISPA Research Group* **2012 - 2012**
Cali, Colombia
I developed and implemented a Model Checking algorithm for the timed concurrent constraint calculus `TCC`. This algorithm was the first step in the development of both the plain and the symbolic model checker for the `NTCC` calculus (a non-deterministic extension of `TCC`). I implemented the symbolic model checker in `OCAML`.
- **Teaching Assistant** at *Pontificia Universidad Javeriana* **2011 - 2012**
Cali, Colombia
I was a teaching assistant on the following courses: analysis and design of algorithms, computability and formal languages, foundations and data structures of programming, object-oriented programming, introduction to programming, digital signal processing, computer architecture, and digital systems.
- **Research Assistant** at *Pontificia Universidad Javeriana* **2010 - 2010**
Cali, Colombia
I designed and taught courses on `TeX` and hardware implementation on FPGAs. Also, I was in charge of the electronics laboratory.

Education

- **Ph.D. in Computer Science** at *Université de Bordeaux, France*. **2012 - 2015**
Thesis: *Formal Semantics and Automatic Verification of Hierarchical Multimedia Scenarios with Interactive Choice*
Supervisors: Prof. Myriam DESAINTE-CATHERINE and Prof. Camilo RUEDA
- **Engineering Degree in Computer Science** at *Universidad Javeriana, Colombia*. **2011 - 2012**
Thesis: *Model Checking for tcc Calculus*
Supervisors: Dr. Carlos OLARTE and Dr. Eugenio TAMURA
- **Electronics Engineering Degree** at *Universidad Javeriana, Colombia*. **2005 - 2010**
Thesis: *Model Checking for tcc Calculus*
Supervisors: Dr. Carlos OLARTE and Dr. Eugenio TAMURA

Distinctions

- Doctoral Scholarship for a 3-year Ph.D. studies from ANR (the French National Research Agency). **2012**
- Laureate thesis award from Pontificia Universidad Javeriana (*twice*). Highest honor distinction for outstanding research in both Computer Science and Electronics Engineering undergraduate programs. **2013**
- Young research scholarship in the REACT+ project, a joint project between École Polytechnique de Paris, IRCAM and Javeriana University. **2012**
- Honorable mention from Pontificia Universidad Javeriana for *highest GPA* in Computer Science undergraduate program. **2011**
- Honorable mention (**3 times**) from Pontificia Universidad Javeriana for *highest GPA* in Electronics Engineering undergraduate program. **2006-2007**
- Honorable mention from Instituto Técnico Industrial San Juan Bosco (High School) given to the *best student* in the specialty of electricity. **2005**

Tools

The reader can visit my Git repository (<https://github.com/himito>) to see the full list of my developments.

- **VMO-Score** (🐍 python): Tool to create an interactive score from an audio recording. The resulting I-SCORE score allows to control the improvisation carried out by the system VMO. **Demo:** <http://bit.ly/2nW9waw>
- **tccMChecker** (🐍 python): Model checker for the timed concurrent constraint calculus TCC.
- **SyMoN** (🦊 ocaml): Symbolic model checker for a non-deterministic timed concurrent constraint calculus.
- **ReactiveIS** (🦊 ocaml): Synchronous programming language for composing and interpreting interactive scores. Its operational semantics is based on labeled trees with a correspondence to linear logic (SELL).
- **IS2UPPAAL** (🦊 ocaml): Tool to translate an interactive score written in I-SCORE into its UPPAAL model for its automatic verification. This tool has been integrated into i-score as the plug-in `iscore-addon-staticanalysis`.
- **RItMos (REACTIVEML)**: Interpreter of interactive scores implemented in REACTIVEML. Thanks to its reactive approach and INScore, it provides a real-time graphical feedback of the execution state of the score.
- **FO-Haskell** (🦋 Haskell): Haskell implementation of the Factor Oracle structure for musical improvisation.
- **HINScore** (🦋 Haskell): Haskell API for the interactive system INScore. **Demo:** <http://bit.ly/2mNmPY9>.

Additional Information

- **Programming Languages:** Python, Ocaml, Haskell, C++, C, ReactiveML, and Bash.
- **Others:** OSX, GNU/Linux, \LaTeX , CSS, HTML, Javascript, Docker, and Git.
- **Languages:** Spanish (Native), French (DELFB2), and English (Fluent).
- **Hobbies:** Playing guitar, reading fantasy books, and cooking Colombian and French food.

Publications

The reader can find all my publications on my website and the HAL server (<http://bit.ly/2s54yfo>).

1. Jaime Arias, Jean-Michaël Celerier, and Myriam Desiante-Catherine. Authoring and automatic verification of interactive multimedia scores. *Journal of New Music Research*, 2016a. doi: 10.1080/09298215.2016.1248444.
2. Mauricio Cano, Jaime Arias, and Jorge A. Pérez. Session-based concurrency, reactively. In *37th IFIP WG 6.1 International Conference on Formal Techniques for Distributed Objects, Components, and Systems (FORTE 2017), Neuchâtel, Switzerland, June 19-22, 2017*, volume 10321 of *Lecture Notes in Computer Science*, pages 74–91. Springer, 2017. doi: 10.1007/978-3-319-60225-7_6.
3. Jaime Arias, Philippe Ciuciu, Michel Dojat, Florence Forbes, Aina Frau-Pascual, Thomas Perret, and Jan M. Warnking. PyHRF: A python library for the analysis of fMRI data based on local estimation of hemodynamic response function. In *15th Python in Science Conference (SciPy 2017)*, 2017. To be published.
4. Jaime Arias, Myriam Desainte-Catherine, and Shlomo Dubnov. Automatic Construction of Interactive Machine Improvisation Scenarios from Audio Recordings. In *4th International Workshop on Musical Metacreation, MUME 2016, Paris, France, June 27 – July 1, 2016*, 2016b. ISBN 978-0-86491-397-5. URL <http://bit.ly/2mCAmDZ>.
5. Jaime Arias, Michell Gúzman, and Carlos Olarte. A symbolic model for timed concurrent constraint programming. *Electronic Notes in Theoretical Computer Science*, 312:161–177, 2015c. doi: 10.1016/j.entcs.2015.04.010.
6. Jaime Arias, Myriam Desainte-Catherine, Carlos Olarte, and Camilo Rueda. Foundations for reliable and flexible interactive multimedia scores. In *5th International Conference on Mathematics and Computation in Music, MCM 2015, London, UK, June 22-25, 2015*, volume 9110 of *Lecture Notes in Computer Science*, pages 29–41. Springer, 2015a. doi: 10.1007/978-3-319-20603-5_3.
7. Jaime Arias, Myriam Desainte-Catherine, and Camilo Rueda. A framework for composition, verification and real-time performance of multimedia interactive scenarios. In *15th International Conference on Application of Concurrency to System Design, ACSD 2015, Brussels, Belgium, June 21-26, 2015*, pages 140–151. IEEE Computer Society, 2015b. doi: 10.1109/ACSD.2015.8.
8. Jaime Arias, Myriam Desainte-Catherine, and Camilo Rueda. Modelling data processing for interactive scores using coloured petri nets. In *14th International Conference on Application of Concurrency to System Design, ACSD 2014, Tunis La Marsa, Tunisia, June 23-27, 2014*, pages 186–195. IEEE Computer Society, 2014. doi: 10.1109/ACSD.2014.23.

Talks

The reader can find all my presentations on my website and the Speaker Deck site (<http://bit.ly/2saLV4Z>).

1. Jaime Arias. Git in practice. Presented as a workshop for the Inria Team Mistis in Montbonnot, France, 2017. URL <http://bit.ly/2sQgKh6>.
2. Jaime Arias. Creating static sites with pelican. Presented as a workshop for the Inria Team Mistis in Montbonnot, France, 2016b. URL <http://bit.ly/2t6bGr7>.
3. Jaime Arias. Automatic verification of interactive multimedia scenarios with branching behavior. Presented at the Colloquium of Computer Science of the University of Groningen in Groningen, the Netherlands, 2016a. URL <http://bit.ly/2sQ0dKi>.
4. Jaime Arias and Shlomo Dubnov. Automatic construction of interactive machine improvisation scenarios from audio recordings. Presented at the Workshop on Dynamics of Creative Improvisation in Bordeaux, France, 2016. URL <http://bit.ly/2sFp9FV>.
5. Jaime Arias. Towards an automatic verification of interactive scores and their real-time performance. Presented at the Journées INEDIT in Bordeaux, France, 2015. URL <http://bit.ly/2rQFJiZ>.