Germán Andrés Delbianco

IRIF - Institute de Recherche en Informatique Fondamentel
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Experience

IRIF - Université Paris Diderot   **Paris, France**
Post-doctoral Researcher   *Sep. 2017 – Sep. 2019*

- **Distributed Systems Verification.** Development of new formal verification techniques for **replicated data-structures** under **weak** and **causal consistency**. Designed novel operational and axiomatic semantics for **causal consistency**, and **causal memory**.

IMDEA Software Institute   **Madrid, Spain**
Research Associate (Ph.D. student)   *Oct. 2011 – Aug. 2017*

- **Mechanized Verification of Wait-Free Concurrency.** Developed a novel **concurrent separation logic**, FCSL, designed for full-functional verification of **concurrent algorithms**. Developed new verification techniques for **wait-free concurrent data-structures**. All these developments were mechanized in the **Coq** proof assistant. The research conducted during the thesis resulted in 4 published articles in top programming languages international conferences: ICFP, OOPSLA, ESOP, and ECOOP.

IMDEA Software Institute   **Madrid, Spain**
Research intern   *Dec. 2010 – Sep. 2011*

- **Program Verification with Control Effects.** Designed a new **separation logic** for *unstructured control-flow* (e.g., continuations and jumps), implemented in the **Coq** proof-assistant.

INRIA. Centre de Sophia-Antipolis Méditerranée   **Sophia-Antipolis, France**
Research intern with the PULSAR team   *Apr. 2008– Oct. 2008*

- **Semantics of Synchronous Languages.** Designed the type system for the **Esterel**-based *synchronous programming language* LE. Developed a type-checker in **Haskell**, which was integrated into the compiler.

Universidad Nacional de Rosario   **Rosario, Argentina**
Teaching Assistant at the Computer Science Department   *Aug. 2007 – Dec. 2010*

- Teacher Assistant for the **Data Structures and Algorithms**, **Functional Programming and Foundations of Programming Languages**, **Introduction to Category Theory**, and **Type Systems** courses. The responsibilities comprised: preparing, conducting and grading practice and lab sessions; monitoring and grading partial and final exams and giving occasional lectures.

Education

Universidad Politécnica de Madrid   **Madrid, Spain**
Ph.D. in Computer Science, Grade: Outstanding   *2017*
Dissertation: *Hoare-style Reasoning with Higher-Order Control: Continuations & Concurrency*.
Advisor: Dr. Aleksandar Nanevski, IMDEA Software Institute

Universidad Nacional de Rosario   **Rosario, Argentina**
Licenciate in Computer Science, Final Grade: 8.87 / 10.   *2010*
(Bac. + 5 degree in Computer Science.)
Thesis: *Program Calculation with Applicative Functors*.
Advisors: Dr.rer.nat Alberto Pardo, UDELAR; Dr. Mauro Jaskelioff, UNR / CIFACIS - CONICET.

Publications

A. Nanevski, A. Banerjee, <u>G. A. Delbianco</u>, and I. Fábregas. Specifying concurrent programs in separation logic: Morphisms and simulations. *Proc. ACM Program. Lang.*, 3(OOPSLA):161, 2019.

<u>G. A. Delbianco</u> and C. Enea. Verifying causally consistent key-value stores with causal cut mappings. *In submission*, 2019.

<u>G. A. Delbianco</u>, I. Sergey, A. Nanevski, and A. Banerjee. Concurrent data structures linked in time. In *31st European Conference on Object-Oriented Programming, ECOOP 2017*, 2017.

I. Sergey, A. Nanevski, A. Banerjee, and <u>G. A. Delbianco</u>. Hoare-style specifications as correctness conditions for non-linearizable concurrent objects. In *ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications, OOPSLA*, 2016.

A. Nanevski, R. Ley-Wild, I. Sergey, and <u>G. A. Delbianco</u>. Communicating state transition systems for fine-grained concurrent resources. In *Programming Languages and Systems - 23rd European Symposium on Programming, ESOP*, 2014.

<u>G. A. Delbianco</u> and A. Nanevski. Hoare-style reasoning with (algebraic) continuations. In *ACM SIGPLAN International Conference on Functional Programming, ICFP*, 2013.

<u>G. A. Delbianco</u>, M. Jaskelioff, and A. Pardo. Applicative shortcut fusion. In *Trends in Functional Programming, TFP*, 2011.

Software Projects & Tools

HTTcc: **Main contributor**. A separation logic for a stateful functional programming language with high order control operators [ICFP'13]. Developed as a *shallowly-embedded* domain-specific language (DSL) in `Coq/ssReflect`. http://delbian.co/httcc

FCSL: **Contributor**. FCSL is the first completely formalized framework for mechanized verification of full functional correctness of fine-grained concurrent programs. It is implemented as an embedded DSL in the dependently-typed language of the `Coq` proof assistant [ESOP'14, OOPSLA'16, ECOOP'17, OOPSLA'19]. http://software.imdea.org/fcsl/

Academic Service

External Review Committee: ICFP 2019

External Reviewer: iFM 2019, ESOP 2019, TACAS 2019, POPL 2019 (ERC), LICS 2018, LICS 2015, ICFP 2013, MFCS 2012.

Reviewer: Science of Computer Programming (2019).

Administrative Duties

IRIF: **Verification Seminar**: Seminar Chair & Coordinator. September 2017 – September 2019.

IMDEA Software Institute: **Theory Lunch Seminar**: Seminar Chair & Coordinator. January 2012 – July 2012