Luis Peñaranda

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Born March 2, 1980—Rosario, Argentina

Current Activities

Software engineer at SciSoft Consulting, Argentina, since 2016. Main duties include Research and Development in C++, C#, JavaScript.

Education and Past Positions

2014–2016	Tenure track professor of Computer Science at the Federal University of Rio de Janeiro (UFRJ), Brazil, since 2014.
2012–2014	Excellence post-doctoral fellow at the National Institute of Pure and Applied Mathematics (IMPA) in Rio de Janeiro, in the Visgraf group headed by Prof. Luiz Velho.
2011–2012	Post-doctoral fellow at the National Kapodistrian University of Athens, Greece, in the Laboratory of Geometric & Algebraic Algorithms headed by Prof. Ioannis Emiris.
2006–2010	*PhD* in Computer Science, Nancy University, France. Thesis: *Non-linear Computational Geometry for Planar Algebraic Curves*, adviced by Sylvain Lazard at INRIA Nancy-Grand Est.
1998–2006	*Computer Science* degree (equivalent to MSc degree), University of Rosario, Argentina.
1993–1997	*High School*, Polytechnic Institute, Rosario, Argentina.

Research and Development

Although I was always eager to explore new areas, my main research topic is *Computational Geometry*. In this field, I am interested in robustness issues in non-linear geometric algorithms, in higher dimensional geometric computing and in the applications of geometric and algebraic algorithms. I am also interested in the robust and efficient implementation of geometric, algebraic and arithmetic algorithms, being C++ my favourite language. In the last years, I biased my topic to *Computer Graphics*. In this broad field, I am mostly interested in the application of mathematical tools to visualization problems.

Consulting

During the last years, I had realized that my expertise can greatly help in industrial environments. Freelance consulting offers me a way of acquiring knowledge, thinking about problems in unexplored areas (related or not to my academic research) and applying theoretical concepts to real-life scenarios. Moreover, I am always open to embark on newer exciting areas.

Language Skills

I am able to fluently speak Spanish (my mother tongue), as well as English, French, Italian and Portuguese. I also have basic communication skills in Greek and German.

Scientific Software (only open source software is listed here)

C++   *Panoramic*: a software which uses shaders to visualize panoramic images using different projections. In particular, it permits to use the technique based on Möbius transformations we introduced so far.

C++   *HeaDDaCHe*: an implementation of Hashed Dynamic Determinants for use in geometric algorithms, such as Convex Hull and triangulation. This library consists of efficient implementations of dynamic determinant algorithms and a hash table that stores intermediate results (matrices and determinants) in order to be used in subsequent steps of the geometric algorithm.

C++   *Respol*: a software to compute a projection of the Newton polytope of the resultant of a polynomial system. Apart of being the implementation of a novel algorithm, this software incorporates improvements in the computation of many sequential determinants, which are crucial to the algorithm, thus considerably speeding-up the computation time.

Maple   *Isotop*: an implementation of the algorithm for the determination of the topology of real plane curves. This software is registered on the French Program Protection Agency.

C++   *CGAL*: the Computational Geometry Algorithms Library is the reference software in Computational Geometry. Before inclusion in this library, all code goes under a thorough review by experts in the domain chosen by the *CGAL Editorial Board*. In the context of this library, I developed a univariate algebraic kernel based on the *RS* library. This kernel contains functions to deal with univariate polynomials, such as root isolations and comparison of algebraic numbers. It was the first implementation of such a set of functions included in *CGAL*, and is bundled since March 2010 (version 3.6). I also developed interfaces for *CGAL* to the *MPFR* and *MPFI* libraries. These interfaces are included in *CGAL* since October 2009 (version 3.5).

C   *Libmug* is a library to compute the greatest common divisor of two univariate polynomials using modular arithmetic.

Certifications

2014   *Introductory Kanban.* LeanKanban University Certified Training Program.

Scientific Publications, Teaching, and more

You can find more information about me on my webpage.