

Sylvain Chevillard

Curriculum Vitæ

Inria - APICS team
Office #B201
2004, route des Lucioles - BP 93
06 902 Sophia Antipolis Cedex
FRANCE
☎ +33 4 92 38 76 42
✉ sylvain.chevillard@inria.fr

General information

Birthday Born on the 6th of May, 1983 in Paris
Personal address 22bis, rue de Paris,
06 000 Nice
FRANCE
Web page <http://www-sop.inria.fr/members/Sylvain.Chevillard/>

Scientific interests

- Polynomial approximation
- Computer arithmetic
- Harmonic analysis
- Inverse problems
- Optimization
- Numerical analysis
- Mathematical software

Career

Education

- 2010–today **Researcher**, at *INRIA*, in the *APICS* team, Sophia-Antipolis.
- 2009–2010 **Postdoc**, *CAMEL* team, in the *LORIA*, Nancy.
Efficient and fast implementation of special functions in arbitrary precision.
Under the direction of Paul Zimmermann.
- 2006–2009 **PhD Thesis in Computer Science**, *ENS*, Lyon.
Efficient evaluation of numerical functions - Tools and examples.
Under the direction of N. Brisebarre and J.-M. Muller. Defended on the 6th of July, 2009.
- 2005–2006 **Master Thesis in Computer Science**, *ENS*, Lyon.
Best approximation polynomials with floating-point coefficients.
Under the direction of Nicolas Brisebarre. Rank 1st.
- 2004–2005 **Agrégation of Mathematics**, *ENS*, Lyon.
It is the highest competitive examination to become a teacher in french secondary schools.
- 2003–2004 **Master 1 in Computer Science**, *ENS*, Lyon.
First year of a Master in Theoretical Computer Science.

Experiences in Research Laboratories

- 2004 In the *FernUniversität* of Hagen, in Germany. Practical experience in a laboratory under the supervision of Vasco Brattka and Klaus Weihrauch on the subject : *About the effectivity of Dini's theorem*.
- 2003 In the team *Arénaire* in the *Laboratoire de l'informatique et du parallélisme* (LIP) in the ENS Lyon, in France. Practical experience in a laboratory under the supervision of Nathalie Revol on the subject : *How to evaluate the function erf with correct rounding in arbitrary precision*.

Talks

- 2012 **Two talks.** Invited talk in the workgroup of the McTAO team (INRIA Sophia-Antipolis, France). Talk at the ERNSI 2012 conference in Maastricht (Netherlands).
- 2010 **Three talks.** Invited talk in the workgroup of the APICS team (INRIA Sophia-Antipolis, France). Invited speaker at the ICMS 2010 conference (Kobe, Japan). Invited talk in the workgroup of the MEASI team (CEA Saclay, France).
- 2009 **One talk.** Invited talk at Intel Corporation in Portland (Oregon, USA).
- 2008 **Three talks.** Invited talks in the Australian National University (Canberra, Australia) and in Macquarie University (Sydney, Australia). Presentation of Sollya (a software toolbox for the engineer) in the french conference *Rencontres Arithmétiques de l'Informatique Mathématique (RAIM 2)* in Lille, France. (It is a meeting of the french research community in Computer Arithmetic).
- 2007 **Six talks.** Invited talks in the workgroups of the team MC2 (ENS Lyon, France), of the team Cacao (Loria Nancy, France), of the team Algo (INRIA Rocquencourt, France), and of the GREYC (University of Caen, France). Participation to the so-called *École jeunes chercheurs du GdR IM* in Nancy, France. (It is a meeting of french PhD students in Computer Science). Presentation of a poster in the poster session of the international conference LLL+25 in Caen, France.
- 2006 **One talk.** Presentation of a joint work with Christoph Lauter entitled *Certified infinite norm using interval arithmetic* in the conference SCAN2006 in Duisburg (Germany). *Christoph Lauter gave the talk*.
- 2004 **One talk.** Presentation of my work about Dini's theorem during the workshop *Computability and Complexity in Analysis 2004* (CCA4) in Wittenberg (Germany).

Visits

- 2012 One week at Vanderbilt University at Nashville (Tennessee, USA).
- 2009 Ten days at Intel Corporation at Portland (Oregon, USA).
- 2008 Ten days in the Australian National University in Canberra (Australia) and five days in the Macquarie University in Sydney (Australia).

Software production

Sollya : it is a free software developed under the license CeCILL-C (a license equivalent to the LGPL and compatible with French law). It is available at <http://sollya.gforge.inria.fr/>. It is a tool environment for safe floating-point code development. It provides numerical routines and can work in arbitrary precision. It provides efficient routines for computing supremum norms with guaranteed bounds, computing best approximation polynomials, evaluating functions with arbitrary precision, etc. A complete documentation [10] beginning by a tutorial is available on the web page of Sollya. **Current version** : 3.0, released on May 24, 2011.

Teaching Assistant Experience

- **In 2011** : about 30 hours of exercises for the course Mathematics for Engineers in the Ecole Polytechnique Nice.
- During my PhD, I have been a teaching assistant in the ENS in Lyon (France). Here is the list of courses I taught :
 - 64 hours of practical work for an introductory course on the software COQ ;
 - 39 hours of practical work for the course Algorithmic and Programming ;
 - 32 hours of exercises for the course Introduction to Computability Theory ;
 - 32 hours of exercises for the course Turing Complexity ;
 - 32 hours of exercises for the course Computer Arithmetic.

Collective responsibilities

- 2011 I have been chairman of the Computer Arithmetic session of the french conference *Rencontres Arithmétiques de l'Informatique Mathématique (RAIM 4)* in Perpignan.
- 2006-2011 I have been a referee for the conference CCA2008 (with proceedings published in the *Electronic Notes in Theoretical Computer Science (ENTCS)*), for the special issue of *IEEE Transactions on Computers (IEEE-TC)* following the ARITH'19 conference, for the *Journal of Symbolic Computation*, and for a special issue of *Mathematics in Computer Science* on Numerical Software Verification.
- 2008 After each academic year, the students of the ENS have a work experience of six to twelve weeks in research laboratories. After this internship, they present their work to a board of examiners chosen among the members of the Computer Science department. In 2008, I organized these presentations. A part of this work was purely logistic (booking presentation rooms, scheduling the presentations, receiving the reports written by the students, distributing these reports to the reviewers, contacting the advisors of the students, etc.) and another part was related to teaching (I read some reports and participated to the board of examiners).

Computer Skills

Languages	C, Java, Ocaml, sh	Software tools	Matlab, Maple, GP, Gnuplot
Web	HTML, CSS, Javascript, PHP	Platform	Linux, Mac OS X, Windows
Typesetting	LaTeX		

Publications

A preliminary version of my publications can be downloaded from my web page.

Article in international journals (with referees)

- [1] S. Chevillard. The functions erf and erfc computed with arbitrary precision and explicit error bounds. *Information & Computation*, 216 :72 – 95, 2012. Special Issue : 8th Conference on Real Numbers and Computers.
- [2] S. Chevillard, J. Harrison, M. Joldeş, and C. Lauter. Efficient and accurate computation of upper bounds of approximation errors. *Theoretical Computer Science*, 412(16) :1523–1543, 2011.

Proceedings of international conferences (with referees)

- [3] N. Brisebarre and S. Chevillard. Efficient polynomial L^∞ -approximations. In P. Kornerup and J.-M. Muller, editors, *18th IEEE SYMPOSIUM on Computer Arithmetic*, pages 169–176, Los Alamitos, CA, 2007. IEEE Computer Society.
- [4] N. Brisebarre, S. Chevillard, M. D. Ercegovic, J.-M. Muller, and S. Torres. An Efficient Method for Evaluating Polynomial and Rational Function Approximations. In *ASAP 08, Conference Proceedings, IEEE 19th International Conference on Application-Specific Systems, Architectures and Processors*, pages 245–250, Los Alamitos, CA, 2008. IEEE Computer Society.
- [5] S. Chevillard. Automatic generation of code for the evaluation of constant expressions at any precision with a guaranteed error bound. In E. Antelo, D. Hough, and P. lenne, editors, *20th IEEE SYMPOSIUM on Computer Arithmetic*, pages 225–232, Los Alamitos, CA, July 2011. IEEE Computer Society.
- [6] S. Chevillard, M. Joldeş, and C. Lauter. Sollya : An environment for the development of numerical codes. In K. Fukuda, J. van der Hoeven, M. Joswig, and N. Takayama, editors, *Mathematical Software - ICMS 2010*, volume 6327 of *Lecture Notes in Computer Science*, pages 28–31, Heidelberg, Germany, September 2010. Springer.
- [7] S. Chevillard, M. Joldeş, and Ch. Lauter. Certified and fast computation of supremum norms of approximation errors. In J. D. Bruguera, M. Cornea, D. DasSarma, and J. Harrison, editors, *19th IEEE SYMPOSIUM on Computer Arithmetic*, pages 169–176, Los Alamitos, CA, 2009. IEEE Computer Society.
- [8] S. Chevillard and Ch. Lauter. A certified infinite norm for the implementation of elementary functions. In A. Mathur, W. E. Wong, and M. F. Lau, editors, *QSIC 2007, Proceedings of the Seventh International Conference on Quality Software*, pages 153–160, Los Alamitos, CA, 2007. IEEE Computer Society.
- [9] S. Chevillard and N. Revol. Computation of the error function erf in arbitrary precision with correct rounding. In J. D. Bruguera and M. Daumas, editors, *RNC 8 Proceedings, 8th Conference on Real Numbers and Computers*, pages 27–36, 2008.

Software documentation

- [10] S. Chevillard, M. Joldeş, and Ch. Lauter. User's Manual for the Sollya Tool, Release 3.0. Available at <http://sollya.gforge.inria.fr/>.

Theses

- [11] S. Chevillard. Polynômes de meilleure approximation à coefficients flottants. Master's thesis, École Normale Supérieure de Lyon, 46 Allée d'Italie, 69364 Lyon Cedex 07, France, 2006.
- [12] S. Chevillard. *Évaluation efficace de fonctions numériques - Outils et exemples*. PhD thesis, École normale supérieure de Lyon, Université de Lyon, 46, allée d'Italie, 69 364 Lyon Cedex 07, 2009.