Simon Tournier

Born the 23^{rd} June 1983 in Montpellier (France)
French

Dept. of Mathematical Eng.
Pontificia Universidad Católica de Chile
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Modeling and Analysis in Computational Electromagnetism and Acoustic, Preconditionning techniques, Homogenization, Domain Decomposition Method, Scientific Programming

Academic Background and Experiences

2014 – (2016) **Post-doctoral** position in the PUC (Chile) [FONDECYT grant : 3150446]
under the supervision of Carlos Jerez-Hanckes,
Efficient and Robust HPC Solver for Multiple Traces Formulations for Engineering Applications.

2012 – 2013 **Post-doctoral** position in the University of Liège (Belgium), in the ACE team,
under the supervision of Christophe Geuzaine,
Study of some preconditioning techniques for Finite Elements Methods and Decomposition of Domain Method.

2007 – 2012 **PhD** from Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), Toulouse,
under the supervision of Pierre Borderies (ONERA, Toulouse)
and Jean-René Poirier (LAPLACE, Toulouse)
Defended the 22^{nd} March 2012 at SupAéro (ISAE), with the jury composed by : Abderrahmane Bendali, Pierre Borderies, Christophe Bourlier, Christophe Geuzaine, Luc Giraud, Jean-René Poirier, Jean-Yves Suratteau.
Title : *Contribution of the modeling of the electromagnetic scattering by rough surfaces from rigorous methods.*

2007 – 2011 **Teaching** in the Department of Electronics and Signal Processing, ENSEEIHT, Toulouse :
- Introduction to the Analysis of Partial Differential Equations *(master level)*,
- Fourier Analysis *(undergraduate level)*,
- Numerical Analysis *(undegraduate level)*,
- Algorithm and Programming in C *(undergraduate. level)*.

I also supervised several students in projects *(Bachelor level)* :
- Study of an equivalent impedance of a rough surface,
- Comparison between plane waves and Gaussian beams in a MoM code,
- Numerical effects of the finitude of surfaces in the spectrum of integral operators.

2007 7 months in EADS Innovation Works (Centre Commun de Recherches)
Engineer intern under the supervision of Andrew Thain.

2006–2007 **Master of Science** (*magna cum laude*) in "ElectroMagnetism and OptoElectronics",
Institut National Polytechnique, Toulouse.
Thesis under the surpervision of Andrew Thain (EADS Innovation Works),
Numerical Simulations of antennas on large planes.

2005 9 weeks in Dublin City University, Radio and Optical Comm. Lab.,
under the supervision of Frédéric Surre and Pascal Landais,
Numerical Investigations of Losses in THz waveguides.

2004 – 2007 **Engineer degree** in Electronics and Signal Processing,
ENSEEIHT, Toulouse.

2001–2004 Preparatory Class for entrance in engineering school, Montpellier.
Personal Project : Modeling of 1D snow avalanche and numerical simulaion by finite difference.

Publications

Articles (with peer-review)

- *Integral Equations Physically based Preconditioner for Two Dimensional Electromagnetic Scattering by Rough Surfaces*,
S. Tournier, P. Borderies, J.-R. Poirier
IEEE Antennas and Propagation, Vol. 59, No. 10, pp. 3764-3774, oct. 2011.

- *Modélisation de la diffusion électromagnétique par des surfaces rugueuses à partir de méthodes rigoureuses*, S. Tournier, P. Borderies, J.-R. Poirier
  Revue d'Electricité et Electronique, No. juin 2012.
  (request by the journal for section "Jeunes Chercheurs")
- *Local Multiple Traces Formulation for High-Frequency Scattering Problems*, C. Jerez-Hanckes , J. Pinto, S. Tournier
  Journal of Computational and Applied Mathematics, Vol. 289, pp. 306-321, dec. 2015.
- *Local Multiple Traces Formulation for High-Frequency Scattering Problems by Spectral Elements*, C. Jerez-Hanckes , J. Pinto, S. Tournier
  Scientific Computing in Electrical Engineering, series Mathematics and Industry, Springer. (to appear)
- *GetDDM : an Open Framework for Testing Optimized Schwarz Methods for Time-Harmonic Wave Problems*, B. Thierry, A. Vion, S. Tournier, M. El Bouajaji, D. Colignon, N. Marsic, X. Antoine, C. Geuzaine
  Computer Physics Communications (to appear)
  (see `http://onelab.info/wiki/GetDDM`)

Articles in preparation

- *Analysis of Homogenization Techniques for Improving Electromagnetic Scattering Computation by Periodic Rough Surfaces : Polarization TM and TE*,
  with J.-R. Poirier.
- *Multi-Scattering with Transmission Conditions : efficient preconditionned multi-trace formulation*,
  with C. Jerez-Hanckes.

International Conferences (with committee selection)

- **SIAM 2016** Annual Meeting, Boston
  Multiple Traces Formulations : Novel Extensions and Challenges ; C. Jerez-Hanckes, S. Tournier
- **FACM 2016**, Newark
  Multiple Traces Formulation : Preconditioning Strategies ; C. Jerez-Hanckes, S. Tournier
- **WAVES 2015**, Karlsruhe,
  Preconditioning Techniques for Local Multiple Traces Formulation for Scattering Problems ; S. Tournier, J. Pinto, C. Jerez-Hanckes
- **WAVES 2015**, Karlsruhe,
  Local Multiple Traces Modelling for High-Frequency Scattering ; C. Jerez-Hanckes, J. Pinto, S. Tournier
- **PANACM 2015**, Buenos Aires,
  Multiple Traces Formulation for High-Frequency Scattering ; C. Jerez-Hanckes, J. Pinto, S. Tournier
- **IEEE ACAMA 2014**, Antibes Juan-les-Pins,
  An Open Source Domain Decomposition Solver for Time-Harmonic Electromagnetic Wave Problems ; C. Geuzaine, B. Thierry, N. Marsic, D. Colignon, A. Vion, S. Tournier, Y. Boubendir, M. El Bouajaji, X. Antoine
- **SCEE 2014**, Wuppertal,
  Local Multiple Traces Formulation for High-Frequency Scattering Problems ; C. Jerez-Hanckes , J. Pinto, S. Tournier
- **EuroEM 2012**, Toulouse,
  Homogenization Techniques for Improving Electromagnetic Scattering Computation by Dielectric Surfaces ; S. Tournier, P. Borderies, J.-R. Poirier
- **AMPERE 2011**, Toulouse – Best Poster Award
  Analysis of QR-compression Techniques for Improving Electromagnetic Scattering Computation by Periodic Rough Surfaces ; S. Tournier, J. Girardin, J.-R. Poirier, P. Borderies
- **PIERS 2010**, Cambridge,
  Analysis of Homogenization Techniques for Improving Electromagnetic Scattering Computation by Rough Surfaces ; S. Tournier, P. Borderies, J.-R. Poirier
- **WAVES 2009**, Pau,
  A Physically-based Preconditioner for 2D Electromagnetic Rough Surfaces Scattering Problems ; S. Tournier, P. Borderies, J.-R. Poirier
- **WAVES 2009**, Pau,
  High order asymptotic expansion for the scattering of fast oscillating periodic surfaces ; J.-R. Poirier, A. Bendali, P. Borderies, S. Tournier
- **PIERS 2009**, Beijing,
  Analysis of Performances of a Floquet Mode Preconditioner for Electromagnetic Scattering Computation by Rough Surfaces ; S. Tournier, J.-R. Poirier, P. Borderies
- **PIERS 2008**, Hangzhou,
  Use of Numerical Methods for Assessing Validity Domains of the approximations Involved in Electromagnetic Interaction Modeling with vegetation ; P. Borderies, J.-R. Poirier, S. Tournier, C. Lauprette, L. Villard, P. Dubois Fernandez, N. Floury

Reviewer for IEEE Antennas and Propagation, IEEE Geoscience and Remote Sensing

Others

Computer skills	**current daily use :** Python, C, `bash` **previously used :** `C++`, `Fortran`, PETSc (MPI), MATLAB/Scilab **basic knowledge :** OCaml, Lisp **office softwares :** Gmsh [a], GetDP [b], `bem++` [c], LaTeX, `git/svn` user of GNU/Linux since 1999.
voluntary of GENEPI (from 2004 to 2009) `http://www.genepi.fr`	Intervention in prison *(teaching, participation to an internal newspaper, sports)*, Organization of events to talk about problems of prison *(intervention in high school, conferences, radio emission)*
participation to Colombbus `http://www.colombbus.org`	Promotion of computer sciences in junior secondary school using Free Software
Miscellaneous	Mountain (hiking, climbing)

a. `http://gmsh.info`
b. `http://getdp.info`
c. `http://www.bempp.org`

References

Jean-René Poirier
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