

Théophile Chaumont-Frelet

PERSONAL DATA	<i>Family Name:</i>	Chaumont-Frelet
	<i>Name:</i>	Théophile
	<i>Date of birth:</i>	February 8, 1989
	<i>Place of birth:</i>	Rouen, France
	<i>Nationality:</i>	French
	<i>Home Address:</i>	Calle Dos de Mayo 11, Piso 4 Izd, 48000 Bilbao, Bizkaia, Spain
	<i>Office Address:</i>	BCAM Alameda de Mazarredo 14 48009 Bilbao, Bizkaia, Spain
	<i>Phone:</i>	+33 06 3067 2258
	<i>E-mail:</i>	tchaumont@bcamath.org
	<i>URL:</i>	http://lmi.insa-rouen.fr/32-TCF.html

CURRENT POSITION	Post-Doctoral fellow, BCAM, Basque Center for Applied Mathematics Advisor : David Pardo (BCAM, UPV/EHU, Ikerbasque)	<i>February 2016 - Now</i>
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RESEARCH ACTIVITY	RESEARCH INTERESTS	
	◇ P.D.E. analysis, Modelling	◇ Inverse problems
	◇ Numerical methods for P.D.E.	◇ High Performance Computing
	◇ Wave propagation	◇ Geophysics

PUBLICATIONS

◇ *Published articles*

1. H. Barucq, T. Chaumont-Frelet, C. Gout, *Stability Analysis of Heterogeneous Helmholtz Problems and Finite Element Solution Based on Propagation Media Approximation*, accepted in *Mathematics of Computation* (2016).
2. T. Chaumont-Frelet, *On high order methods for the Helmholtz equation in highly heterogeneous media*, *Computers and Mathematics with Applications*, Vol. 72, Issue 9, pp. 2203-2225, 2016.
3. H. Barucq, T. Chaumont-Frelet, J. Diaz, V. Péron, *Upscaling for the Laplace problem using a Discontinuous Galerkin Method*, *J. of Computational and Applied Mathematics*, Vol. 240, pp. 192-203, 2013.

◇ *Proceedings at international conferences*

4. H. Barucq, H. Calandra, T. Chaumont-Frelet, C. Gout, *Multiscale Medium Approximation: Application to Geophysical Benchmarks*, extend abstract, 7th EAGE Saint Petersburg International Conference and Exhibition, DOI 10.3997/2214-4609.201600241 (2016).

◇ *Submitted articles*

5. T. Chaumont-Frelet, H. Barucq, H. Calandra, C. Gout, *The Multiscale Medium Approximation Method in Geophysics*, submitted to *Computational Geosciences* (2017).
6. T. Chaumont-Frelet, S. Nicaise, D. Pardo *Finite element approximation of electromagnetic fields using non-fitting meshes for Geophysics*, submitted to *SIAM J. Numer. Anal.* (2016).
7. T. Chaumont-Frelet, S. Nicaise, *High-frequency behaviour of corner singularities in Helmholtz problems*, submitted to *M2AN* (2017).
8. T. Chaumont-Frelet, D. Pardo, A. Rodriguez-Rozas *2.5D borehole logging simulations using non-fitting meshes*, submitted to *Computational Geosciences* (2017).
9. T. Chaumont-Frelet, S. Nicaise, *Wavenumber explicit convergence analysis for finite element discretizations of general wave propagation problems*, submitted to *IMA Journal of Numerical Analysis* (2017).
10. T. Chaumont-Frelet, M. Shahriari, D. Pardo, *Adjoint-based formulation for computing derivatives with respect to bed boundary positions in resistivity geophysics* submitted to *Geophysical Prospecting* (2017).

◇ *Articles in preparation*

11. T. Chaumont-Frelet, F. Valentin, *The Multiscale Hybrid Mixed Method for the Helmholtz Equation* (2018).
12. T. Chaumont-Frelet, D. Gallistl, S. Nicaise and J. Tomezyk, *Wavenumber explicit convergence analysis for acoustic Helmholtz problems with perfectly matched layers* (2018).

◇ *Reports*

13. T. Chaumont-Frelet, C. Gout, C. Le Guyader, *Image segmentation using LSM with a priori conditions: application to non invasive assessment of pulmonary arterial hypertension*,
Master's thesis, INSA Rouen (2012).
14. T. Chaumont-Frelet, P. Donato, *Homogenization of an oscillating boundary for the Laplace problem with mixed boundary conditions*,
Master's thesis, University of Rouen (2012).
15. T. Chaumont-Frelet, *Finite element approximation of Helmholtz problems with application to seismic wave propagation*,
Ph.D. Thesis, <https://tel.archives-ouvertes.fr/tel-01246244v2> (2016),

OBTAINED GRANTS

- ◇ Projects of the Spanish Ministry of Economy and Competitiveness with reference MTM2016-76329-R

COMMUNICATIONS AT INTERNATIONAL CONFERENCES

1. Non-Fitting meshes for Maxwell's equations,
International Conference on Computational Science, Zürich, Switzerland (June 12-14, 2017).
2. Finite-element computations of waves with non-fitting meshes,
4th International Workshop on Multiphysics, Multiscale and Optimization problems, BCAM, Bilbao, Spain (May 26-27, 2016).
3. Multiscale Medium Approximation method: Application to Geophysical Benchmarks,
7th EAGE Saint Petersburg International Conference and Exhibition, Saint Petersburg, Russia (April 11-14, 2016).
4. Multiscale Medium Approximation for the Helmholtz equation. Application to geophysical benchmarks,
Third "Depth Imaging Partnership" workshop, Inria TOTAL, Pau, France (June 22-23, 2015).
5. Pollution analysis for high order discretizations of highly heterogeneous Helmholtz problems,
GEAGAM workshop: Exploring the Earth, Inria, Pau, France (May 26-27, 2015).
6. Helmholtz Equation in Highly Heterogeneous Media,
1st. Pan-American Congress on Computational Mechanics, Buenos Aires, Argentina (April 27-29, 2015).
7. Analysis of the Pollution Effect in Finite Element Discretization of Highly Heterogeneous Helmholtz Problems,
LBL Applied Mathematics Seminar, Berkeley, USA (February 25, 2015).
8. Multiscale Medium Approximation for Seismic Wave Propagation
Modelling, Numerical Simulation and HPC workshop, CORIA, Rouen, France (February 19, 2015).
9. A Multiscale Medium Approximation Strategy to solve the Heterogeneous Helmholtz equation,
Mathias, TOTAL, Paris, France (October 23-25, 2014).
10. Pollution analysis of finite element discretizations of Heterogeneous Helmholtz problems,
2nd Russian-French workshop on computational geophysics, Inria, Novosibirsk, Russia (September 20-30, 2014).
11. Helmholtz equation in Highly Heterogeneous Media,
11th World Congress on Computational Mechanics, Eccomas, Barcelone, Spain (July 9-11, 2014).
12. Image segmentation with a priori conditions: applications to Geophysics and Medicine,
Curves and Surfaces, SMAI, Paris, France (June 12-18, 2014).
13. Helmholtz equation in Heterogeneous Media: a two-scale analysis,
3rd International Workshop on Multiphysics, Multiscale and Optimization problems, BCAM, Bilbao, Spain (May 22-23, 2014).
14. The Multiscale Hybrid Mixed method for the Helmholtz problem,
3rd workshop of the HOSCAR project, Inria CNPq, Bordeaux, France (September 2-6, 2013).
15. Residual-Free Bubbles for the Helmholtz equation,
Congrès SMAI 2013, SMAI, Seignosse, France (May 27-31, 2013).

16. Upscaling for the Laplace problem using a Discontinuous Galerkin method,
2nd workshop of the HOSCAR project,
Inria CNPq, Petropolis, Brazil (September 10-13, 2012).
17. Upscaling for the Laplace problem using a Discontinuous Galerkin method,
*NSF workshop on Barycentric Coordinates in Geometric Processing and Finite /
Boundary Element Methods*,
Columbia University, New York, USA (July 25-27, 2012).

INTERNATIONAL COLLABORATIONS

- ◊ Since 2016 I have been cooperating with Prof. S. Nicaise (LAMAV, University of Valenciennes, France). I regularly visit prof S. Nicaise in Valenciennes and Prof S. Nicaise spent 1 week in Bilbao in 2017.
- ◊ Since 2013 I have been cooperating with Prof. F. Valentin (LNCC, Petropolis, Brazil) at the research project HOSCAR. I spent 1 month in Petropolis in 2013 and 1 week in Sophia-Antipolis in 2015.
- ◊ During 2011-2016 I have been cooperating with Dr. H. Calandra (TOTAL, Houston, U.S.A.) at the research project DIP (Depth Image Processing). I spent 1 month in Houston in April 2014, 3 weeks in October/November 2014 and 2 weeks in February 2015.

STUDENT
SUPERVISION*Academic year 2014/15*

Propagation media approximation for the time-domain wave equation,
INSA Rouen (France), Master's thesis of Conrad Hillairet (INSA Rouen).

TEACHING
ACTIVITY*Academic year 2014/15*

40h, Mathematics (Bachelor's degree level),
INSA Rouen, Dept. STPI (Science et Technique Pour l'Ingénieur), France.
12h, Modelling and numerical simulation (Master's degree level),
INSA Rouen, Dept. GM (Génie Mathématique), France.

Academic year 2013/14

40h, Mathematics (Bachelor's degree level),
INSA Rouen, Dept. STPI, France.
12h, Modelling and numerical simulation (Master's degree level),
INSA Rouen, Dept. GM, France.

PH.D. THESIS

October 2012 - December 2015

Finite element approximation of Helmholtz problems with application to seismic wave propagation,
<https://tel.archives-ouvertes.fr/tel-01246244v2> (2016),
TOTAL, LMI INSA Rouen, Inria MAGIQUE3D, France.
Advisors: Hélène Barucq, Christian Gout
Ph. D. defense : December 11, 2015, in front of the following jury:
M. Rémi Abgrall, Universität Zürich, Switzerland - Referee reporter
M. Grégoire Allaire, Ecole Polytechnique, Referee reporter
M. Markus Melenk, TU Wien, Austria, Referee reporter
Mme Hélène Barucq, Inria, Ph. D. co-advisor
M. Henri Calandra, TOTAL Houston, USA
M. Christian Gout, INSA Rouen - Ph. D. co-advisor
Mme Carole Le Guyader, INSA Rouen
M. Serge Nicaise, Univ. Valenciennes - President of the Jury

EDUCATION

June 2012

Master's Degree in Mathematics from the University of Rouen
 "Fundamental and Applied Mathematics"

June 2012

Engineering Degree from INSA Rouen in Applied Mathematics,
 "Génie Mathématique"

INTERNSHIP

June 2011 - September 2011

Upscaling for the Laplace problem using a discontinuous Galerkin method,
 TOTAL, Inria MAGIQUE3D, France,
 Advisor: Hélène Barucq and Henri Calandra

SCIENTIFIC
BACKGROUND

◇ Mathematics: Analysis, control theory, data analysis, finite elements, functional analysis, image processing, linear programming, Markov chain, martingales and non-parametric estimation, numerical analysis, optimization, optimal control, PDE, probability, signal processing, statistics, geometric modelling.

◇ Computer and Programming Skills: C++, C, Fortran. OpenMP, MPI. GPU, OpenACC. Git, SVN. UNIX.

◇ c3i label (Certificate of skills in HPC: <http://www.genci.fr/fr/content/c3i>)

LINGUISTIC SKILLS

◇ French: mother tongue.

◇ English: fluent.

◇ Spanish: fluent.

Bilbao, January 22, 2018