

# CURRICULUM VITAE

## CHRYSOULA TSOGKA

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### Education

- 1996 - 1999 *Ph.D.* in Applied Mathematics, University Paris IX, France.  
My Ph.D research was carried out in the team ONDES (current POEMS) of INRIA.  
**Dissertation:** *Mathematical and numerical modeling of 3D elastic wave propagation in complex media with cracks.*
- 1995 - 1996 *M.S.* in Applied Mathematics, University Paris IX, France.
- 1990 - 1995 *Diploma* in Chemical Engineering, National Technical University of Athens, Greece.

### Honors/Awards

- 2012 *SIGEST paper award* for our paper “Filtering Deterministic Layer Effects in Imaging”, SIAM MMS (7) 2009, 1267– 1301.
- 2009 European Research Council (ERC) starting grant for my project ADAPTIVES (2010-2015).

### Professional Appointments

- 2016 - PRESENT **Stanford University**  
Visiting Professor, Department of Mathematics.
- 2014 - PRESENT **University of Crete**  
Professor, Department of Mathematics and Applied Mathematics.  
(On leave since Feb 2016.)
- 2007 - 2014 **University of Crete**  
Associate Professor, Department of Applied Mathematics.
- 2004 - 2006 **University of Chicago**  
Assistant Professor, Department of Mathematics.

- 2003 - 2004      **Stanford University**  
Visiting Researcher.
- 2001 - 2003      **CNRS/FRANCE**  
Tenured researcher in the Laboratoire de Mecanique et d'Acoustique (LMA).
- 2000 - 2001      **Stanford University**  
Postdoctoral fellow.

### **Other affiliations**

- 2008 - 2016      **FORTH**  
Associated faculty member with the Institute of Applied and Computational Mathematics.
- 2010 - 2016      **ACMAC**  
Associated faculty member.

### **Short term visits (one month or longer)**

- SUMMER 2015      Department of Mathematics, Stanford University, USA.
- JULY 2012          Department of Mathematics, Stanford University, USA.
- DEC 2011            École Normale Supérieure, Paris, France.
- NOV 2010           Institut des Hautes Etudes Scientifiques, Bures sur Yvette, France.
- AUG 2010            Mathematical Science Research Institute (MSRI), Berkeley, USA.
- DEC 2009            Department of Mathematics, Stanford University, USA.
- JULY 2008           Department of Mathematics, Stanford University, USA.
- SUMMER 2006        Department of Mathematics, Stanford University, USA.
- NOV 2006            Department of Mathematics, Stanford University, USA.
- OCT 2005            Institute for Mathematics and its Applications (IMA), University of Minnesota, USA.
- SUMMER 2005        Department of Mathematics, Stanford University, USA.
- MAY 2005            POEMS, INRIA-Rocquencourt, France.
- FALL 2003           Institute for Pure and Applied Mathematics (IPAM), UCLA, USA.
- AUG 2002            Department of Mathematics, Stanford University, USA.

## Research interests

Numerical methods for wave propagation, Inverse problems and Imaging in Complex Random media, Intensity based imaging

## Software development

Developed a numerical code for computing the solution of the wave equation in elastic media in two and three spatial dimensions. The propagation medium can be heterogeneous and anisotropic containing internal cracks and/or topographies of complex geometry. The code was transferred to EDF/France and was further developed by the R&D team of EDF. It is now called Athena2D and Athena3D and has been widely used in industrial applications.

Developed prototype code (MATLAB) for several imaging methodologies such as travel time migration, matched filter, synthetic aperture radar, coherent interferometry, MUSIC, correlation based imaging and  $\ell_1$ -minimization based methodologies.

## Professional Activities

### Scientific coordination/research management

From 2008 to 2016, I have been associated with the Institute of Applied and Computational Mathematics (IACM) at FORTH. It is at the facilities of IACM that I established a research group working on “Coherent and Incoherent Imaging methods with Waves”. In this group, I have been working with three postdoctoral research associates, four Ph.D. students and three master students. Also, several undergraduate students from the Applied Mathematics Department did their summer internship and three carried out their bachelor diploma thesis in our group.

With my colleagues at the Department of Applied Mathematics we developed an ambitious project, the creation of the Archimedes Center for Modeling Analysis and Computation (ACMAC). ACMAC was established as a research program in 2010 and since its creation, I was a member of its steering committee which was responsible for the implementation of the whole project. ACMAC activities included: mentoring of postdoctoral researchers, organization of thematic programs where we brought together senior as well as junior scientists, organization of workshops and two-way visits for exchange of know-how and experience between members of ACMAC and members of major research centers in Europe. Since 2015 ACMAC has very limited activities due to lack of funding.

### Committee work

2014 - 2015      **University of Crete**  
Coordinator of the PhD Studies Committee of the Department of Mathematics and Applied Mathematics.

- 2013 - 2015      **University of Crete**  
Member of the Graduate Studies Committee of the University of Crete.
- 2013 - 2015      **FORTH**  
Member of scientific council of IACM-FORTH.
- 2011 - 2013      **University of Crete**  
Member of the Graduate Studies Committee of the Department of Applied Mathematics.
- 2010 - 2015      **ACMAC**  
Member of the steering committee.
- 2002-2003      **CNRS**  
Member of the steering committee of GDR 2501, Wave propagation in inhomogeneous media and applications in non-destructive testing.

#### Editorial Boards

- SIAM Journal on Imaging Sciences (SIMS), 2013 - present.
- Journal of Mathematical Imaging and Vision (JMIV, springer), 2014 - present.
- Bulletin of the Greek Mathematical Society, 2015 - present.

#### Prize Committees

- SIAG/Imaging Science Early Career Prize 2016
- SIAG/Imaging Science Best Paper Prize 2016

**Refereeing journals** The breadth of my research interests is reflected in the diversity of the journals for which I have refereed several papers such as the SIAM J. on Imaging Science, SIAM J. on Multi-scale Modeling and Simulation, SIAM J. on Scientific Computing, ESAIM: Mathematical Modelling and Numerical Analysis, SIAM J. on Applied Mathematics, SIAM J. on Numerical Analysis, Inverse Problems, Communications in Mathematical Sciences, Physical Review E, Nonlinearity, Wave Motion, J. Computational Acoustics, J. of the Acoustical Society of America, Geophysics, Geophysical Journal International, Bulletin of the Seismological Society of America, IEEE Transactions on Antennas and Propagation, IEEE Transactions on Computational Imaging, IEEE Transactions on Geoscience and Remote Sensing and, IEE Proc. Radar, Sonar & Navigation.

#### Ph.D Thesis Committees (International)

- Valentin Violes, *Problèmes d'interface en présence de métamatériaux : modélisation, analyse et simulations*, École doctorale Mathématiques Hadamard, Palaiseau, France, September 18, 2016. (Rapporteur de thèse).

- Lorenzo Audibert, *Qualitative methods for heterogeneous media*, École Polytechnique, September 17, 2015. (Rapporteur de thèse).
- Maxence Cassier, *Étude de deux problèmes de propagation d'ondes transitoires : 1) Focalisation spatio-temporelle en acoustique ; 2) Transmission entre un diélectrique et un métamatériau*. École Polytechnique, France, June 12, 2014.
- Marie Cray, *Signals reconstruction and objects identification by the TRAC method in time reversal*. Université Pierre et Marie Curie, France, July 2, 2012. (Rapporteur de thèse).
- Chokri Ben Amar, *Étude théorique et numérique de processus de retournement temporel*. École Polytechnique, France and École Nationale d'Ingénieurs de Tunis (ENIT), Tunis, June 23, 2007. (Rapporteur de thèse).

#### Organization of conferences/workshops/thematic programs

- Program on *Mathematical and Computational Challenges in Radar and Seismic Reconstruction*, ICERM, Brown University, USA, September 6-December 8, 2017.
- *International Conference on Applied Mathematics*, September 16-20, 2013, Heraklion, Crete.
- *11th European Finite Element Fair*, May 31-June 1, 2013, Heraklion, Crete, Greece.
- ACMAC workshop on *Waves and imaging in complex media* at Heraklion, Greece, June 11-15, 2012.
- ACMAC workshop on *Wave propagation in complex media and applications* at Heraklion, Greece, May 7-11, 2012.
- ACMAC workshop on *Women in Applied Mathematics* at Heraklion, Greece, May 2-5, 2011.
- MSRI workshop *Connection for Women Workshop: Inverse Problems and Applications* at MSRI, Berkeley, CA, USA, August 19-20, 2010.
- Program on *Random Media*, Statistical and Applied Mathematical Sciences Institute (SAMSI), NC, USA, 2007-2008.
- Oberwolfach Seminar *Mathematical and Computational Problems in Interferometric Imaging*, Oberwolfach, Germany, June 4-10, 2006.
- International conference *Acoustics, Mechanics and the Related Topics of Mathematical Analysis* (AMRTMA), Fréjus, June 2002.

#### Scientific committee of International Conferences

- 13th International Conference on Mathematical and Numerical Aspects of Wave Propagation, WAVES 2017, University of Minnesota, Minneapolis, May 15-18, 2017.

- Modelling of high performance acoustic structure. Porous media and metamaterials, University Roma Tre, Rome, January 24-25 2017.
- 12th International Conference on Mathematical and Numerical Aspects of Waves Propagation, Karlsruhe Institute of Technology, Germany, July 20-24, 2015.
- 3rd International Conference “Modern Mathematical Methods in Science and Technology 2012 (M3ST '12)”, August 26-28, 2012, Kalamata, Greece.
- 7th GRACM International Congress on Computational Mechanics, June 30-July 2, 2011, Athens, Greece.
- 9th International Conference on Mathematical and Numerical Aspects of Waves Propagation, June 15-19, 2009, Pau, France.

## Research Grants

I have participated in several research projects in Europe and the US. While in Greece, I have been successful as a PI in attracting funding in very competitive European grants such as the ERC. Below is a list of the European and US grants I have participated in.

- ERC-ADAPTIVES: European Research Council starting grant ERC-StG, #239959, 2010-2015. PI.  
<http://www.tem.uoc.gr/~tsogka/adaptives/index.html>
- IRG-CII-RMA: European FP7 Marie Curie International Reintegration Grant MIRG-CT-2007-203438, 2007-2011. PI.
- Regpot-ACMAC: European grant under the FP7 regional potential program, #245749, 2010-2014. co-PI.  
<http://www.acmac.uoc.gr/>
- DARPA-ONR Grant N00014-04-1-0224, Time reversal of Electromagnetic Waves, February 2004 - July 2008.
- Consortium on Time Reversal for Waves and its Applications, supported by Office of Navy Research (ONR) and Defence Advanced Research Projects Agency (DARPA). I participated in writing the proposal and I was member of the funded team.
- ONR grant on Time reversal, Imaging and Communications (2001-2004). I was a named collaborator in this grant which supported me as a visiting researcher at Stanford.
- GDR-2051 : Wave propagation in inhomogeneous media and applications in non-destructive testing. 2001-2003. Sponsored by CNRS, EDF and CEA. co-PI.
- ACI “Prevention of Natural Disasters”: Site-city interaction and seismic risks in urban environment, 2000-2002. Sponsored by the French Ministry of Research. co-PI.

## Oral Presentations

### Invited Plenary and workshop talks

- [P1] Journées sur les méthodes d'évaluations non destructives pour le génie civil LCPC, Nantes, October 7-8, 1999.
- [P2] Workshop on Inverse Problems and Applications, MSRI, Berkeley, November 15, 2001.
- [P3] Workshop on Imaging in Noisy Environments, Crete, June 19-21, 2001.
- [P4] 4me Colloque du PPF Problèmes Inverses de Champs, Marseille, March 8, 2001.
- [P5] MGSS, Stanford, CA, August 2002.
- [P6] Journées scientifiques du GDR "Étude de la propagation ultrasonore en milieux non-homogènes en vue du contrôle non destructif", ESPCI, Paris, October 2002.
- [P7] Conference on Applied Inverse Problems: Theoretical and Computational Aspects, UCLA (IPAM), Lake Arrowhead, CA, May 18-23, 2003.
- [P8] Workshop on Time-Reversal method, University of California at Irvine, August 8-11, 2003.
- [P9] IMA hot topics workshop on adaptive sensing and multimode data inversion, IMA, University of Minnesota, Minneapolis, June 27-30, 2004.
- [P10] ARCC workshop in time reversal and communications, American Institute of Mathematics, Palo Alto, CA, October 18-22, 2004.
- [P11] Journée scientifique du GDR ONDES "Modélisation des phénomènes de diffraction et de propagation des ondes électromagnétiques et acoustiques", Institut Henri Poincaré (IHP), Paris, May 2005.
- [P12] Inverse Problems Reunion Conference I, UCLA (IPAM), Lake Arrowhead, CA, June 5-10, 2005.
- [P13] Workshop on Radiative transport and diffusion-approximation: From theory to applications, CIRM, Marseille, France, September 5-9, 2005.
- [P14] 4th Workshop on Numerical Methods for Evolution Equations, Heraklion, Crete, September 26-27, 2008.
- [P15] 4th International Conference on Inverse Problems Control and Shape Optimization (PI-COF'08), Marrakesh, Morocco, April 16-19, 2008.
- [P16] MMNS Workshop on Inverse Problems for Waves: Methods and Applications, Palaiseau, France, March 29-30, 2010.
- [P17] International Conference on Applied Mathematics, City University of Hong Kong, Hong Kong, June 7-11, 2010.
- [P18] 5th Workshop on Numerical Methods for Evolution Equations, Heraklion, Crete, September 24-25, 2010.

- [P19] Workshop on Random Media: Homogenization and Beyond, IPAM, Los Angeles, CA, January 24-29, 2011.
- [P20] International Conference “Frontiers in Applied and Computational Mathematics 2011”, Newark, New Jersey, United States, June 9-11, 2011.
- [P21] Workshop on Multiscale and High Contrast PDE, Mathematical Institute, Oxford, United Kingdom, June 28-July 1, 2011.
- [P22] Workshop on Inverse Problems in Analysis and Geometry, Isaac Newton Institute for Mathematical Sciences, Cambridge, England, August 1-5, 2011.
- [P23] Workshop in honor of George Papanicolaou on the occasion of his awarding of the degree of Doctor Honoris Causa from the University Paris Diderot, “Laboratoire de Probabilités et Modèles Aléatoires” and the “Laboratoire Jacques-Louis Lions”, Paris, December 1-2, 2011.
- [P24] Workshop on Imaging, wave propagation in complex media, and optimal control under uncertainties, École Normale Supérieure, Paris, December 19-21, 2011.
- [P25] Workshop on “Theoretical and Applied Computational Inverse Problems”, Erwin Schrödinger International Institute for Mathematical Physics (ESI), Vienna, May 5-16, 2014.
- [P26] 11th International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES’2013), Tunis, Tunisia, June 3-7, 2013.
- [P27] Conference on Multi-Scale Waveform Modeling and Inversion, KAUST, March 22-24, 2015.
- [P28] 4th International Conference on Modern Mathematical Methods in Science and Technology, Kalamata, Greece, August 30-September 2, 2015.
- [P29] Workshop on Computational and Numerical Analysis of Transient Problems in Acoustics, Elasticity, and Electromagnetis, Banff International Research Station for Mathematical Innovation and Discovery, Banff, Canada, January 17-22, 2016.

### **Seminars**

- [P30] Projet ONDES, INRIA, February 1997.
- [P31] Mathématiques Appliquées, ENSTA, Paris, April 1999.
- [P32] Department of Mathematics, University of Crete, Greece, June 1999.
- [P33] Applied Mathematics seminar, Stanford University, April 7, 2000.
- [P34] Seminar projet POEMS, ENSTA, Paris, April 2001.
- [P35] Department of Mathematics, Université de Nice, January 2002.
- [P36] LOA, École Supérieur de Physique et Chimie Industrielles de la ville de Paris, Paris, June 2002.
- [P37] ISITV, Université de Toulon et du Var, Toulon, November 2002.



- [P38] Seminar LMA, Marseille, France, December 16, 2002.
- [P39] Computational and Applied Mathematics, Rice University, April 7, 2003.
- [P40] Mathematics Department, University of Wisconsin, Madison, November 10, 2003.
- [P41] Mathematics Department, University of Wisconsin, Madison, January 16, 2004.
- [P42] Department of Mathematics, University of California, Davis, January 21, 2004.
- [P43] Department of Mathematics, Rutgers University, February 2, 2004.
- [P44] Department of Mathematics, University of Florida, February 6, 2004.
- [P45] Department of Mathematics, Texas A&M University, February 13, 2004.
- [P46] Department of Mathematical and Computer Sciences, Colorado School of Mines, February 16, 2004.
- [P47] Computational and Applied Mathematics Seminar, Department of Mathematics, University of California, Irvine, March 15, 2004.
- [P48] Computational and Applied Mathematics Colloquium, Rice University, November 15, 2004.
- [P49] Applied and Interdisciplinary Mathematics (AIM) seminar, Department of Mathematics, University of Michigan, December 10, 2004.
- [P50] Seminar LMA, Marseille, France, December 16, 2004.
- [P51] CMAP Inverse Problems Seminar, École Polytechnique, May 18, 2005.
- [P52] Inverse Problems Seminar, Inverse Problems Center at Rensselaer Polytechnic Institute, October 3, 2005.
- [P53] ICME Seminar, Stanford University, November 7, 2005.
- [P54] Applied Math Seminar, University of Delaware, February 28, 2006.
- [P55] CSCAMM Seminar, University of Maryland, April 26, 2006.
- [P56] Laboratoire d'Acoustique de l'Université du Maine, July 2013.
- [P57] GAFD Seminar, University of California Santa Cruz, October 11, 2016.
- [P58] Applied Mathematics Seminar, UC Berkeley, October 26, 2016.
- [P59] Applied Mathematics Seminar, UC Merced, November 4, 2016.
- [P60] Colloquium, Mathematics Department, Penn State University, February 7, 2017.

**Workshop & Conference Presentations**

- [P61] Fourth International Conference on Mathematical and Numerical Aspects of Wave Propagation, Golden, Colorado, June 1998.
- [P62] Fifth National Congress on Mechanics, Ioannina, Greece, August 1998.

- [P63] Fourth International Conference on Theoretical and Computational Acoustics, Trieste, May 1999.
- [P64] 31e Congrès d'Analyse Numérique, May 1999.
- [P65] 3rd National Congress on Computational Mechanics, Volos, Greece, June 1999.
- [P66] Fourth International Congress on Industrial and Applied Mathematics, Edinburgh, July 1999.
- [P67] Annual meeting of the Acoustical Society of America, Fort Lauderdale, FL, December 3, 2001.
- [P68] Conference AMRTMA, Frejus, June 2002.
- [P69] SIAM, Philadelphia, PA, July 2002.
- [P70] Sixth International Conference on Mathematical and Numerical Aspects of Wave Propagation, Jyväskylä, Finland, June 30-July 4, 2003.
- [P71] Fifth World Congress on Ultrasonics, Paris, France, September 7-10, 2003.
- [P72] Progress in Electromagnetics Research Symposium (PIERS 2004), Pisa, Italy, March 28-31, 2004.
- [P73] The fifth international conference on Dynamical Systems and Differential Equations, California State Polytechnic University, Pomona (Los Angeles), June 16-19, 2004.
- [P74] Joint AMS-SIAM meeting, Special session on Theoretical and Computational Aspects of Inverse Problems, Atlanta, Georgia, January 5-8, 2005.
- [P75] Seventh International Conference on Mathematical and Numerical Aspects of Wave Propagation, Brown University, June 20-24, 2005.
- [P76] First International wireless Summit, Aalborg, Denmark, September 17-22, 2005.
- [P77] Applied Inverse Problems: Theoretical and Computational Aspects conference, United Kingdom, June 26-30, 2005.
- [P78] Joint AMS-SIAM meeting, Special session on Time Reversal Methods: Analysis and Applications, San Antonio, Texas, January 12-15, 2006.
- [P79] Progress in Electromagnetics Research Symposium (PIERS 2006), Cambridge, MA, March 2006.
- [P80] Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN, Rethymnon, Crete, June 13-16, 2007.
- [P81] WCCM8-ECCOMAS 08 (8th World Congress on Computational Mechanics (WCCM8) and 5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)), Venice, Italy, June 30-July 4, 2008.
- [P82] SIAM Conference on Imaging Science, San Diego, CA, United States, July 7-9, 2008.
- [P83] 2nd International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, Rhodes, Greece, June 22-24, 2009.

- [P84] 9th International conference on Theoretical and Computational Acoustics, Dresden, Germany, September 7-11, 2009.
- [P85] SIAM conference on Analysis of Partial Differential Equations, Miami, United States, December 7-9, 2009.
- [P86] SIAM conference on Imaging Science, Chicago, United States, April 12-14, 2010.
- [P87] IV European conference on computational mechanics, ECCM 2010, Paris, France, May 16-21, 2010.
- [P88] International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2011), Corfu, Greece, May 26-28, 2011.
- [P89] SIAM Conference on Analysis of Partial Differential Equations, San Diego Marriott Mission Valley, San Diego, CA, United States, November 14-17, 2011.
- [P90] SIAM Conference on Imaging Science, Hong Kong Baptist University, Hong-Kong, May 12-14, 2014.
- [P91] SIAM 2014 Annual Meeting, Chicago, July 7-11, 2014.
- [P92] International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2015), Crete, Greece, May 25-27, 2015.
- [P93] Applied Inverse Problems Conference, Helsinki, Finland, May 25-29, 2015.
- [P94] Congr s SMAI 2015, Savoie, France, June 8-12, 2015.
- [P95] SIAM Conference on Mathematical and Computational Issues in Geosciences, Stanford, June 29-July 2, 2015.
- [P96] SIAM Conference on Imaging Science, Albuquerque, New Mexico, May 23-26, 2016.

CHRYSOULA TSOGKA  
LIST OF PUBLICATIONS

**Chapters in Books**

- [B1] L. Borcea, G. Papanicolaou and C. Tsogka, *Asymptotics for the space-time Wigner transform with applications to imaging*, in Stochastic Differential Equations: Theory and Applications. Volume in Honor of Professor Boris L. Rozovskii, edited by P. H. Baxendale and S. V. Lototsky, volume 2 of Interdisciplinary Mathematical Sciences, pp. 91–112 (World Scientific), 2007.
- [B2] P. Joly and C. Tsogka, *Finite Element Methods with Discontinuous Displacement*, in Effective Computational Methods in Wave Propagation, edited by N. A. Campanis, V. A. Dougalis and J. A. Ekaterinaris, Chapman & Hall/CRC, 2008.
- [B3] P. Joly and C. Tsogka, *Fictitious Domains Methods for Wave Diffraction*, in Effective Computational Methods in Wave Propagation, edited by N. A. Campanis, V. A. Dougalis and J. A. Ekaterinaris, Chapman & Hall/CRC, 2008.
- [B4] P. Joly and C. Tsogka, *Numerical Methods for Treating Unbounded Media*, in Effective Computational Methods in Wave Propagation, edited by N. A. Campanis, V. A. Dougalis and J. A. Ekaterinaris, Chapman & Hall/CRC, 2008.
- [B5] C. Panagiotopoulos, Y. Petromichelakis and C. Tsogka, *Time reversal and imaging for structures*, in Dynamic Response of Infrastructure to Environmentally Induced Loads, edited by A. Sextos and G.D. Manolis, Springer International Publishing AG. In press, 2016.

**Papers in Refereed Journals**

- [J1] E. Bécache, P. Joly, C. Tsogka. *Éléments finis mixtes et condensation de masse en élastodynamique linéaire. (I) Construction*, C. R. Acad. Sci. Paris, t 325, Serie I, pp. 545–550, 1997.
- [J2] E. Bécache, P. Joly, C. Tsogka. *Étude d'un nouvel élément fini mixte permettant la condensation de masse*, C. R. Acad. Sci. Paris, t 324, Serie I, pp. 1281–1286, 1997.
- [J3] E. Bécache, P. Joly, C. Tsogka. *An analysis of new mixed finite elements for the approximation of wave propagation problems*, SIAM J. Numer. Anal., Vol. 37, No. 4, pp. 1053–1084, 2000.
- [J4] F. Collino, C. Tsogka. *Application of the PML absorbing layer model to the linear elastodynamic problem in anisotropic heterogeneous media*, Geophysics, Vol. 66, No. 1, pp. 294–307, 2001.
- [J5] E. Bécache, P. Joly, C. Tsogka. *Application of the fictitious domain method to 2D linear elastodynamic problems*, J. of Comput. Acoustics, Vol. 9, No. 3, pp. 1175–1202, 2001.

- [J6] E. Bécache, P. Joly, C. Tsogka. *A new family of mixed finite elements for the linear elastodynamic problem*, SIAM J. of Num. Anal., Vol. 39, No. 6, pp. 2109– 2132, 2002.
- [J7] L. Borcea, G. Papanicolaou, C. Tsogka and J. Berryman, *Imaging and time reversal in random media*, Inverse Problems, Vol. 18, pp. 1247– 1279, 2002.
- [J8] J. Berryman, L. Borcea, G. Papanicolaou and C. Tsogka, *Statistically stable ultrasonic imaging in random media*, J. Acoust. Soc. Am., Vol. 112, pp. 1509– 1522, 2002.
- [J9] C. Tsogka and G. Papanicolaou, *Time reversal through a solid-liquid interface and super-resolution*, Inverse Problems, Vol 18, pp. 1639– 1657, 2002.
- [J10] L. Borcea, G. Papanicolaou and C. Tsogka, *Theory and applications of time reversal and interferometric imaging*, Inverse Problems, 19, pp. S139– S164, 2003.
- [J11] L. Borcea, G. Papanicolaou and C. Tsogka, *A resolution study for imaging and time reversal in random media*, Contemporary Math, 333, pp. 63–77, 2003.
- [J12] C. Tsogka et A. Wirgin, *Seismic response of a set of blocks partially imbedded in soft soil*, Comptes Rendus Mecanique, Vol. 331, No. 3, pp. 217– 224, 2003.
- [J13] C. Tsogka et A. Wirgin, *Simulation of seismic response in an idealized city*, Soil Dynamics and Earthquake Engineering, Vol. 23, pp. 391– 402, 2003.
- [J14] J. Berryman, L. Borcea, G. Papanicolaou and C. Tsogka, *Statistical stability and time-reversal imaging in random media*, Geometric methods in inverse problems and PDE control, IMA Vol. Math. Appl., 137, Springer, New York, pp. 15–24, 2004.
- [J15] L. Borcea, G. Papanicolaou and C. Tsogka, *Interferometric array imaging in clutter*, Inverse Problems, 21, pp. 1419– 1460, 2005.
- [J16] J.P. Groby, C. Tsogka and A. Wirgin, *Simulation of seismic response in a city-like environment*, Soil Dynamics and Earthquake Engineering, 25:7-10, pp. 487– 504, 2005.
- [J17] L. Borcea, G. Papanicolaou and C. Tsogka, *Adaptive interferometric imaging in clutter and optimal illumination*, Inverse Problems, 22, pp. 1405– 1436, 2006.
- [J18] Grégoire Derveaux, George Papanicolaou and Chrysoula Tsogka, *Resolution and Denoising in Near-Field imaging*, Inverse Problems, 22, pp. 1437– 1456, 2006.
- [J19] K. Huang, G. Papanicolaou K. Solna, C. Tsogka and H. Zhao, *Efficient numerical simulation for long range wave propagation*, J. Comp. Phys., 215:2, pp. 448– 464, 2006.
- [J20] L. Borcea, G. Papanicolaou and C. Tsogka, *Coherent interferometry in finely layered random media*, SIAM J. on Multiscale Model. Simul, 5 (1), pp. 62– 83, 2006.
- [J21] L. Borcea, G. Papanicolaou and C. Tsogka, *Coherent interferometric imaging in clutter*, Geophysics, 71:4, pp. S1165– S1175, 2006.
- [J22] J.P. Groby and C. Tsogka, *A time domain method for modeling viscoacoustic wave propagation*, J. of Comput. Acoustics, 14:2, pp. 201– 236, 2006.

- [J23] L. Le Marrec, P. Lasaygues, T. Scotti and C. Tsogka, *Efficient shape reconstruction of non-circular tubes using broadband acoustic measurements*, Acta Acoustica united with Acoustica, 92, pp. 355– 361, 2006.
- [J24] L. Borcea, G. Papanicolaou and C. Tsogka, *Optimal illumination and waveform design for imaging in random media*, J. Acoust. Soc. Am., 122, pp. 3507– 3519, 2007.
- [J25] L. Borcea, G. Papanicolaou and C. Tsogka, *Optimal waveform design for array imaging*, Inverse Problems, 23, pp. 1973– 2020, 2007.
- [J26] E. Bécache, J. Rodriguez and C. Tsogka, *A fictitious domain method with mixed finite elements for elastodynamics*, SIAM J. on Scientific Computing, 29, pp. 1244– 1267, 2007.
- [J27] G. Derveaux, G. Papanicolaou and C. Tsogka, *Time reversal imaging for sensor networks with optimal compensation in time*, J. Acoust. Soc. Am., 121, pp. 2071– 2085, 2007.
- [J28] L. Borcea, F. González del Cueto, G. Papanicolaou and C. Tsogka, *Filtering Deterministic Layer Effects in Imaging*, SIAM Multiscale Model. Simul., 7:3, pp. 1267– 1301, 2008.
- [J29] E. Bécache, J. Rodriguez and C. Tsogka, *Convergence results of the fictitious domain method for a mixed formulation of the wave equation with a Neumann boundary condition*, ESAIM: Mathematical Modelling and Numerical Analysis, 43:2, pp. 377– 398, 2009.
- [J30] L. Borcea, L. Issa and C. Tsogka, *Source localization in random acoustic waveguides*, SIAM Multiscale Modeling Simulations, Vol. 8 (5), pp. 1981– 2022, 2010.
- [J31] L. Borcea, G. Papanicolaou and C. Tsogka, *Subspace projection filters for imaging in random media*, Comptes Rendus Mecanique, Vol. 338, pp. 390–401, 2010.
- [J32] L. Borcea, F. González del Cueto, G. Papanicolaou and C. Tsogka, *Filtering Random Layering Effects in Imaging*, SIAM Multiscale Model. Simul., 8:3, pp. 751– 781, 2010.
- [J33] L. Borcea, J. Garnier, G. Papanicolaou and C. Tsogka, *Coherent interferometric imaging, time gating and beamforming*, Inverse Problems, Vol. 27, p. 065008 (17pp), 2011.
- [J34] R. Alonzo, L. Borcea, G. Papanicolaou and C. Tsogka, *Detection and imaging in strongly backscattering randomly layered media*, Inverse Problems, Vol. 27, p. 025004 (43pp), 2011.
- [J35] L. Borcea, G. Papanicolaou and C. Tsogka, *Adaptive time-frequency detection and filtering for imaging in heavy clutter*, SIAM Journal on Imaging Sciences, 4(3), pp. 827– 849, 2011.
- [J36] L. Borcea, J. Garnier, G. Papanicolaou and C. Tsogka, *Enhanced statistical stability in coherent interferometric imaging*, Inverse Problems, 27 (8), p. 085003, 2011.
- [J37] L. Borcea F. González del Cueto G. Papanicolaou and C. Tsogka. *Filtering Deterministic Layer Effects in Imaging*, SIAM Review 2012, Vol. 54, No. 4, pp. 757– 798, 2012. **2012 SIGEST best paper award.**
- [J38] J. Garnier, G. Papanicolaou, A. Semin and C. Tsogka, *Signal-to-Noise Ratio Estimation in Passive Correlation-Based Imaging*, SIAM Journal on Imaging Sciences, Vol. 6, No. 2, pp. 1092– 1110, 2013.

- [J39] C. Tsogka, D. A. Mitsoudis and S. Papadimitropoulos, *Selective imaging of extended reflectors in two-dimensional waveguides*, SIAM Journal on Imaging Science, Vol. 6, No. 4, pp. 2714–2739, 2013.
- [J40] J. Garnier, G. Papanicolaou, Adrien Semin, and Chrysoula Tsogka, *Signal to Noise Ratio Analysis in Virtual Source Array Imaging*, SIAM Journal on Imaging Sciences, Vol. 8, No. 1, pp. 248–279, 2015.
- [J41] L. Borcea, J. Garnier and C. Tsogka, *A quantitative study of source imaging in random waveguides*, Commun. Math. Sci., Vol. 13, No. 3, pp. 749–776, 2015.
- [J42] L. Borcea, M. Moscoso, G. Papanicolaou and C. Tsogka, *Synthetic aperture imaging of directional and frequency dependent reflectivity*, SIAM Journal on Imaging Science, Vol. 9, No. 1, pp. 52–81, 2016.
- [J43] E. Daskalakis, C. Evangelidis, J. Garnier, N. Melis, G. Papanicolaou and C. Tsogka, *Robust seismic velocity change estimation using ambient noise recordings*, Geophysical Journal International, Vol. 205, pp. 1926–1936, 2016.
- [J44] C. Tsogka and D. A. Mitsoudis and S. Papadimitropoulos, *Partial-aperture array imaging in acoustic waveguides*, Inverse Problems, Vol. 32, p. 125011 (31pp), 2016.
- [J45] C. Tsogka and M. Apostolopoulos, *A comparative study of data filtering methods for imaging in strongly scattering media*, Wave Motion (2017), pp. 97–113.
- [J46] C. Tsogka, E. Daskalakis, G. Comanducci, F. Ubertini, *The stretching method for vibration-based SHM of civil structures*, Computer-Aided Civil and Infrastructure Engineering, Vol. 32, Issue 4, pp. 288–303, 2017.
- [J47] L. Borcea, G. Papanicolaou and C. Tsogka, *Time and direction of arrival detection and filtering for imaging in strongly scattering random media*, Waves in Random and Complex Media, published online: 22 Mar 2017.
- [J48] L. Borcea, J. Garnier, G. Papanicolaou, K. Solna and C. Tsogka, *Resolution analysis of passive synthetic aperture imaging of fast moving objects*, to appear in SIAM Journal on Imaging Sciences, 2017.
- [J49] M. Moscoso, A. Novikov, G. Papanicolaou and C. Tsogka, *Multifrequency interferometric imaging with intensity-only measurements*, to appear in SIAM Journal on Imaging Sciences, 2017.

### Papers in Refereed Conferences

- [C1] E. Bécache, P. Joly, C. Tsogka. *Fictitious domain method applied to the scattering by a crack of transient elastic wave in anisotropic media: a new family of mixed finite elements leading to explicit schemes*, Mathematical and Numerical Aspects of Wave Propagation, SIAM, pp. 322–326, 1998.

- [C2] E. Bécache, P. Joly, C. Tsogka. *Fictitious domain method applied to an elastodynamic scattering problem*, Proceedings of the Fifth National Congress on Mechanics, University of Ioannina Press, 1998.
- [C3] F. Collino, C. Tsogka. *Application of the Perfectly Matched absorbing Layer model to elastodynamics*, Proceedings of the Third National Congress on Computational, University of Thessaly Press, 1999.
- [C4] J. Berryman, L. Borcea, G. Papanicolaou and C. Tsogka, *Imaging methods in random media*, in A. Wirgin (ed.), Proceedings of the conference Acoustics mechanics and the related topics of mathematical analysis (AMRTMA), World Scientific, pp. 14– 20, 2002.
- [C5] C. Tsogka and A. Wirgin, *Simulation of seismic response in a city*, in A. Wirgin (ed.), Proceedings of the conference Acoustics mechanics and the related topics of mathematical analysis (AMRTMA), World Scientific, pp. 258– 264, 2002.
- [C6] L. Le Marrec, C. Tsogka, P. Lasaygues and T. Scotti, *Wide Band Quantitative Imaging Of High Contrast Objects By A Canonical Approximation*, Proceedings of the Fifth World Congress on Ultrasonics, Paris, France, 2003.
- [C7] L. Borcea, G. Papanicolaou and C. Tsogka, *Estimation for imaging and time reversal in scattering media*, Proceedings of the Sixth International Conference on Mathematical and Numerical Aspects of Wave Propagation, Springer-Verlag, pp. 911– 915, 2003.
- [C8] J.P. Groby and C. Tsogka, *A time domain method for modeling wave propagation phenomena in viscoacoustic media*, Proceedings of the sixth International Conference on Mathematical and Numerical Aspects of Wave Propagation, Springer-Verlag, pp. 631– 636, 2003.
- [C9] L. Le Marrec, P. Lasaygues, C. Tsogka and T. Scotti, *Multi-frequency quantitative imaging of high contrast objects: canonical approximation*, Proceedings of the 27th International Symposium on Acoustical Imaging, Saarbrücken, Germany, March 24– 27, 2003.
- [C10] L. Borcea, G. Papanicolaou and C. Tsogka, *Adaptive imaging in clutter*, Proceedings of the 7th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Providence, RI, June 20– 24, 2005.
- [C11] K. Huang, G. Papanicolaou K. Solna, C. Tsogka and H. Zhao, *An algorithm for long range wave propagation*, Proceedings of the 7th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Providence, RI, June 20– 24, 2005.
- [C12] P. Kyritsi, C. Tsogka and G. Papanicolaou, *Optimally Designed Time Reversal and Zero Forcing Schemes*, Proceedings of the First International wireless Summit, Aalborg, Denmark, September 17– 22, 2005.
- [C13] L. Borcea, G. Papanicolaou and C. Tsogka, *Waveform Design for Selective Imaging in Random Media*, Proceedings of the conference Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN, Rethymnon, Crete, June 13– 16 2007.



- [C14] L. Borcea, G. Papanicolaou, C. Tsogka, *Waveform design for selective imaging in random media*, Proceedings of the Conference on Inverse Problems Control and Optimization, Marrakesh, Marroco, April 16– 19, 2008.
- [C15] L. Borcea, G. Papanicolaou, C. Tsogka, *Selective array imaging of cracks in homogeneous and random media*, Proceedings of WCCM8-ECCOMAS 08, Venice, Italy, June 30 – July 4, 2008.
- [C16] E. Becache, J. Rodriguez and C. Tsogka, *The fictitious domain method and applications in wave propagation*, Proceedings of the 2nd International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, Rhodes, Greece, June 22– 24, 2009.
- [C17] A. Semin and C. Tsogka, *Coherent imaging using cross-correlations of ambient noise sources*, Proceedings of the 10th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Vancouver, Canada, July 25– 29, 2011.
- [C18] J. Garnier, G. Papanicolaou, A. Semin and C. Tsogka, *Signal to noise ratio estimation in passive correlation based imaging*, Proceedings of the 6th International Conference on Inverse Problems Control and Optimization, Ecole Polytechnique, Palaiseau, France, April 2– 4, 2012.
- [C19] L. Borcea, G. Papanicolaou and C. Tsogka, *Array imaging in heavy clutter*, Proceedings of the 11th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Tunis, Tunisia, June 3– 7, 2013.
- [C20] C. Tsogka, D.A. Mitsoudis and S. Papadimitropoulos, *Imaging extended reflectors in a two-dimensional waveguide*, Proceedings of the 11th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Tunis, Tunisia, June 3– 7, 2013.
- [C21] L. Borcea, E. Karasmani and C. Tsogka, *Underwater source detection and localization with incoherent data*, Proceedings of the 3rd Underwater Acoustic Conference and Exhibition, Chania, Greece, June 21– 26, 2015.
- [C22] C. Tsogka, Y. Petromichelakis and C. G. Panagiotopoulos, *Influence of the boundaries in imaging for damage localization in 1D domains*, Proceedings of the 8th GRACM International Congress on Computational Mechanics, Volos, Greece, July 12– 15, 2015.
- [C23] C. G. Panagiotopoulos, Y. Petromichelakis and C. Tsogka, *Time reversal in elastodynamics and applications to structural health monitoring*, Proceedings of the 5th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, Crete, Greece, May 25– 27, 2015.