

# Gilles A. Francfort

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## Degrees

- 06/89      Habilitation à diriger des recherches,  
              Université Paris 6, Paris.
- 06/82      Ph.D. in Mechanical Engineering,  
              Stanford University, Stanford.
- 06/78      Diplôme d'Ingénieur Civil des Ponts et Chaussées,  
              Ecole Nationale des Ponts et Chaussées, Paris.

## Professional Experience

- 09/14 - 02/15  
02/16 - 06/16    Visiting Professor, Courant Institute,  
01/17 - 06/17    New York University, New York.  
01/18 - 06/18
- 10/11 - 09/16    Senior Member, Institut Universitaire de France, Paris.
- 09/94 - now      Professor, Department of Mathematics,  
                    Université Paris-Nord, Villetaneuse.
- 09/93 - 05/94    Visiting Associate Professor, Department of Mathematics,  
                    Carnegie Mellon University, Pittsburgh.
- 10/83 - 10/92    Research Scientist, Mathematics Division,  
                    Laboratoire Central des Ponts et Chaussées, Paris.
- 09/90 - 06/91    Senior Research Scientist, Courant Institute,  
                    New York University, New York.

## Non-academic cursus

- 10/82 - 10/83    Military service, France.
- 10/92 - 08/93    Personal leave.

## Honors

- 04/02      Prix Thématique Paul Doistau-Emile Blutet,  
              French Academy of Sciences (jointly with J.-J. Marigo).

## Plenary Conferences

- 05/98      Congrès National d'Analyse Numérique 1998, Arles, France.
- 03/10      GAMM 2010, 81st Annual Meeting, Karlsruhe, Germany.
- 07/11      ICIAM 2011, 7th International Congress on Industrial and  
              Applied Mathematics, Vancouver, Canada.

## Supervision

- 12 /98 Blaise Bourdin (Paris-Nord): *Une méthode variationnelle en Mécanique de la rupture, théorie et applications numérique*, highest honors.  
Currently Professor, L.S.U., Baton Rouge, USA.
- 10/05 Jean-François Babadjian (Paris-Nord): *Dimensional reduction for heterogeneous, cracked or slit materials*, highest honors.  
Currently Professeur, Université Paris-Sud, Orsay, France.
- 02/05-02/06 Alessandro Ferriero (Paris-Nord & Ecole Polytechnique): Post-Doctoral Fellow. Research topic: *Fatigue*.  
Currently Profesor Contratado Doctor, Universidad Autónoma de Madrid, Spain.

## Editorial Board

Annales de l'Institut Henri Poincaré (C) Analyse Non Linéaire  
Applied Mathematics Research Express (defunct)  
Mathematics and Mechanics of Complex Systems

## Contractual and sponsored activity

- 16-19 co-Principal Investigator: NSF grant DMS-1615839  
*"Fracture in Soft Organic Solids – The Variational View"*.
- 07-10 Member: ANR : *"Mouvements d'Interfaces, Calcul et Applications"*.
- 04-09 Member: Multimath European Network: *"Multi-scale modelling and characterisation for phase transformations in advanced materials"* (MRTN-CT-2004-505226).
- 98-04 Member: TMR European Network: *"Phase Transitions in Crystalline Solids"*.

## Various Services

Referee for: Arch. Rat. Mech Anal., *J. Mech. Phys. Solids*, M2AN, M2AS, Comptes Rendus Acad. Sc. Paris, *J. Convex Anal.*, S.I.A.M. J. Appl. Math., *S.I.A.M. J. Math. Anal.*, *J. Elasticity*, *Port. Mat.*, *Interfaces Free Bdaries*, *Eur. J. Mech.*, Ann. Fac. Sc. Toulouse, *Appl. Math. Optim.*, *Asymp. Anal.*, *Proc. Royal Soc. London*, *Proc. Royal Soc. Edinburgh*, *Nonlinear Anal.*, *J. Nonlinear Sc.*, *Com. Part. Dif. Eq.*, *Eur. J. Appl. Math.*, *ESAIM: COCV*, *Zeit. Ang. Math. Mech.*, *Annali di Mat*, *Proc. A.M.S.*, *Cont. Mech and Therm.*, *J. Diff. Eqns.*, *Nonlinearity*, *J. Funct. Anal.*, *Comm. Pure Applied Maths.*, *J. Maths Pures Appliquées*, *Optimization*, *Cont. Discrete Dyn. Systems*, *M3AS*, *Annali Scuola Norm. Sup. Pisa*, *Comp. Appl. Maths.*, *J. Dyn. Differential Eqns.*, *S.I.A.M. Mult. Mod. Sim.*, *IMA J. Applied Maths*, *Calc. Var.*, *Eng. Fracture Mech.*  
+ about 10 books.

Expertise for: European Research Council, International Centre for  
Mathematical Sciences Research-in-groups, Ecos Sud,  
Mathematics Responsive Mode, Engineering and Physical  
Sciences Research Council, IndAM, INRIA Research Project  
Teams, e-GAP (The Royal Society).

### Conferences organized

- 06/92 Member of Organization Committee: *First European Congress of Mathematics*, Paris, July 06 -10, 1992.
- 09/04 Co-organizer with A. Mielke (Stuttgart) of *Workshop on Rate Independent Processes*, Paris, Aug. 30 – Sept. 01, 2004.
- 07/06 Co-organizer with G. Dal Maso (Trieste), V. Ferone (Napoli), F. Murat (Paris) of Special Session: *P.D.E.'s and applications*, in *Joint Meeting Mathematics and Its Applications*, Torino, July 03 – 07, 2006.
- 02/07 Co-organizer with G. Dal Maso (Trieste), A. Mielke (Stuttgart), T. Rubicek (Prague) of Oberwolfach Workshop: *Analysis and Numerics for Rate Independent Processes*, Oberwolfach, Feb. 25 – Mar. 03, 2007.
- 07/07 Co-organizer with K. Hamdache (Palaiseau), L. Mascarenhas (Lisboa), F. Murat (Paris) of Conference: *Des équations aux dérivées partielles au calcul scientifique, Congrès en l'honneur de Luc Tartar*, Paris, July 02 – 06, 2007.
- 09/07 Member Scientific Committee CEDYA 2007  
*X Congreso de Matemática Aplicada*, Sevilla, Sept. 24–28, 2007.
- 05/08 Co-organizer with G. Dal Maso (Trieste), A. Garroni (Rome), C. Larsen (Worcester) of four-part mini-symposium: *Damage and Fracture Evolution*, SIAM conference on *Mathematical Aspects of Materials Science*, Philadelphia, May 11 – 14, 2008.
- 09/08 Member Scientific Committee IUTAM Conference on *Variational Concepts with Applications to the Mechanics of Materials*, Bochum, Sept. 22–26 , 2008.
- 05/10 Member Organizing Committee SIAM Conference on *Mathematical Aspects of Materials Science*, Philadelphia, May 23 – 26 , 2010.
- 07/14 Co-organizer with M. Kružík (Prague), A. Gloria (Brussels), of Workshop: *Relaxation, Homogenization and Dimensional Reduction in Hyperelasticity*, Paris, March 25 – 27, 2014.
- 08/15 Co-organizer with S. Luckhaus (Leipzig) of Oberwolfach Mini-Workshop: *Scales in Plasticity*, Oberwolfach, Nov. 8 – 14, 2015.
- 01/16 Co-organizer with C. Miehe (Stuttgart) of 15th GAMM-Seminar on Microstructures, Paris, Jan 22 – 23, 2016.
- 05/16 Co-organizer with B. Bourdin (Baton Rouge), C. Larsen (Worcester), C. Maurini (Paris) of BIRS Workshop “Variational Models of Fracture” , Banff, May 9 –13, 2016.
- 05/18 One of 9 co-organizers of Workshop “Vers une vision variationnelle de la mécanique”, Porquerolles, May 31 –June 2, 2018.

### Invited Visits outside France

New York University New York	many times since 06/84 (stays ranging from one week to 6 months).
University of Michigan, Ann Arbor	08/84 (1 week); 06/85 (2 weeks); 04/86 (1 week); 12/88 (1 week).
California Institute of Technology, Pasadena	04/86 (1 week); 06/97(1 week); 06/98(2 months); 08/02(6 weeks).
Carnegie Mellon University, Pittsburgh	10/91(1 week); 04/91(1week); 12/94 (1 week); 03/96(1 month); 03/97 (2 weeks); 11/98 (1 week); 01/00 (1 week); 09/00 (1 week) ; 10/01 (3 weeks); 11/02(3 weeks), 11/03(3 weeks), 10/04 (2 weeks), 11/13(1 week), 11/14(1 week).
Mathematical Science Research Institute, Berkeley	01/91 (2 weeks).
University of Minnesota, Minneapolis	04/91 (1 week) ; 03/94 (1week); 06/96 (1 week).
University of Utah, Salt Lake City	04/96 (1 month); 01/05(1 week).
University of California, Los Angeles	07/96 (1 month).
Rice University, Houston	10/95 (1 week).
Università di Napoli, Napoli	12/84 (1 week).
Danmarks Tekniske Højskole, Lyngby	02/86 (1 week).
Universidade de Lisboa, Lisboa	06/86 (1 week).
International Center for Theoretical Physics, Trieste	10/85 (2 weeks); 01/90 (3 weeks).
Heriot-Watt University, Edinburgh	06/86 (1 week); 12/17 (2 days).
Universidad Complutense, Madrid	02/95 (1 week).
Universidad de Chile, Santiago	06/96 (1 month).
Max-Planck Institut fur Mathematik, Leipzig	03/98 (1 week); 05/98 (2 weeks).
Worcester Polytechnic Institute, Worcester	01/00(1 week), 08/01(1 week) ; 11/02(1 week); 11/14(3 days)

Isaac Newton Institute Cambridge	10/99(8 weeks)
Universidad de Sevilla, Sevilla	04/00(1 week)
Università di Roma 1 Roma	12/01(2 weeks); 11/07(1 week)
Università di Roma 2 Roma	12/02(1 week); 02/05(1 week)
S.I.S.S.A. Trieste	01/03(3 weeks); 04/13(2 weeks); 05/15 (1 week)
University of Warwick Coventry	06/03(1 week)
Rutgers University New Brunswick	11/04(1 week)
Scuola Normale Superiore Pisa	10/06(1 month)
Oxford University Oxford	12/06(1 week)
Max Planck Institut Leipzig	04/08(3 days)
University of Bristol Bristol	06/08(1 week)
Università di Brescia Brescia	07/10(3 days)
McGill University Montreal	01/11(3 days)
Cornell University Ithaca	05/11(3 days)
Università di Pavia Pavia	12/11(3 days); 06/12(3 days); 10/16(1 week)
Technische Universität München Munich	07/12(3 days)
Technische Universität Dortmund Dortmund	03/13(3 days)
University North Texas Denton	10/13(4 days)
Stanford University Stanford	02/02 (2 days); 12/15(3 days)
University of Illinois at Urbana-Champaign Champaign	09/15 (3 days)
Purdue University West Lafayette	04/16 (3 days)
Schrödinger Institute Vienna	06/16 (2 weeks)
University of Texas Austin	04/17 (3 days)

## Seminars

- 1983 ONERA, Université Nancy 1, Ecole Mines Nancy , Ecole Polytechnique.
- 1984 Ecole Normale Supérieure , Université Paris 6 , Academia Navale de Napoli, Ecole Polytechnique.
- 1985 Université Paris 6, Université de Metz, University of Michigan.
- 1986 Université Paris 6, Université de Chambéry, Danmarks Tekniske Højskole, University of Michigan, Universidade de Lisboa.
- 1988 Université du Languedoc, New Jersey Institute of Technology, University of Michigan, Université Paris 6.
- 1989 Carnegie Mellon University.
- 1990 Université de Toulon, Princeton University, Université Paris 6, Courant Institute.
- 1991 University of Delaware, University of Minnesota(2), Carnegie Mellon University, Courant Institute.
- 1992 Collège de France, Ecole Polytechnique, Université Paris 6, Université Paris-Sud.
- 1993 Carnegie Mellon University, Ecole Polytechnique.
- 1994 Collège de France, Université Paris-Sud, Worcester Polytechnic Institute, University of Minnesota, Carnegie Mellon University, Ecole Normale Supérieure.
- 1995 Universidad Complutense de Madrid, Rice University (colloquium).
- 1996 Université Grenoble(2), Université Paris 6, Carnegie Mellon University, University of Utah, Universidad de Chile.
- 1997 Carnegie Mellon University, Université Paris 6, Oxford University.
- 1998 Université Orléans, Université Paris 6(2) , Université Nice, Max Planck Institut leipzig, Carnegie Mellon University:.
- 1999 Ecole Polytechnique (colloquium).
- 2000 Worcester Polytechnic Institute, Université Paris 6, Universidad de Sevilla, SISSA.
- 2001 Worcester Polytechnic Institute, Université Versailles, Università di Roma 1, Carnegie Mellon University, Université Paris 6.
- 2002 Université Paris 6, Université de Rennes, Ecole Nationale des Ponts et Chaussées, Stanford University, Carnegie Mellon University, Worcester Polytechnic Institute.
- 2003 Courant Institute, Louisiana State University, Carnegie Mellon University, University of Warwick.
- 2004 Courant Institute, Carnegie Mellon University, Université de Grenoble, Rutgers, Technische Universität Kaiserslautern.
- 2005 Ecole Polytechnique, Université Paris 6, University of Utah, University of Maryland.
- 2006 Oxford University, Ecole Polytechnique.
- 2007 Yeshiva University, Temple University, Worcester Polytechnic Institute, New York University, Brown University, University of Pennsylvania.

- 2008 Université Rennes (colloquium), INRIA, Max Planck Institut Leipzig, University of Bristol.
- 2009 Collège de France, Courant Institute, Fédération Francilienne de Mécanique.
- 2011 McGill University, CRS-ISM Colloquium Université de Montréal, GDR Chant, Ecole Polytechnique(2), Cornell University, Courant Institute, Institut des Hautes Études Scientifiques (Séminaire Laurent Schwartz).
- 2012 Université Paris 6, Université de Grenoble, Courant Institute(2), Technische Universität München, Temple University.
- 2013 Technische Universität Dortmund, University of North Texas, Carnegie Mellon University.
- 2014 Courant Institute (colloquium), University of Pittsburgh (colloquium), Worcester Polytechnic Institute.
- 2015 Université Paris 6, Université Libre de Bruxelles, Stanford University (colloquium).
- 2016 Purdue University (colloquium+seminar), University of Connecticut, Università di Pavia.
- 2017 University of Texas at Austin, Heriot-Watt University.
- 2018 Courant Institute.



### Communications, lectures during special schools

\*\* : *course*

- 09/83 6ème Congrès français de mécanique, Lyon, France.
- 07/84 International Conference on Numerical Methods for Transient and Coupled Problems, Venezia, Italy.
- 01/85 Symposium on Energy Release Rates and Path Independent Integrals in Defect and Fracture Mechanics, Bad Honnef, Germany.
- 10/85\*\* Workshop on Semi-group Theory, International Center for Theoretical Physics, Trieste, Italy.
- 07/86 Symposium on Non-Classical Continuum Mechanics: Abstract Techniques and Applications, Durham, UK.
- 09/86 IUTAM Symposium on Thermomechanical Coupling in Solids, Paris, France.
- 12/88 SIAM Conference on Random Media, Leesburg, USA.
- 01/90 Workshop on Composite Media and Homogenization Theory, Trieste, Italy.
- 03/90 Mécamat, Evian, France.
- 06/90 Mathematical Problems in Non Linear Elasticity, Oberwolfach, Germany.
- 12/90 Problèmes non linéaires appliqués, Ecole CEA-EDF-INRIA, Clamart, France.
- 01/91 P.D.E. Conference on Homogenization, Berkeley, USA.
- 06/91 First European Conference on Elliptic and Parabolic Problems, Pont-à-Mousson, France.
- 06/92 Topology Design of Structures, Sesimbra, Portugal.
- 06/93 CIRM meeting on Calculus of Variations, Homogenization and Continuum Mechanics, Luminy, France.
- 02/94 North American Conference on Smart Structures and Materials, Orlando, USA.
- 04/94 SIAM Conference on Mathematics of Materials, Pittsburgh, USA.
- 02/95 Eurhomogenization Conference, Madrid, Spain.
- 03/95\*\* Workshop on Shape Optimization, Saint Etienne, France.
- 06/95 Calculus of Variations and Nonlinear Elasticity, Cortona, Italy.
- 06/95 Conference on Dynamics of Microstructures, Hanover, Germany.
- 07/95 Minisymposium on Shape Optimization, ICIAM 95, Hamburg, Germany.
- 07/95\*\* Conference on Optimal Design, Banach Center, Warsaw, Poland.
- 08/95 Conference on Structural Optimization, Salt Lake City, USA.
- 06/96 Workshop on Interface and Thin Films, IMA, Minneapolis, USA.
- 03/97 IUTAM Symposium on Composites/Active Materials, Cairo, Egypt.
- 05/97 Second SIAM Conference on the Mathematical Aspects of Materials Science, Philadelphia, USA.
- 06/97 Workshop: Mathematical Continuum Mechanics, Oberwolfach, Germany.

07/97\*\* School on Shape Optimization, CEMRACS, Orsay, France.

09/97\*\* Summer School on the Mathematics of Materials, CIM, Coimbra, Portugal.

09/97 Multiscale II, Leipzig, Germany.

04/99 GAMM 99, Metz, France.

06/99 CIRM meeting on Shape Optimization, Luminy, France.

10-12/99 Workshop on Mathematical developments in solid mechanics and materials science, Isaac Newton Institute, Cambridge, UK.

07/00\*\* Euroconference on New Mathematical Methods in Continuum Mechanics, Anogia, Greece.

10/00 Symposium on Continuous Damage and Fracture, Cachan, France.

02/01 Workshop on Variational Methods beyond Elasticity, Leipzig, Germany.

06/01 First CSMA-GIMC Workshop on Modern Issues in Modelling and Computation of Damage and Failure, Cefalu, Italy.

07/01\*\* School on Multi-Scale Problems, CEMRACS, Orsay, France.

12/01\*\* School on Multiple Scales, Rome, Italy.

01/03\*\* Course on Brittle Fracture, SISSA, Trieste, Italy.

07/03 CIRM meeting on Shape Optimization, Luminy, France.

08/03 Recent Developments in Modelling Rupture, Foz do Iguacu, Brazil.

09/03 Workshop: P.D.E.'s and Materials, Oberwolfach, Germany.

10/03 Workshop on Homogenization, Orléans, France.

01/04 Third GAMM on Microstructures, Stuttgart, Germany.

06/04 Midnight Sun Homogenization Conference, Narvik, Norway.

08/04 ICTAM04, Warsaw, Poland.

09/04 Variational Methods in Materials Science, Trieste, Italy.

09/04 Homogenization and Shape Optimization, Lisbon, Portugal.

12/04 Workshop: Thermodynamische Materialtheorien, Oberwolfach, Germany.

05/05 Mathematical Modeling in Continuum Mechanics, Alghero, Italy.

05/05 Equations aux dérivées partielles non-linéaires, Tipaza, Algeria.

09/05 Workshop on thin structures, Napoli, Italy.

10/05 Society for Natural Philosophy Meeting, Bari, Italy.

10/05 Workshop on the Calculus of Variations, Pittsburgh, USA.

10/05 AMS Sectional Meeting, Lincoln, USA.

11/05 Miniworkshop: Analysis and Computation of Microstructures in Finite Plasticity, Oberwolfach, Germany.

02/06 Modelling and analysis of phase transitions, Pisa, Italy.

05/06 VIII Congresso SIMAI, Ragusa, Italy.

07/06 SIAM Conference on Analysis of Partial Differential Equations, Boston, USA.

10/06 Workshop on Variational methods in Material Science, Pisa, Italy.

01/07 AMS Annual Meeting, New Orleans, USA.

06/07 Thermomechanical Modeling of Solids, Palaiseau, France.

- 10/07 SES 2007, College Station, USA.
- 11/07 Workshop on Rate-Independence, Homogenization and Multiscaling, Pisa, Italy.
- 02/08\*\* Fracture and Damage : Formation and propagation of singularities in continuum mechanics, Winter School, Institut Henri Poincaré, Paris, France.
- 03/08\*\* Singularities in Mechanics: formation, propagation and microscopic description, Centre Emile Borel, Paris, France.
- 05/08 SIAM Conference on the Mathematical Aspects of Materials Science Philadelphia, USA.
- 06/08 Workshop on Geometric Analysis, Elasticity, and PDE on the 60th Birthday of John Ball, Maxwell Institute and Heriot-Watt University, Edinburgh, UK.
- 09/08 IUTAM Symposium on Progress in the Theory and Numerics of Configurational Mechanics, Erlangen, Germany.
- 06/09\*\* LMS-EP SRC Short Course on the Mathematics of Materials, Oxmos, Oxford University, Oxford, UK.
- 09/09 Homogenization and Optimal Design, Sevilla, Spain.
- 12/09 SIAM Conference on Analysis of PDE's, Miami, USA.
- 01/10 New Developments in Elasticity, the Legacy of Robert Hooke, Oxford, UK.
- 02/10 Motions of Interfaces and Non Linear P.D.E.'s, Tours, France.
- 05/10 SIAM Conference on the Mathematical Aspects of Materials Science Philadelphia, USA.
- 07/10\*\* Variational Models and Methods in Solid and Fluid Mechanics, CISM, Udine, Italy.
- 08/10\*\* Ecole Thématique 2010, GDR Chant: Enjeux de Modélisation et Analyse Liés aux Problèmes de Surfaces Rugueuses et de Défauts, Wolfgang Pauli Institute, Wien, Österreich.
- 08/10 Rate-independent systems: Modeling, Analysis, and Computations, Banff International Research Station Workshop, Banff, Canada.
- 09/10 Stability and Nonlinear Solid Mechanics, Institut Henri Poincaré, Paris, France.
- 07/11\*\* School "Mechanics of Fractures and Second Gradient Theory", M&Mocs, La Cisterna, Italy.
- 12/11 Workshop: Variational Methods for Evolution, Oberwolfach, Germany.
- 03/12 Workshop: Mechanics of Materials, Oberwolfach, Germany.
- 06/12 Variational Problems with Multiple Scales, Otranto, Italy.
- 07/12 Exotic Structures and Homogenization, Saint-Petersburg, Russia.
- 09/12 Evolution Problems in Damage, Plasticity and Fracture, Udine, Italy.
- 02/13 12th GAMM Seminar on Microstructures, Berlin, Germany.
- 04/13\*\* Evolution Problems for Fracture Mechanics, SISSA, Trieste, Italy.
- 05/13 PACAM XIII, Houston, USA.

- 06/13 SIAM Conference on the Mathematical Aspects of Materials Science Philadelphia, USA.
- 06/13 15ème Rencontres Mathématiques de Rouen, Rouen, France.
- 09/13 International Conference on Nonlinear and Multiscale Partial Differential Equations: Theory, Numerics and Applications, Shanghai, China.
- 09/13 Evolution Problems for Material Defects: Dislocations, Plasticity, and Fracture, Trieste, Italy.
- 11/13\*\* Multi-scale and Multi-field Representations of Condensed Matter Behavior, Pisa, Italy.
- 12/13 Workshop: Material Theory, Oberwolfach, Germany.
- 06/14 International Conference on Length Scale in Solid Mechanics: Mathematical and Physical Aspects, Paris, France.
- 09/14\*\* Analyse Variationnelle et Microstructuration, 3<sup>ème</sup> école d'été de mécanique, Quiberon, France.
- 12/14 Workshop: Variational Methods for Evolution, Oberwolfach, Germany.
- 01/15 14th GAMM Seminar on Microstructures, Regensburg, Germany.
- 05/15\*\* Variational Methods for Plasticity and Dislocations, SISSA, Trieste, Italy.
- 05/15 PACAM XV, Champaign, USA.
- 12/15 Workshop Calculus of Variations and its Applications on the 65th birthday of Luisa Mascarenhas, Caparica, Portugal.
- 05/16 Workshop New Challenges in the Calculus of Variations in honor of the 60th birthday of Irene Fonseca, Montreal, Canada.
- 06/16 Workshop Advances in the Mathematical Analysis of Material Defects in Elastic Solids, SISSA, Trieste, Italy.
- 06/16 Workshop Entropy methods, dissipative systems, and applications, Schrödinger Institute, Vienna, Austria.
- 01/17 16th GAMM Seminar on Microstructures, Dortmund, Germany.
- 07/17 Workshop on Multiscale Problems and Relaxation in Nonlinear Elasticity, Dresden, Germany.
- 07/17 Workshop: Material Theories, Oberwolfach, Germany.
- 08/17\*\* Free discontinuity problems and applications in fracture, mechanics Research Summer School, Ningbo, China.
- 02/18 Workshop: Variational Methods for Inelastic Solids, Oberwolfach, Germany.
- 05/18 Topics in the Calculus of Variations: Recent Advances and New Trends, Banff International Research Station Workshop, Banff, Canada (*did not give a talk*).
- 06/18 Celebrating Approximate 60s, Shanghai, China.
- 06/18 Free Boundary, Free Discontinuity Problems and Applications, Ningbo, China.
- 08/18 New Trends in the Variational Modeling of Failure Phenomena, Schrödinger Institute Workshop, Vienna, Austria.
- 11/18 Rencontres Franco-Tchèques de mathématiques, Lyon, France.

## List of Publications

1. Homogénéisation et oscillations rapides en thermoélasticité linéaire, C.R.A.S. Paris(1), 295, 1982, 367–370.
2. Conservation laws and material momentum in thermoelasticity, *with A.G. Herrmann*, J. Appl. Mech., 104, 1982, 710-714.
3. Homogénéisation de milieux viscoélastiques linéaires de Kelvin-Voigt, *with D. Leguillon, P. Suquet*, C.R.A.S. Paris(1), 296, 1983, 287-290.
4. Thermodynamique et lois de comportement thermomécanique homogénéisées, *with Q.S. Nguyen, P. Suquet*, C.R.A.S. Paris(2), 296, 1983, 1007-1010.
5. Homogenization and linear thermoelasticity, S.I.A.M. J. Math. Anal., 14(4), 1983, 696-708.
6. Homogenization and fast oscillations in linear thermoelasticity, **in:** Numerical Methods for Transient & Coupled Problems, R. Lewis, E.Hinton, P. Betess, B.Schrefler, eds., Pineridge, Swansea, 1984, 382-393.
7. Homogenization and optimal bounds in linear elasticity, *with F. Murat*, Arch. Rat. Mech. Anal., 94(4), 1986, 307-334.
8. Homogenization and mechanical dissipation in thermoviscoelasticity, *with P. Suquet*, Arch. Rat. Mech. Anal. , 96(3), 1986, 265-293.
9. A contour integral and an energy release rate in thermoelasticity, *with A.G. Herrmann*, Int. J. Sol. Struct., 22(7), 1986, 759-766.
10. Asymptotic thermoelastic behavior of flat plates, *with D. Blanchard*, Quat. Appl. Math., 45(4), 1987, 645-667.
11. Optimal bounds for conduction in two-dimensional, multiphase, polycrystalline Media, *with G.W. Milton*, J. Stat. Phys., 46, 1987, 161-177.
12. Asymptotic transient thermoelastic behavior, **in:** Proceedings of the IUTAM Symposium on Thermomechanical Coupling in Solids, H.D. Bui , Q.S. Nguyen, eds. ,Elsevier, Amsterdam, 1987, 291-304.
13. Study of a doubly non-linear heat equation with no growth assumption on the parabolic term, *with D. Blanchard*, S.I.A.M. J. Math. Anal., 19(5), 1988, 1032-1056.
14. Optimal bounds for conduction in two-dimensional, two phase, anisotropic media, *with F. Murat*, **in:** Proceedings of the Durham Symposium on Non-Classical Continuum Mechanics, R.J. Knops, ed., Cambridge Press, Cambridge, 1987,197-212.
15. Homogenization in thermoelasticity, *with S. Brahim-Otsmane, F. Murat*, **in:** Random Media and Composites, R.V. Kohn, G. W. Milton, eds. , S.I.A.M. Press, Philadelphia, 1989, 13-45.
16. Comportement effectif d'un mélange de matériaux élastiques isotropes ayant le même module de cisaillement, *with L. Tartar*, C.R.A.S. Paris(1), 312, 1991, 301-307.
17. A few results on a class of degenerate parabolic equations, *with D. Blanchard*, Ann. Sc. Norm. Sup. Pisa, 18(2), 1991, 213-249.
18. Mathematical analysis of the damage evolution in a brittle damaging continuous medium, *with J.-J. Marigo*, **in:** Mécanique, modélisation numérique et dynamique des matériaux, Publications du L.M.A., 124, Presses du C.N.R.S., 1991, 245-276.

19. Correctors for the homogenization of the wave and heat equations, *with S. Brahim-Otsmane, F. Murat*, J. Math. Pures et Appl., 71(2), 1992, 197-231.
20. Homogenisation of a class of fourth order equations with application to incompressible elasticity, Proc. Royal Soc. Edinburgh, 120A, 1992, 25-46.
21. Oscillations and energy densities in the wave equation, *with F. Murat*, Comm. Part. Dif. Eq., 17(11&12), 1992, 1785-1865.
22. A numerical algorithm for topology and shape optimization, *with G. Allaire*, **in:** Topology Design of Structures, M. Bendsoe, C. Mota Soares, eds., Kluwer, Dordrecht, 1993, 239-248.
23. Stable damage evolution in a brittle continuous medium, *with J.-J. Marigo*, Eur. J. Mech. A/Solids, 12(2), 1993, 149-189.
24. Combined effects of homogenization and singular perturbations in elasticity, *with S. Muller*, J. reine angew. Math., 454, 1994, 1-35 (featured AMS review).
25. Sets of conductivity and elasticity tensors stable under lamination, *with G.W. Milton*, Comm. Pure Appl. Math., 47, 1994, 1-23.
26. Relaxation in BV versus quasiconvexification in  $W^{1,p}$ ; a model for the interaction between fracture and damage, *with I. Fonseca*, Calc. Variations and PDE, 3(4), 1995, 407-446.
27. Fourth order moments of a nonnegative measure on  $S^2$  and applications, *with F. Murat, L. Tartar*, Arch. Rat. Mech. Anal., 131, 1995, 305-333.
28. A topological approach to shape optimization, *with G. Allaire, A. Bonnetier, F. Jouve*, Z. fur Ang. Math. & Mechanik, 76(S3), 1996, 255-258.
29. Shape optimization by the homogenization method, *with G. Allaire, A. Bonnetier, F. Jouve*, Numer. Math., 76, 1997, 27-68 (featured AMS review).
30. Existence of Minimizers for Non-Quasiconvex Functionals Arising in Optimal Design, *with G. Allaire*, Ann. I.H.P., Anal. Nonlin., 15(3), 1998, 301- 339.
31. Cracks in fracture mechanics: A time-indexed family of energy minimizers, *with J.-J. Marigo*, **in:** IUTAM Symposium on Variation of Domains and Free-Boundary Problems in Solid Mechanics, P. Argoul, M. Frémond, Q.S. Nguyen, eds., Solid Mechanics and its Applications, Vol. 66, Kluwer, Dordrecht, 1999, 197-203.
32. Revisiting brittle fracture as an energy minimization problem, *with J.-J. Marigo*, J. Mech. Phys. Solids, 46(2), 1998, 1319-1342.
33. 3d-2d asymptotic analysis of an optimal design problem for a thin film, *with I. Fonseca*, J. reine angew. Math., 505, 1998, 173- 202.
34. Une approche variationnelle de la mécanique du défaut, *with J.-J. Marigo*, ESAIM: Proc., 6, 1998, 57-74 ([www.emath.fr/proc/Vol.6/](http://www.emath.fr/proc/Vol.6/)).
35. Numerical experiments in revisited brittle fracture, *with B. Bourdin, J.-J. Marigo*, J. Mech. Phys. Sol., 48(4), 2000, 797-826.
36. 3D- 2D asymptotic analysis for inhomogeneous thin films, *with A. Braides, I. Fonseca*, Indiana U. Maths. J., 49(4), 2000, 1367-1404.
37. Duality relations for nonlinear incompressible 2-dimensional elasticity, *with P. Suquet*, Proc. Royal Soc. Edinburgh, 131A, 2001, 351-369.

38. On the inadequacy of the scaling of linear elasticity for 3d-2d asymptotics in a nonlinear setting,  
*with I. Fonseca*, J. Math. Pures et Appl., 80(5), 2001, 547-562.
39. An asymptotic study of the debonding of thin films,  
*with K. Bhattacharya, I. Fonseca*, Arch. Rat. Mech. Anal., 161, 2002, 205-229.
40. Monotone operators in divergence form with x-dependent multivalued graphs,  
*with F. Murat, L. Tartar*, Boll. Un. Mat. Ital., 7B, 2004, 23-59.
41. The wave equation on a thin domain: energy density and observability.  
*with P. Gérard*, J. Hyp. Diff. Eq., 1(2), 2004, 351-366.
42. On conservation laws and necessary conditions in the calculus of variations,  
*with J. Sivaloganathan*, Proc. Royal Soc. Edinburgh, 132A, 2002, 1361-1371.
43. Vers une théorie énergétique de la rupture fragile,  
*with J.-J. Marigo*, C.R. Mécanique, 330, 2002, 225-233.
44. Revisiting brittle fracture as an energy minimization problem: Comparison of Griffith and Barenblatt surface energy models,  
*with M. Charlotte, J.-J. Marigo, L. Truskinovsky*, **in**: Continuous Damage and Fracture, A. Benallal, Ed., The Data Science Library, Elsevier, Paris, 2000, 7-12.
45. Existence and convergence for quasistatic evolution in brittle fracture,  
*with C.J. Larsen*, Comm. Pure Appl. Maths, 56, 2003, 1465-1500.
46. Bounds on the effective behaviour of a square conducting lattice,  
*with A. Braides*, Proc. Royal Soc. London A, 460(2046), 2004, 1755-1769.
47. Quasistatic crack growth in non-linear elasticity,  
*with G. Dal Maso, R. Toader*, Arch. Rat. Mech. Anal., 176, 2005, 165-225.
48. Spatial heterogeneity in 3D-2D dimensional reduction,  
*with J.F. Babadjian*, ESAIM: COCV, 11(1), 2005, 139-160.
49. Quasistatic evolution in brittle fracture : the case of bounded solutions,  
*with G. Dal Maso, R. Toader*, **in** : Calculus of Variations. Topics from the Mathematical Heritage of Ennio De Giorgi, D. Pallara, Ed., Quaderni di Matematica 14, Aracne, Roma, 2005, 245-266.
50. Griffith theory of brittle fracture revisited : merits and drawbacks,  
*with J.-J. Marigo*, Latin Amer. J. Solids Struct., 2, 2005, 57-64.
51. An introduction to H-measures and their applications,  
**in** : Variational Problems in Materials Science, G. Dal Maso, A. DeSimone, F. Tomarelli, Eds., Progress in Nonlinear Differential Equations and Their Applications 68, Birkhäuser Verlag, Basel, 2006, 85-110.
52. Quasistatic brittle fracture seen as an energy minimizing movement,  
GAMM-Mitteilungen, 29(2), 2006, 172-191.
53. Existence results for a class of rate-independent material models with nonconvex elastic energies,  
*with A. Mielke*, J. reine angew. Math., 595, 2006, 55-91.
54. A variational view of partial brittle damage evolution,  
*with A. Garroni*, Arch. Rat. Mech. Anal., 182, 2006, 125-152.
55. Thin elastic films : the impact of higher order perturbations,  
*with I. Fonseca, G. Leoni*, Quarterly Applied Maths., LXV,1, 2007, 69-98 + erratum, Quarterly Applied Maths., LXVI(4), 2008, 781-799.

56. The variational approach to fracture,  
*with B. Bourdin, J.-J. Marigo*, *J. Elasticity*, 91(1-3), 2008, 1-148  
(also appeared as a Springer book: ISBN: 978-1-4020-6394-7).
57. Critical Points of Ambrosio-Tortorelli converge to critical points of  
Mumford-Shah in the one-dimensional Dirichlet case,  
*with N. Le, S. Serfaty*, *ESAIM: COCV*, 15(3), 2009, 576-598.
58. The proofs of the optimal bounds for mixtures of two anisotropic  
conducting materials in two dimensions,  
*with F. Murat*, *Mech. Materials*, 41, 2009, 448-455.
59. Homogenization of monotone operators in divergence form  
with  $x$ -dependent multivalued graphs,  
*with F. Murat, L. Tartar*, *Ann. Mat. Pura Appl.*, 188(4), 2009,  
631-652.
60. Revisiting energy release rates in brittle fracture,  
*with A. Chambolle, J.-J. Marigo*, *J. NonLinear Sci.*, 20(4), 2010,  
395-424.
61. When and how do cracks propagate?,  
*with A. Chambolle, J.-J. Marigo*, *J. Mech. Phys. Solids*, 56, 2009,  
1614-1622.
62. Quasistatic evolution in non-associative plasticity – The cap model,  
*with J.-F. Babadjian, M.G. Mora*, *SIAM J. Math. Anal.*, 44, 2012,  
245-292.
63. Small strain heterogeneous elasto-plasticity revisited,  
*with A. Giacomini*, *Comm. Pure Appl. Maths.*, 65(9), 2012, 1185-1241.
64. Fracture,  
*with B. Bourdin*, **in** : *Variational Models and Methods in Solid and  
Fluid Mechanics*, F. dell'Isola and S. Gavrilyuk, Eds., CISM, Springer,  
2014, 107-161.
65. Un résumé de la théorie variationnelle de la rupture,  
Séminaire Laurent Schwartz – EDP et applications, Exp. XXII,  
2011-2012, 11p., 2013.
66. On the Fleck & Willis homogenization procedure in strain gradient  
plasticity,  
*with A. Giacomini, A. Musesti*, *Discrete Contin. Dyn. Syst.*, S., 6(1),  
2013, 43-62.
67. On periodic homogenization in perfect elasto-plasticity,  
*with A. Giacomini*, *J. Eur. Math. Soc.*, 16(3), 2014, 409-461.
68. Quasistatic evolution for the Armstrong-Frederick hardening-plasticity  
model,  
*with U. Stefanelli*, *Appl. Maths. Res. Exp.*, 2, 2013, 297-344.
69. A critical revisiting of finite elasto-plasticity,  
*with E. Davoli*, *SIAM J. Math. Anal.* 47(1), 2015, 526-565.
70. Loss of Ellipticity through homogenization in linear elasticity,  
*with M. Briane*, *Math. Mod. Meth. Appl. Sciences*, 25(5),  
2015, 905-928.
71. The role of a vanishing interfacial layer in perfect elasto-plasticity,  
*with A. Giacomini*, *Chin. Ann. Math.*, 36B(5), 2015, 813-828.
72. The taming of plastic slips in Von Mises elasto-plasticity,  
*with A. Giacomini, J.-J. Marigo*, *Int. and Free Bdaries*, 17(4),  
2015, 497-516.
73. A case study for uniqueness of elasto-plastic evolutions: bi-axial test,  
*with A. Giacomini, J.-J. Marigo*, *J. Math. Pures Appl.*, 105, 2016,  
198-227.



74. Korn-Poincaré inequalities for functions with a small jump set,  
*with A. Chambolle, S. Conti*, Indiana U. Maths. J., 65(4), 2016,  
1373-1399.
75. The elasto-plastic exquisite corpse: A Suquet legacy,  
*with A. Giacomini, J.-J. Marigo*, J. Mech. Phys. Solids, 97, 2016,  
125-139.
76. A note on the derivation of rigid-plastic models,  
*with J.-F. Babadjian*, Nonlinear Diff. Eq. and Appl., 23(3), 2016,  
article 37.
77. Isotropy prohibits the loss of strong ellipticity through homogenization  
in linearized elasticity,  
*with A. Gloria*, Comptes Rendus Mathématique, 354(11), 2016,  
1139-1144.
78. Recovering convexity in non-associated plasticity,  
Comptes Rendus Mécanique, 346(3), 2018, 198-205.
79. Quasistatic evolution in non-associative plasticity revisited,  
*with M.G. Mora*, Calc. Variations and PDE, 57:11, 2018.
80. Approximation of a brittle fracture energy with a constraint of non-  
interpenetration,  
*with A. Chambolle, S. Conti*, Arch. Rat. Mech. Anal., 228(3), 2018,  
867-889.
81. Fracture and healing of elastomers: A phase-transition theory  
and numerical implementation,  
*with A. Kumar, O. Lopez-Pamies*, J. Mech. Phys. Solids, 112, 2018,  
523-551.
82. Fracture with healing: a first step towards a new view of cavitation,  
*with A. Giacomini, O. Lopez-Pamies*, Analysis & PDE, 12(2), 2019,  
417-447.
83. A two-dimensional labile aether through homogenization,  
*with M. Briane*, to appear in Commun. Math. Phys.