

ADRIANA GARRONI
CURRICULUM VITAE
(last update June 2008)

Personal Data

Place and date of birth: Rome, March 22, 1966.

Citizenship: Italian.

Home address: Via Balilla 22, 00185 Roma (ITALY).

Phone number: +39 06 70452392.

Work address: Dipartimento di Matematica, “La Sapienza” Università di Roma,
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Languages spoken: English, French.

Education (higher degrees)

Degree in Mathematics: Università degli Studi di Roma “La Sapienza”, Rome
July 15, 1991. Grade: 110/110 cum laude.

Title of written dissertation: “Il criterio di Wiener per problemi di Dirichlet rilassati”
 (“Wiener criterion for relaxed Dirichlet problems”)

Supervisor: Prof. Umberto Mosco.

Magister Philosophiæ in Functional Analysis: SISSA, Trieste. Grade: 30/30
cum laude.

Title of written dissertation: “A new approach to the study of limits of Dirichlet
problems in perforated domains”.

Supervisor: Prof. Gianni Dal Maso.

PhD in Functional Analysis: SISSA, Trieste, October 1994.

Title of written dissertation: “Asymptotic behaviour of Dirichlet problems in perfo-
rated domains”.

Supervisor: Prof. Gianni Dal Maso

Academic Positions

- (since 1998) Associate Professor at University of Rome, “La Sapienza”, Rome (ITALY).
- (1995-98) Researcher at University of Rome, “La Sapienza”, Rome (ITALY).
- April 1999: Visiting professor at the University of Bonn, Germany.
- March 2000: Visiting professor at the University, Paris VI, France.

- March 2004: Visiting professor at the University, Paris XIII, France.
- July 2004: Visiting professor at the Tata Institute of Balgalore, India.

Fellowships

- 1996: Post doctoral fellowship of the European Community at the University Toulouse, France (three months).
- 1998: CNR-NATO Fellowship at the Max Planck Institute of Leipzig, Germany (two months).
- 2000: CNR-NATO Fellowship at the Courant Institute, New York University, New York, USA (two months).

Advanced Teaching

- 2002: Graduate course “Potential Theory and Applications to Concentration Problems”, PhD program in Mathematics, Department of Mathematics, University of Rome “La Sapienza”
- 2003: “ Γ -convergence for concentration problems with critical growth”, Summer School “School on Concentration Phenomena for Variational Problems”, Rome, 4 lectures.
- 2004: “A phase field model for dislocations”, CNA Summer School: “Advances in Nonlinear Analysis”, Pittsburgh, 1 lecture.
 “ Γ -convergence for concentration problems with critical growth”, Tata Institute, Bangalore, 5 lectures.
- 2006: Graduate course “Variational Methods for Phase Transitions”, PhD program in Mathematics, Department of Mathematics, University of Rome “La Sapienza”
- 2007: Graduate course “Variational Methods for the dislocations”, (in collaboration with M. Ponsiglione) PhD program in Mathematics, Department of Mathematics, University of Rome “Tor Vergata”

Former students

- G. Palatucci, “Phase Transition with Line Tension effect”, University of Rome 3, PhD (2007).
- S. Cacace, “ Γ -convergenza di un modello transizione di fase per le dislocazioni planari nei cristalli”, University of Rome “La Sapienza”, PhD (2007).
- Undergraduate students (Laurea thesis): M. Ponsiglione (2000), F. Di Leo (2006), I. Guaraldo (2007).

Organization of Schools and Conferences

- 2004: September, Rome, Summer School in “Analysis and Applied Mathematics” (coorganizers: V. Chiadó Piat, C. Mantegazza). Lectures by X. Cabré, G. Citti, G. Dal Maso, B. Niethammer.
- 2005: September, Rome, Summer School “Second School in Analysis and Applied Mathematics” (coorganizers: A. Braides, G. Bellettini, V. Chiadó Piat, C. Sinestrari). Lectures by P. Cardaliaguet C. De Lellis, G. Huisken, C. Sinestrari.
- 2006: June, Rome, Summer School “Third School in Analysis and Applied Mathematics” (coorganizer: V. Nesi). Lectures by S. Conti, R.V. Kohn, T. Iwaniec.
- 2007: June, Rome, Summer School “Forth School in Analysis and Applied Mathematics” (coorganizer: A. Braides). Lectures by J. M. Ball , S. Muller, V. Sverak.
- 2008: May, Minisymposium on ”Damage and Fracture”. “SIAM Conference on Mathematical Aspects of Materials Science”, Philadelphia
June, Rome, “Meeting on Applied Mathematics and Calculus of Variations” (coorganizers: A. Braides e V. Nesi).

Services to the Mathematical community

- Member of the Collegio dei Docenti del Dottorato in Matematica (PhD in Mathematics Scientific Committee) of the University of Rome “La Sapienza”
- Member of Associate Professorship Hiring Committee: University of Cagliari (2004), University of Salerno (2006).
- Panelist for the National Science Foundation (2008).
- Peer reviewing for the Journals: Comm. Pure Appl. Math., Ann. Scuola Norm. Sup. Pisa, SIAM Journal on Applied Mathematics, Comm. in Partial Diff. Eq., Arch. Rational Mech. Anal., Proc. Roy. Soc. Edinburgh A, Proc. Roy. Soc. London A, Jour. Mech. Phys. of Solids, Multiscale Modeling and Simulation, Calc. Var. in Partial Differential Equations, Rocky Mountain Journal of Mathematics

Short term visiting positions

(Period, Sponsor, Institution)

- 1993: December , J. Casado Diaz, University of Sevilla, Spain.
- 1995: March, J. Casado Diaz, University of Sevilla, Spain.
- 1996: March-May, J. Flekinger, University of Tolose, France.
May 3-10, P. Wittbold, University of Strasburg, France.

- 1998: April-May, S. Müller, Max Planck Institute of Leipzig, Germany.
 October 17-23, S. Müller, Max Planck Institute of Leipzig, Germany.
- 1999: April, B. Niethammer, University of Bonn, Germany.
 September, J.R. Willis, Newton Institute di Cambridge, UK.
- 2000: March, H. Brezis, University of Paris VI, France.
 May-June, R.V. Kohn, Courant Institute di New York, USA.
- 2001: February 17-25, S. Müller, Max Planck Institute of Leipzig, Germany.
 July 22 - August 6 , S. Müller, Max Planck Institute of Leipzig, Germany.
- 2002: May 17-27, S. Müller, Max Planck Institute of Leipzig, Germany.
 September 6-15, S. Müller, Max Planck Institute of Leipzig, Germany.
- 2003: January 24-31, S. Müller, Max Planck Institute of Leipzig, Germany.
 April 22-27, R.V. Kohn, Courant Institute di New York, USA.
 April 28 - May 3, A. Bahri, Rutgers University, USA.
 May 4-18, M. Ortiz, Caltech, Pasadena, USA.
 May 19 - June 3, G. Leoni and I. Fonseca, Carnegie-Mellon, Pittsburgh, USA.
 November 24-29, G. Alberti, Centro De Giorgi, Pisa, Italy.
- 2004: March, G. Francfort, University of Paris Nord, France.
 May 15-26, M. Ortiz, Caltech, Pasadena, USA.
 May 26 - June 5, G. Leoni and I. Fonseca, Carnegie-Mellon, Pittsburgh, USA.
 July 15 - August 9 , M. Ramaswamy, Tata Institute, Bangalore, India.
 August 11-19, S. Müller, Max Planck Institute of Leipzig, Germany.
- 2005: February 21-27, S. Müller, Max Planck Institute of Leipzig, Germany.
 May 15-23, M. Ortiz, Caltech, Pasadena, USA.
 May 23 - June 2, G. Leoni, Carnegie-Mellon, Pittsburgh, USA.
 June 2 -15, D. James, IMA, Minneapolis, USA.
 July 13-17, V. Smyshlyaev, University of Bath, UK.
- 2006: November 27 - December 9, S. Müller, Max Planck Institute of Leipzig, Germany.
 December 10-15, S. Conti, University of Duisburg-Essen, Germany.
- 2007: January 7-10, B. Bourdin, University of Baton Rouge, USA.
 January 10-18, M. Ortiz, Caltech, Pasadena, USA.
 January 18-26, C. Larsen, WPI, Woncerster, USA.
 September 11-15, S. Conti, University of Duisburg-Essen, Germany.

2008: April 6-9, G. Allaire, Polytechnique, Paris, France.
May 20-31, M. Ortiz, Caltech, Pasadena, USA.

Invited talks at conferences (only from 2002)

(Period, Name of the Conference, Location)

- 2002: March, “GAMM 2002”, Augsburg.
June, “Meeting AMS-UMI”, Pisa.
July, “Calculus of Variations”, Oberwolfach, Germany.
- 2003 February, “Giornate di lavoro sul calcolo delle variazioni: Teoria Geometrica della Misura, Rilassamento e Γ -Convergenza”, Levico, Italy.
May, “Advances in Nonlinear Analysis”, CNA, Pittsburgh. USA.
- 2004: February, “Mathematical aspects of material science: discrete and continuum descriptions of matter”, Ringberg, Germany.
May, “SIAM 2004”, minisymposium on Contemporary Calculus of Variations for Advanced Materials. Los Angeles, USA.
June, “Calculus of Variations”, Oberwolfach, Italy.
September, “Variational Problems in Materials Science”, SISSA, Trieste, Italy.
- 2005: February, “Giornate di lavoro sul calcolo delle variazioni: Teoria Geometrica della Misura, Rilassamento e Γ -Convergenza”, Levico, Italy.
July, “Dynamical Problems in Mathematical Materials Science”, Edimburgo, UK.
November, “Analysis and Computation of Microstructures in Finite Plasticity”, Oberwolfach, Germany.
December, “Moving boundaries”, Lyon, France.
- 2006: June, “Networks and Heterogeneous Media”, Maiori, Italy.
July, “Mathematics and its applications, Special session 15: PDE’s and applications”, Torino, Italy.
September, “Workshop on Calculus of Variations”, Lisbona, Portugal.
September, “Multiscale Materials Modeling” mini-symposium ” Bridging Scales for the Strength of Materials”, Freiburg, Germany.
October, “Variational methods in Material Science”, Pisa, Italy.
October, “Workshop on Microscopic Approaches to Elastic and Surface Tension Functionals”, Università di Tor Vergata, Roma, Italy.
October, “Smart-Systems”, Roma, Italy.

- 2007: January, “AMS annual meeting”, New Orleans, USA.
 February, “Analysis and Numerics for Rate-Independent Processes”, Oberwolfach, Germany.
 June, “Joint Meeting UMI-DMV”, Perugia, Italy.
 November, “Rate-Independence, Homogenization and Multiscaling”, Centro De Giorgi, Pisa, Italy.
 December, “Material Theories”, Oberwolfach, Germany.
- 2008: January, “7th GAMM Seminar on Microstructures”, Bochum, Germany.
 March, “OxMOS workshop on Fractur”, Oxford, UK.
 April, “Atomistic Models of Materials: Mathematical Challenges”, Oberwolfach, Germany.
 May, “SIAM Conference on Mathematical Aspects of Materials Science”, Philadelphia, USA (plenary lecture).
 May, “SIAM Conference on Mathematical Aspects of Materials Science”, Minisymposium on ”Damage and Fracture”, Philadelphia, USA.

Seminars (only from 2002)

- 2002: March, SISSA, Trieste (Italy).
 April, University of Pisa (Italy).
- 2003: January, Max Planck Institute Leipzig (Germany), Oberseminar Analysis.
 March, University of Pavia.
 April, Courant Institute New York (USA).
 May, Rutgers University (USA).
 November, Centro De Giorgi, Pisa (Italy).
- 2004: March, University of Paris VI (France).
- 2005: May, Carnegie-Mellon, Pittsburgh (USA).
- 2006: April, University of Pisa.
 November, University of Warwick (UK).
 November, Max Planck Institute Leipzig (Germany), Oberseminar Analysis.
 December, University of Duisburg-Essen (Germany).
- 2007: January, WPI, Woncerster (USA).
 May, Univ. Trento (Italy).
- 2008: April, Ecole Polytechnique, Parigi (Francia).

Citations on scientific monographs

Some of my results have been cited or described in detail in the following monographs

- ADAMS, D.R. E HEDBERG, L. I. *Function spaces and potential theory*, Springer-Verlag, Berlin, 1996.
- CHERKAEV, A. E KOHN, R.V. *Topics in the Mathematical Modeling of Composite Materials*, Birkhäuser, 1997.
- BRAIDES, A. *Approximation of free-discontinuity problems* Lecture Notes in Mathematics, 1694. Springer-Verlag, Berlin, 1998.
- BRAIDES, A. E DEFRANCESCHI, A. *Homogenization of Multiple Integrals*, Oxford University Press, 1998.
- FLUCHER, M. *Variational problems with concentration*, Birkhuser Verlag, Basel, 1999.
- DACOROGNA, B. E MARCELLINI, P. *Implicit partial differential equations*, Birkhuser Boston, Inc., Boston, MA, 1999.
- CARBONE, L. E DE ARCANGELIS, R. *Unbounded functionals in the calculus of variations. Representation, relaxation, and homogenization*, Chapman, 2002.
- BRAIDES, A. *Γ -convergence for Beginners*, Oxford University Press, Oxford, 2002.
- BOURDIN, B., FRANCFORT, G. E MARIGO, J.J. *The variational approach to fracture*, Springer-Verlag, Berlin, 2008.

LIST OF PUBLICATIONS

- [1] A. GARRONI: *A Wiener estimate for relaxed Dirichlet problems in dimension $N \geq 2$* , Differential and Integral Equations, Vol. 8 (1995), 849-866.
- [2] G. DAL MASO, A. GARRONI: *New results on the asymptotic behaviour of the solutions of Dirichlet problems in perforated domains*, Mathematical Models and Methods in Applied Sciences, Vol. 4, N. 3 (1994), 373-407.
- [3] A. BRAIDES, A. GARRONI: *Homogenization of nonlinear media with stiff and soft inclusions*, Mathematical Models and Methods in Applied Sciences, Vol. 5, N. 4 (1995) 543-564.
- [4] G. BUTTAZZO, G. DAL MASO, A. GARRONI, A. MALUSA: *On the relaxed formulation of some shape optimization problems*, Advances in Mathematical Sciences and Applications, Vol. 7 (1997), 1-24.
- [5] G. DAL MASO, A. GARRONI: *The capacity method for asymptotic Dirichlet problems* Asymptotic Analysis, Vol. 15 (1997), 299-324.
- [6] J. CASADO DIAZ, A. GARRONI: *Asymptotic behaviour of nonlinear elliptic systems on varying domains*, SIAM J. Math. Anal., Vol. 31 (2000), no. 3, 581-624.
- [7] G. DAL MASO, A. GARRONI, I.V. SKRYPNIK: *Capacitary method for monotone operators*, J. Anal. Math., Vol. 71 (1997), 263-313
- [8] L. AMBROSIO, A. BRAIDES, A. GARRONI: *Special functions with bounded variation and with weakly differentiable traces on the jump set*, Nonlinear Diff. Equations Appl., Vol. 5 (1998), 219-243.
- [9] J. CASADO DIAZ, A. GARRONI: *A non homogeneous extra term for the limit of nonlinear Dirichlet problems in perforated domains*, in "Homogenization and applications to material sciences" (Nice, 1995), 81-94, GAKUTO Internat. Ser. Math. Sci. Appl., 9, Gakkotosho, Tokyo, 1995 (refereed publication).
- [10] A. BRAIDES, A. GARRONI: *On the non-local approximation of free-discontinuity problems*, Comm. Partial Diff. Equat., Vol. 23 (1998), 817-829.
- [11] A. BRAIDES, G. DAL MASO, A. GARRONI: *Variational formulation of softening phenomena in fracture mechanics: the one-dimensional case*, Arch. Rational Mech. Anal., Vol. 146 (1999), n.1, 23-58.
- [12] M. FLUCHER, A. GARRONI, S. MÜLLER: *Concentration of low energy extremals: Identification of concentration points*, Calc. Var. Partial Differential Equations, Vol. 14 (2002), no. 4, 483-516.
- [13] A. GARRONI, B. NIETHAMMER: *Correctors and error estimates in the homogenization of a Mullins-Sekerka problem*, Ann. Inst. H. Poincaré Anal. Non Linéaire, Vol. 19 (2002), no. 4, 371-393.

- [14] A. GARRONI, V. NESI, M. PONSIGLIONE: *Dielectric breakdown: optimal bounds*, Proc. Royal Soc. London A, Vol. 457 (2001), 2317-2335.
- [15] A. GARRONI, S. MÜLLER: *Concentration phenomena for the volume functional in unbounded domains: Identification of concentration points*, J. Funct. Anal. Vol. 199 (2003), no. 2, 386–410.
- [16] M. AMAR, A. GARRONI: *Γ -convergence of concentration problems with critical growth*, Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) Vol. 2 (2003), no. 1, 151–179.
- [17] A. GARRONI, R.V. KOHN: *Some three-dimensional problems related to dielectric breakdown and polycrystal plasticity*, Proc. R. Soc. London A Vol. 459 (2003), 2613-2625.
- [18] A. GARRONI, V. NESI: *Rigidity and lack of rigidity for solenoidal matrix fields*, Proc. R. Soc. London A Vol. 460 (2004), no. 2046, 1789–1806.
- [19] A. BRIANI, A. GARRONI, F. PRINARI: *Homogenization of L^∞ functionals*, Mathematical Models and Methods in Applied Sciences, Vol. 14 (2004), no. 12, 1761–1784.
- [20] A. GARRONI, S. MÜLLER: *Γ -limit of a phase field model of dislocations*, SIAM J. Math. Anal., Vol. 36 (2005), no. 6, 1943–1964.
- [21] A. GARRONI, S. MÜLLER: *A variational model for dislocations in the line tension limit*, Arch. Rational Mech. Anal., Vol. 181 (2006), no. 3, 535-578
- [22] G. FRANCFORT, A. GARRONI: *A variational view of brittle damage evolution*, Arch. Rational Mech. Anal., Vol. 182 (2006), no. 1, 125–152.
- [23] A. GARRONI, M. PONSIGLIONE, F. PRINARI: *From 1-homogeneous supremal functionals to difference quotients: relaxation and Γ -convergence*. Calc. Var. Partial Differential Equations, Vol. 27 (2006), no. 4, 397-420
- [24] N. ANSINI, A. GARRONI: *Γ -convergence of integral functionals on divergence free fields*, ESAIM: COCV , Vol. 13 (2007), no.4, 809–828.
- [25] G. DAL MASO, A. GARRONI: *Gradient bounds for minimizers of variational problems related to cohesive zone models in fracture mechanics*, Calc. Var. Partial Differential Equations, , Vol. 31 (2008), no. 2, 137–145.
- [26] M. FOCARDI, A. GARRONI: *A 1D macroscopic phase field model for dislocations and a second order Γ -limit*, Multiscale Modeling and Simulation, Vol. 6 (2007), no. 4, 1098–1124.
- [27] A. GARRONI, C. J. LARSEN: *Threshold-based quasi-static brittle damage evolution*, Arch. Rational Mech. Anal., to appear.

Preprints

- [28] S. CACACE, A. GARRONI: *A multi-phase transition model for dislocations with interfacial microstructure*, Preprint 2008 (submitted).
- [29] A. GARRONI, G. LEONI, M. PONSIGLIONE *Gradient theory for plasticity via homogenization of discrete dislocations*, Preprint 2008 (submitted).

Publications on books

- [30] A. GARRONI: *Γ -convergence of concentration problems*, in “Topics on concentration phenomena and problems with multiple scales”, Lect. Notes Unione Mat. Ital., Vol. 2, Springer, Berlin, 2006, 233–266

Proceedings and other publications

- [31] G. DAL MASO, A. GARRONI *Capacity theory for non-symmetric elliptic operators*, Preprint SISSA (1993).
- [32] L. AMBROSIO, A. BRAIDES, A. GARRONI: *Free Discontinuity Problems*, Proceedings of the International Conference “Nonlinear Differential Equations” (Kiev, Aug. 21-27, 1995) in “Nonlinear boundary value problems”, Vol. 7 (1997), 3-12.
- [33] A. GARRONI, G. PALATUCCI: *A singular perturbation result with a fractional norm*, in “Variational Problems in Materials Science”, Progress in Nonlinear Differential Equations and Their Applications, Vol. 68, Birkhäuser, 2006, 111-126.
- [34] A. GARRONI: *Quasi-static evolution of damage*, Oberwolfach Report Vol. 1 (2004), 1576.
- [35] A. GARRONI: *Asymptotics of phase-field models of dislocations*, Oberwolfach Report Vol. 2 (2005).
- [36] A. GARRONI: *Threshold-based quasi-static brittle damage evolution*, Oberwolfach Report Vol. 4 (2007).
- [37] A. GARRONI: *Variational models for plasticity by homogenization of discrete dislocations*, Oberwolfach Report Vol. 4 (2007).

Rome, June 30, 2008

(Adriana Garroni)