

MARIA AGOSTINA VIVALDI CURRICULUM

11.03.2019

MARIA AGOSTINA VIVALDI CURRICULUM * 1972: Bachelor's degree in Mathematics at the Faculty of Mathematical, Physical and Natural Sciences of the University of Rome La Sapienza with a score of 110/110 cum laude (Rapporteur prof.F .Scarpini).

* 1978-1983: Assistant at the Faculty of Mathematical, Physical and Natural Sciences of the University of Rome La Sapienza (Chair of prof.G.Fichera).

* 1976-1983: Teacher of Mathematical Analysis at the Faculty of Mathematical, Physical and Natural Sciences of the University of Rome La Sapienza.

* 1983-1987: Associate Professor at the Faculty of Mathematical, Physical and Natural Sciences of the University of Rome La Sapienza.

* 1987-October 1990: Full Professor at the Faculty of Mathematical, Physical and Natural Sciences of the University of L'Aquila.

* From 1 November 1990 Full Professor at the Faculty of Engineering, University of Rome La Sapienza.

Winner of the Medal of the National Academy of Sciences (XL) for Mathematics 2016.

Coordinator of the University projects, 2000, 2001, 2002 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2015 and 2016.

Participant to the PRIN (financed) Dirichlet forms and Fractals. Scientific coordination tor Umberto Mosco (Sapienza University of Rome).

Participant to the P.R.I.N. (Financed): nonlinear differential problems: algorithms, analysis and applications. scientific coordinator Alfio Quarteroni (Politecnico di Milano).

Participant to the PRIN (financed) Extensions of physics still bodies and little regular courts. Scientific Coordinator Antonio Di Carlo (University of

Rome III).

Participant in the project INDAM intergroup: the contract of continuous physical problems of irregular domains (Coordinator Antonio Di Carlo).

"OPPONENT" in the discussion of the PhD thesis of Dr. Mats Bodin University of UMEA (Sweden) DEPARTMENT OF MATHEMATICS AND MATHEMATICAL STATISTICS: September 30, 2005. ("Advisor" Alf Jonsson: title Characterization of function spaces on fractals).

Member of "DISSERTATION Comitee" for submission of the PhD thesis of Dr. Emily Evans Worcester Polytechnic Institute (WPI) (MA.USA) December 9, 2010 and for the subsequent discussion ("DEFENSE" April 2011) (Title: Extension Operators and Finite Elements for Fractal Boundary Value Problems).

Member of the "Jury de thèse" for "soutenance" of the PhD thesis of Dr. Thibaut Deheuvels: University of Rennes1: March 22, 2013 (title: Contributions à l'étude d'espaces de fonctions et d'EDP dans une classe de domaines à frontière fractale self-similaire).

Member of "DISSERTATION Comitee" for discussion ("DEFENSE" April 17, 2013) of the PhD thesis of Dr. Liang Haodong Worcester Polytechnic Institute (WPI) (MA.U.S.A.) (Title: Fractal Interfaces and Heat Transmission Problems).

Member of the Organization Committee of the conference "International symposium: ANALYSIS, PDEs AND APPLICATIONS: on the occasion of the 70th birthday of Vladimir Maz'ya. Rome, 30 June -3 July 2008.

Member of the Organization Committee of the conference "PERSPECTIVES in PDEs" in honor of Umberto Mosco. Rome 24 to 26 June 2009.

Member of the Organization Committee of the conference: "Homogenization: flows in collapsing domains and composite materials". Rome 25-27 June 2012.

Member of the Organization Committee of the conference: "the Matematica Meeting at the Sapienza" the Mathematical Departments Guido Castelnuovo and Basic Science and Engineering applied to present their research. Roma February 16 to 17, 2015.

Coordinator of the international agreement between the Faculty of Civil and Industrial Engineering, and Worcester Polytechnic Institute (MA.USA). Subject : "Fractal fibers and singular homogenization".

MAIN COMMITTEES FOR PERMANENT POSITIONS (2002-2014):

For Associate Professor sector MAT / 05, University of Catania ended in

May 2002.

For Associate Professor sector MAT / 05, University of Cassino ended in May 2005.

For Assistant Professor sector MAT / 05 Faculty of Architecture Valle Giulia, Sapienza University of Rome ended in February 2006.

For Assistant Professor sector MAT / 05 , Faculty of Architecture Valle Giulia, Sapienza University of Rome ended in November 2008.

For Associate Professor sector MAT / 06, University of Rome III, ended in July 2010.

For Assistant Professor sector MAT / 05, Faculty of Architecture Valle Giulia, Sapienza University of Rome ended in May 2011.

For Assistant Professor RTDA sector 01/A3 Faculty of M.F.N Sciences University of Naples Federico II ended in September 2014.

For Associate Professor sector MAT / 05, Sapienza University of Rome ended in June 2018.

For Assistant Professor RTDB sector 01/A3 Faculty of M.F.N Sciences University of Naples Federico II ended in September 2018.

MAIN INVITED TALKS (2008 - 2018)

In the conference: "PDEs and Mathematical Hydrodynamics: A conference in Honor of Vsevolod Alekseevich Solonnikov's 85'th Birthday" St.Petersburg, 30 July - 3 August, 2018 . Title: "PDEs in domains with non-smooth boundaries"

In the XIV congresso SIMAI. Mini symposium Different Issues in Asymptotic Analysis and Material Sciences. 2-6 July, 2018 Sapienza University of Rome. Title: "Error estimates for quasilinear obstacle problems in bad domains".

In the conference "last 60 years of Mathematical Fluid Mechanics: Long-standing Problems and New Perspectives". In Honor of Professors Robert Finn and Vsevolod Solonnikov. 21-25 August, 2017 — Vilnius, Lithuania. Title: " Quasilinear obstacle problems in bad domains".

International Conference on Elliptic and Parabolic Problems. Gaeta 22 to 26 May 2017. Title: " Error estimates for FEM solutions of quasilinear obstacle problems in bad domains"

In the 11TH CONFERENCE AIMS - ORLANDO USA, Special Session. Orlando USA 1 to 5 July 2016. Title: "P-Laplaceans and mass transport

problems”.

In the : 9th European Conference on Elliptic and Parabolic Problems. Gaeta 23 to 27 May 2016. Title: ”Obstacles problems in bad domains.”

In the XXV National Conference of Calculus of Variations. Levico Terme (Trento), 2 to 6 February 2015. Title: ”Regularity results for solutions of PDEs in bad domains.”

In the 10TH CONFERENCE AIMS, Special Session. Fractals. ”Madrid 7 to 11 July 2014. Title: ”Brennan’s conjecture and weighted estimates on snowflake domains.”

In the conference: International Symposium on Applied Analysis, in honor of the 65th Birthday of Michel Chipot Zurich 10 to 11 June 2014. Title: ”Weighted estimates for the solutions of Dirichlet problems in irregular domains.”

In the congress: ”8th European Conference on Elliptic and Parabolic Problems”, Gaeta 26 to 30 May 2014. Title: ”Mixed type systems in Koch snowflake domain.”

In the congress: ”Fractal Geometry and Stochastics V”, Tabarz (Germany) 24 to 29 March 2014. Title: ”Regularity results for solutions in the Koch snowflake domain.”

As part of the congress: ”Analysis of partial differential equations”, in honor of Vladimir Maz’ya on the occasion of His 75th birthday. Liverpool 16 to 17 December 2013. Title: ”Pdes in the Koch snowflake domain.”

In the conference: ”Mathematical hydrodynamics and parabolic equations”, in honor of Vsevolod Solonnikov on the occasion of His 80th birthday. St. Petersburg 11 to 14 September 2013. Title: ”Mixed type non-linear systems in polygonal domains.”

In the conference: ”Mathematical models and analytical problems in special materials”. Rome 16 to 20 April 2012. Title: ”Existence, uniqueness and stability results for mixed type non-linear systems in polygonal domains.”

At Worcester Polytechnic Institute (WPI) (MA.U.S.A.) April 15 2011. Titolo: ”Thin layers vs. fractals.”

In the congress: "Evolution Equations and Materials with Memory" Rome 12 to 14 July 2010 Title: "Homogenization models with fractal strings".

In the congress: "Workshop on Asymptotic Analysis and Stochastic Methods for Heterogeneous Media", Alba Julia (Romania) 9 to 13 June 2010. Title: "Insulating and conductive layers fractal".

In the congress: "6th european conference on elliptic and parabolic problems". Gaeta 25 to 29 May 2009. Title: "Fractal singular homogenization".

In the congress S.I.M.A.I. 2008: Minisymposium on differential modeling in applied sciences. "Roma 15 to 19 September 2008. Title:" Variational convergence of weighted energy forms. "

In the International Symposium: "Analysis, pdes and applications", on the occasion of the 70th birthday of Vladimir Maz'ya. Rome, 30 June -3 July 2008. Title: "Irregular conductive layers".

In the Symposium: "Mathematical modeling, mechanics and materials". Udine 11 to 14 January 2008. Title: "Fractal reinforcement of elastic membranes."

MAIN PUBLICATIONS MARIA AGOSTINA VIVALDI

- 1) **Preface [Issue on variational convergence and degeneracies in PDES: fractal domains, composite media, dynamical boundary conditions]**. Discrete Contin. Dyn. Syst. Ser. S 12 (2019), no. 1, i. 35-06. In collaborazione con R. Capitanelli e M.R. Lancia.
- 2) **Regularity results for p-Laplacians in pre-fractal domains**. Advances in Nonlinear Anal.8 (2019), no. 1, 1043-1056. In collaborazione con R. Capitanelli e S. Fragapane.
- 3) **FEM for quasilinear obstacle problems in bad domains**. ESAIM Math. Model. Numer. Anal. 51 (2017), no. 6, 2465-2485. In collaborazione con R. Capitanelli.
- 4) **Absolutely minimizing Lipschitz extensions and infinity harmonic functions on the Sierpinski gasket**. Nonlinear Anal. 163 (2017), 71-85. In collaborazione con F. Camilli e R. Capitanelli.
- 5) **Dynamical Quasi-Filling Fractal Layers**. SIAM J. Math. Anal. 48 (2016), no. 6, 3931-3961. In collaborazione con R. Capitanelli.

- 6) **Asymptotic analysis of singular problems in perforated cylinders.** Differential Integral Equations 29 (2016), no. 5-6, 531-562. In collaborazione con D. Giachetti e B. Vernescu.
- 7) **Quasi-filling fractal layers.** Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. 26 (2015), no. 4, 465-473. In collaborazione con R. Capitanelli.
- 8) **Reinforcement problems for variational inequalities on fractal sets.** Calc. Var. Partial Differential Equations 54 (2015), no. 3, 2751-2783. In collaborazione con R. Capitanelli.
- 9) **Weighted estimates on fractal domains.** Mathematika 61 (2015), no. 2, 370-384. In collaborazione con R. Capitanelli.
- 10) **Layered fractal fibers and potentials.** J. Math. Pures Appl. (9) 103 (2015), no. 5, 1198-1227. In collaborazione con U. Mosco.
- 11) **Uniform weighted estimates on pre-fractal domains.** Discrete Contin. Dyn. Syst. Ser. B 19 (2014), no. 7, 1969-1985. In collaborazione con R. Capitanelli.
- 12) **Thin fractal fibers.** Math. Methods Appl. Sci. 36 (2013), no. 15, 2048-20682. In collaborazione con U. Mosco.
- 13) **Insulating layers of fractal type.** Differential Integral Equations 26 (2013), no. 9-10, 1055-1076. In collaborazione con R. Capitanelli e M.R. Lancia.
- 14) **On the Laplacean transfer across fractal mixtures.** Asymptot. Anal. 83 (2013), no. 1-2, 1-33. In collaborazione con R. Capitanelli.
- 15) **Mixed type, nonlinear systems in polygonal domains.** Atti Accad. Naz. Lincei Cl. Sci. Fis. Mat. Natur. Rend. Lincei (9) Mat. Appl. 24 (2013), no. 1, 397-81. In collaborazione con V.A. Solonnikov.
- 16) **Trace Theorems on scale irregular fractals.** In Classification and Applications of Fractals Nova Science Publishers 2012, 363-381. In collaborazione con R. Capitanelli.
- 17) **Insulating layers and Robin problems on Koch mixtures.** J. Differential Equations 251 (2011), no. 4-5, 1332-1353. In collaborazione con R. Capitanelli.
- 18) **Vanishing viscosity for fractal sets.** Discrete Contin. Dyn. Syst. 28 (2010), no. 3, 1207-1235. In collaborazione con U. Mosco.
- 19) **Irregular conductive layers.** In Analysis, partial differential equations and applications. Oper. Theory Adv. Appl., 193, Birkhuser Verlag, Basel, 2009, 303-318.
- 20) **Schauder estimates for a system of equations of mixed type.** Rend. Mat. Appl. (7) 29 (2009), no. 1, 117-132. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 21) **Fractal reinforcement of elastic membranes.** Arch. Ration. Mech. Anal. 194 (2009), no. 1, 49-74. In collaborazione con U. Mosco.

- 22) **Homogenization for conductive thin layers of pre-fractal type.** J. Math. Anal. Appl. 347 (2008), no. 1, 354-369. In collaborazione con M.R.Lancia e U. Mosco.
- 23) **Variational principles and transmission problems with fractal layers.** Mathematical modelling of bodies with complicated bulk and boundary behavior, 239-259, Quad. Mat., 20, Dept. Math., Seconda Univ. Napoli, Caserta, 2007.
- 24) **Fractal and Euclidean interaction in some transmission problems.** Matematiche (Catania) 62 (2007), no. 2, 327-343.
- 25) **An example of fractal singular homogenization.** Georgian Math. J. 14 (2007), no. 1, 169-193. In collaborazione con U.Mosco.
- 26) **Variational principles and transmission conditions for fractal layers.** Fractal geometry and stochastics III, 205-217, Progr. Probab., 57, Birkhuser, Basel, 2004.
- 27) **Transmission problems with highly conductive fractal layers.** Far East J. Appl. Math. 15 (2004), no. 2, 151-170.
- 28) **Variational problems with fractal layers.** Rend. Accad. Naz. Sci. XL Mem. Mat. Appl. (5) 27 (2003), 237-251. 13 (2003), no. 1, 315-341. In collaborazione con U.Mosco.
- 29) **Asymptotic convergence of transmission energy forms.** Adv. Math. Sci. Appl. 13 (2003), no. 1, 315-341. In collaborazione con M.R.Lancia.
- 30) **On the regularity of the solutions for transmission problems.** Adv. Math. Sci. Appl. 12 (2002), no. 1, 455-466. In collaborazione con M.R.Lancia.
- 31) **The exponential behaviour of the Green function in a dihedral angle.** Commun. Contemp. Math. 3 (2001), no. 4, 571-592. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 32) **Lipschitz spaces and Besov traces on self-similar fractals.** Rend. Accad. Naz. Sci. XL Mem. Mat. Appl. (5) 23 (1999), 101-116. In collaborazione con M.R. Lancia.
- 33) **A Liouville type theorem for weighted elliptic equations.** Adv. Math. Sci. Appl. 9 (1999), no. 1, 183-207. In collaborazione con V. De Cicco.
- 34) **Existence and regularity results for oblique derivative problems for heat equations in an angle.** Proc. Roy. Soc. Edinburgh Sect. A 128 (1998), no. 1, 47-79. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 35) **Green function for the heat equation with oblique boundary conditions in an angle.** Dedicated to Ennio De Giorgi. Ann. Scuola Norm. Sup. Pisa Cl. Sci. (4) 25 (1997), no. 3-4, 455-485 (1998). In collaborazione con M.G. Garroni e V.A. Solonnikov.

- 36) **On the oblique derivative problem in an infinite angle.** Topol. Methods Nonlinear Anal. 7 (1996), no. 2, 299-325. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 37) **Harnack inequalities for Fuchsian type weighted elliptic equations.** Comm. Partial Differential Equations 21 (1996), no. 9-10, 1321-1347. In collaborazione con V. De Cicco.
- 38) **Existence and uniqueness results for degenerate-elliptic integro-differential problems.** Elliptic and parabolic problems (Pont-à-Mousson, 1994), 213-223, Pitman Res. Notes Math. Ser., 325, Longman Sci. Tech., Harlow, 1995.
- 39) **Nonlinear two-obstacle problems: pointwise regularity.** Rend. Mat. Appl. (7) 14 (1994), no. 3, 415-455. In collaborazione con I. Birindelli.
- 40) **Fully nonlinear boundary conditions for quasilinear, integro-differential operators.** Nonlinear partial differential equations and their applications. Collège de France Seminar, Vol. XI (Paris, 1989-1991), 97-117, Pitman Res. Notes Math. Ser., 299, Longman Sci. Tech., Harlow, 1994. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 41) **Problèmes intégro-différentiels complètement non linéaires.** (French) [Fully nonlinear integro-differential problems] C. R. Acad. Sci. Paris Sr. I Math. 316 (1993), no. 3, 245-248. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 42) **Quasi-linear, integro-differential, parabolic problems with non-homogeneous conditions.** Houston J. Math. 18 (1992), no. 4, 481-532. In collaborazione con M.G. Garroni e V.A. Solonnikov.
- 43) **Oscillation and energy decay of solutions to obstacle problems involving quasi-linear, degenerate-elliptic operators.** Progress in partial differential equations: elliptic and parabolic problems (Pont--Mousson, 1991), 259-273, Pitman Res. Notes Math. Ser., 266, Longman Sci. Tech., Harlow, 1992.
- 44) **Quasilinear, parabolic, integro-differential problems with nonlinear oblique boundary conditions.** Nonlinear Anal. 16 (1991), no. 12, 1089-1116. In collaborazione con M.G. Garroni.
- 45) **A pointwise regularity theory for the two-obstacle problem.** Acta Math. 163 (1989), no. 1-2, 57-107. In collaborazione con G. Dal Maso e U. Mosco.
- 46) **Stability of free boundaries.** Nonlinear Anal. 12 (1988), no. 12, 1339-1347. In collaborazione con M.G. Garroni.
- 47) **Nonlinear parabolic variational inequalities.** Proceedings of the International Workshop on Integral Functionals in the Calculus of Variations (Trieste, 1985). Rend. Circ. Mat. Palermo (2) Suppl. No. 15 (1987), 181-188.

- 48) **Nonlinear parabolic variational inequalities: existence of weak solutions and regularity properties.** Boll. Un. Mat. Ital. B (7) 1 (1987), no. 1, 259-274.
- 49) **Existence of strong solutions for nonlinear parabolic variational inequalities.** Nonlinear Anal. 11 (1987), no. 2, 285-295.
- 50) **On the Hölder continuity of bounded weak solutions of quasilinear parabolic inequalities.** Ann. Mat. Pura Appl. (4) 139 (1985), 175-189. In collaborazione con M. Struwe.
- 51) **Optimal impulse and continuous control with Hamiltonian of quadratic growth.** Contributions to operations research and mathematical economics, Vol. I, 59-105, Methods Oper. Res., 51, Athenäum/Hain/Hanstein, Königstein, 1984. In collaborazione con M. Matzeue U. Mosco.
- 52) **Bilateral evolution problems of nonvariational type: existence, uniqueness, Hölder-regularity and approximation of solutions.** Manuscripta Math. 48 (1984), no. 1-3, 39-69. In collaborazione con M.G. Garroni.
- 53) **Approximation results for bilateral nonlinear problems of nonvariational type.** Nonlinear Anal. 8 (1984), no. 4, 301-312. In collaborazione con M.G. Garroni.
- 54) **Sur un problème de contrôle optimal stochastique continu et impulsif avec hamiltonien à croissance quadratique.** (French) [A stochastic continuous and impulse optimal control problem with quadratic growth Hamiltonian] C. R. Acad. Sci. Paris Sér. I Math. 296 (1983), no. 19, 817-820. In collaborazione con M. Matzeu e U. Mosco.
- 55) **A parabolic quasivariational inequality related to a stochastic impulse control problem with quadratic growth Hamiltonian.** Numer. Funct. Anal. Optim. 4 (1981/82), no. 3, 241-268.
- 56) **Bilateral inequalities and implicit unilateral systems of the nonvariational type.** Manuscripta Math. 33 (1980/81), no. 2, 177-215. In collaborazione con M.G. Garroni.
- 57) **A dual estimate for the Hamilton-Jacobi function of a continuous and impulsive stochastic control problem.** Boll. Un. Mat. Ital. B (5) 17 (1980), no. 2, 458-477. In collaborazione con M. Matzeu.
- 58) **Existence, regularity and dual estimates for the solution of a quasivariational inequality relative to a quasilinear operator.** (Italian) Boll. Un. Mat. Ital. B (5) 16 (1979), no. 1, 154-167. In collaborazione con M.G. Garroni.
- 59) **Régularité de la solution forte de problèmes non linéaires d'évolution.** (French) Czechoslovak Math. J. 29(104) (1979), no. 3, 430-450. In collaborazione con M.G. Garroni.
- 60) **On the regular solution of a nonlinear parabolic quasivariational inequality related to a stochastic control problem.** Comm. Partial

Differential Equations 4 (1979), no. 10, 1123-1147. In collaborazione con M. Matzeu.

61) **Existence of a regular solution of a quasivariational inequality in an unbounded domain.** Comm. Partial Differential Equations 3 (1978), no. 5, 443-470. In collaborazione con I. Capuzzo Dolcetta.

62) **Régularité de la solution forte d'un problème non linéaire d'évolution avec contraintes dépendantes du temps.** (French) C. R. Acad. Sci. Paris Sr. A-B 286 (1978), no. 4, A207-A210. In collaborazione con M.G. Garroni.

63) **Error estimates for the approximation of some unilateral problems.** RAIRO Anal. Numér. 11 (1977), no. 2, 197-208, 221. In collaborazione con F. Scarpini.

64) **Existence d'une solution régulière d'une inéquation quasi-variationnelle d'évolution avec conditions de Dirichlet.** (French) Boll. Un. Mat. Ital. A (5) 14 (1977), no. 3, 579-589. In collaborazione con P. Charrier.

65) **Evaluation de l'erreur d'approximation pour une inéquation parabolique relative aux convexes dépendant du temps.** (French) Appl. Math. Optim. 4 (1977-78), no. 2, 121-138. In collaborazione con F. Scarpini.

66) **Existence d'une solution régulière d'une inéquation quasi variationnelle elliptique sur un domaine non borné.** C. R. Acad. Sci. Paris Sér. A-B 284 (1977), no. 17, A1033-A1036. In collaborazione con I. Capuzzo Dolcetta.

67) **Existence d'une solution forte régulière d'une inéquation quasi variationnelle d'evolution.** (French) C. R. Acad. Sci. Paris Sr. A-B 283 (1976), no. 7, Aii, A465-A467. In collaborazione con P. Charrier.

68) **Strong discrete convergence of solutions of variational inequalities.** Rend. Mat. (6) 9 (1976), no. 1, 17-35. In collaborazione con E. Stroescu.