

CURRICULUM VITAE ET STUDIORUM

Francesca Gardini

Dipartimento di Matematica “F. Casorati”
Università degli Studi di Pavia
Via Ferrata 1, 27100 Pavia
ITALY

Tel: (+39) 0382-985634
Fax: (+39) 0382-985602
E-mail: francesca.gardini@unipv.it
Url: <http://www-dimat.unipv.it/gardini/>

PERSONAL INFORMATION

Born in Pavia (Italy), November 2, 1979.
Italian citizenship.

CURRENT ACCADEMIC POSITION

May 1, 2007-onwards. Assistant Professor of Numerical Analysis, Dipartimento di Matematica “F. Casorati”, Università di Pavia (Italy).

PAST ACCADEMIC POSITION

August 1, 2006 - April 30, 2007. Postdoctoral fellow, Dipartimento di Matematica “F. Casorati”, Università degli Studi di Pavia (Italy).

October 1, 2005 - July 31, 2006. Postdoctoral fellow, Abteilung Numerik, Universität Ulm (Germany).

EDUCATION

February 2, 2006. PhD in Mathematics and Statistics, Dipartimento di Matematica “F. Casorati”, Università degli Studi di Pavia (Italy). Advisor: Prof. Daniele Boffi. Thesis: “A Posteriori Error Estimates for Eigenvalue Problems in Mixed Form”.

September 19, 2002. Graduated in Mathematics, Università degli Studi di Pavia (Italy). Advisor: Prof. Daniele Boffi. Thesis: “Proprietà di Compattezza Discreta per Spazi di Elementi Finiti su Quadrilateri”. Mark: 110/110 *cum laude*.

July 1998. Liceo Scientifico “N. Copernico”, Pavia (Italy). Graduated from high school (scientific oriented). Mark: 60/60.

RESEARCH INTEREST

Main research field. Numerical analysis, discretization of partial differential equations, approximation of eigenvalue problems, finite elements techniques.

Main keywords. Finite element methods, mixed methods, mimetic finite differences methods, virtual element methods, a posteriori error estimates, adaptive methods, interaction of fluid and structure.

RESEARCH EXPERIENCE

March 1, 2005 - September 30, 2005. Department of Mathematics, Brunel University of West London, Uxbridge, UK. Supervisor: Prof. Stefan Funken.

HONORS

Vice-Chancellor's Prize for Postgraduate Research. Granted a Fellowship by the Brunel University Graduate School to attend an international conference.

2003. "Proff. Silvio Cinquini and Maria Cinquini Cibrario" Prize (best Laurea thesis at the Università di Pavia; given every three years).

CONFERENCE TALKS

1. MAFELAP 2013- The Mathematics of Finite Elements and Applications, Brunel University of West London, Uxbridge (UK), June 11-14, 2013.
2. XIX Congresso dell'Unione Matematica Italiana, Bologna (Italy), September 12-17, 2011.
3. *invited* Workshop "Non-Standard Numerical Methods for PDEs", Pavia (Italy), June 29-July 2, 2010.
4. Congresso Nazionale della Società Italiana di Matematica Applicata e Industriale SIMAI, (SIMAI 2010), Cagliari (Italy), June 21-25, 2010.
5. The Fourth European Finite Element Fair, Zurich (Switzerland), June 2-3, 2006.
6. 22nd GAMM Seminar, Lipsia (Germany), January 19-21, 2006.
7. ENUMATH 2005- The Sixth European Conference on Numerical Mathematics and Advanced Applications, Santiago de Compostela (Spain), July 18-22, 2005.
8. International Workshop on Reliable Methods of Mathematical Modelling, Zurich (Switzerland), July 6-8, 2005.
9. Third MIT Conference on Computational Fluid and Solid Mechanics, Boston (USA), June 14-17, 2005.
10. The Third European Finite Element Fair, Pavia (Italy), June 3-4, 2005.
11. Convegno del Gruppo Nazionale di Calcolo Scientifico dell'INDAM, Montecatini Terme (Italy), February 9-11, 2004.
12. The First European Finite Element Fair, Cambridge (UK), May 8-9, 2003.

INVITED SEMINAR TALKS

1. Oberseminar Numerik, Abteilung Numerik, Universität Ulm, Ulm (Germany), January 12, 2006.
2. Dipartimento di Matematica, Università di Pavia, Pavia (Italy), June 6, 2005.
3. Abteilung Numerik, Universität Ulm, Ulm (Germany), July 1, 2005.
4. Department of Mathematical Sciences, Brunel University of West London, Uxbridge (UK), February 6, 2005.
5. Dipartimento di Matematica, Università di Pavia, Pavia (Italy), October 28, 2004.
6. IMATI-CNR, Pavia (Italy), March 24, 2004. Presented within the PhD course “Programming numerical methods for PDE’s I”.
7. Dipartimento di Matematica, Università di Pavia, Pavia (Italy), October 17, 2003.

PARTICIPATION TO MEETINGS (WITHOUT TALK)

1. “Workshop on Nonconforming and DG methods”, Milan (Italy), January 27, 2017
2. “The 14th European Finite Element Fair”, Bonn (Germany), May 20-21, 2016.
3. “Analysis and Numerics of Partial Differential Equations-In memory of Enrico Magenes”, Pavia (Italy), November 2-4, 2011.
4. Workshop on “Multiscale Problems: Modeling, Adaptive Discretization, Stabilization, Solver”, Cortona (Italy), September 18-22, 2006.
5. “The Second European Finite Element Fair”, Berlin (Germany), June 4-5, 2004.

PARTICIPATION TO SCHOOLS AND COURSES

1. C.I.M.E. Summer Course “Mixed Finite Elements , Compatibility Conditions , and Application”, Cetraro (Italia), June 26 - July 1, 2006.
2. “School on Modelling, Control and Numerical Simulation of Smart Systems”, IMATI-CNR Pavia (Italia), September 15-19, 2003.

TEACHING

2016/2017

- Lecturer. MATHEMATICAL ANALYSIS (9 CFU, for students in Biotechnologies, University of Pavia).

2015/2016

- Lecturer. MATHEMATICAL ANALYSIS (9 CFU, for students in Biotechnologies, University of Pavia).
- Lecturer. NUMERICAL ANALYSIS, mod. 2 (3 CFU, for students in Mathematics, University of Pavia).

2014/2015

- Lecturer. MATHEMATICAL ANALYSIS (9 CFU, for students in Biotechnologies, University of Pavia).
- Lecturer. NUMERICAL ANALYSIS, mod. 2 (3 CFU, for students in Mathematics, University of Pavia).

2013/2014

- Lecturer. MATHEMATICAL ANALYSIS (9 CFU, for students in Biotechnologies, University of Pavia).
- Lecturer. NUMERICAL ANALYSIS, mod. 2 (3 CFU, for students in Mathematics, University of Pavia).

2012/2013

- Lecturer. LABORATORY OF COMPUTATIONAL MATHEMATICS (3 CFU, for students in Mathematics, University of Pavia).
- Lecturer. NUMERICAL ANALYSIS, mod. 2 (3 CFU, for students in Mathematics, University of Pavia).

2011/2012

- Lecturer. LABORATORY OF COMPUTATIONAL MATHEMATICS (3 CFU, for students in Mathematics, University of Pavia)
- Lecturer. NUMERICAL ANALYSIS, mod. 2 (3 CFU, for students in Mathematics, University of Pavia).

2009/2010

- Lecturer. LABORATORY OF COMPUTATIONAL MATHEMATICS (3 CFU, for students in Mathematics, University of Pavia).
- Lecturer. NUMERICAL ANALYSIS, mod. 2 (3 CFU, for students in Mathematics, University of Pavia).

2008/2009

- Head Assistant. NUMERICAL ANALYSIS (for students in Mathematics, University of Pavia).

2007/2008

- Head Assistant. NUMERICAL ANALYSIS (for students in Mathematics, University of Pavia).

2006/2007

- Head Assistant. NUMERICAL ANALYSIS (for students in Mathematics, University of Pavia).
- Head Assistant. NUMERICAL METHODS FOR CHEMISTRY (for students in Chemistry, University of Pavia).

2005/2006

- Head Assistant. EINFÜHRUNG IN DIE FINITE ELEMENTE METHODE. (Master of Science in Finance (in English), University of Ulm).

- Head Assistant. NUMERIK IA (for students in Mathematics, University of Ulm).

2003/2004

- Head Assistant. NUMERICAL MODELLING (for students in Mathematics, University of Pavia).
- Head Assistant. MATHEMATICS FOR APPLIED SCIENCES (for students in Natural Sciences, University of Pavia).

2001/2002

- Tutor. NUMERICAL ANALYSIS (for students in Chemistry, University of Pavia).

STUDENT ADVISING

Bachelor/Master Students

1. Cataldo Manigrasso. *Elementi finiti quadrilateri per la soluzione di problemi agli autovalori*. Pavia, 2007, BSc in Mathematics. Co-advisor: Daniele Boffi.

RESEARCH FUNDING

2016. GNCS Research project 2016 “Precondizionatori scalabili, metodi di alto ordine e immersed boundary per l’elettrocardiologia computazionale”. Role: participant. Principal Investigator: Simone Scacchi.

2016-2018. MIUR PRIN 2015: “Innovative numerical methods for the approximation of partial differential equations”. Role: participant. Local Coordinator: D. Boffi. National Coordinator: D. Boffi.

2014. GNCS Research project 2014 “Analisi isogeometrica del modello matematico per l’accoppiamento elettro-fluido-meccanico cardiaco”. Role: participant. Principal Investigator: Simone Scacchi.

2013. GNCS Research project 2013 “Metodo agli elementi finiti ed analisi isogeometrica per problemi di interazione fluido-struttura”. Role: participant. Principal Investigator: Daniele Boffi.

2013-2015. MIUR PRIN 2012: “Modelli matematici e numerici del sistema cardiocircolatorio e loro applicazione in ambito clinico”. Role: participant. Local Coordinator: P. Colli Franzone. National Coordinator: L. Formaggia.

2010-2013. MIUR PRIN 2009: “Modelli, metodi e calcolo scientifico per problemi di elettrocardiologia e di interazione fluido-struttura”. Role: participant. Local Coordinator: P. Colli Franzone. National Coordinator: A. M. Quarteroni.

2007-2010. MIUR PRIN 2007: “Modelli, metodi e calcolo scientifico per problemi di elettrocardiologia e di interazione fluido-struttura”. Role: participant. Local Coordinator: P. Colli Franzone. National Coordinator: A. M. Quarteroni.

GRANTS

GNCS grant. Granted a Fellowship to attend the “XIX Congresso dell’Unione Matematica Italiana”, September 12-17, 2011 Bologna (Italy).

CIME grant. Granted a Fellowship to attend the C.I.M.E. course “Mixed Finite Elements,

Compatibility Conditions, and Applications”, June 26 - July 1, 2006, Cetraro (Italy).

DFG Research grant. Granted a Fellowship to attend the “MAFELAP 2006- The Mathematics of Finite Elements and Applications” conference, June 13-16, 2006, Brunel University of West London, Uxbridge (UK).

Enumath 2005 PhD Student Grant. Granted a Fellowship to attend the “Sixth European Conference on Numerical Mathematics and Advanced Applications-ENUMATH 2005”, Universidade de Santiago de Compostela, July 18-22, 2005, Santiago de Compostela (Spain).

MIT Conference Fellowship. Granted a Fellowship to attend the “Third MIT Conference on Computational Fluid and Solid Mechanics”, June 14-17, 2005, MIT, Cambridge (USA).

REFEREE AND MEMBER OF PhD COMMISSION

- Referee and committee member for the thesis of H. Espinoza, (Universita Politècnica de Catalunya, 2015)

REFEREEING ACTIVITY

- Applied Numerical Mathematics
- Calcolo
- Computer and Mathematics with Applications
- IMA Journal of Numerical Analysis
- Mathematical Modelling and Numerical Analysis
- Mathematical Review
- Numerical Methods for Partial Differential Equations
- Science China Mathematics
- SIAM Journal on Numerical Analysis

PROFESSIONAL SOCIETIES

- Member of UMI Italian Mathematical Union (since 2007).
- Member of the GNCS-IndAM Nazionale per il Calcolo Scientifico” (since 2003).

FOREIGN LANGUAGES

English. Good written and oral knowledge.

COMPUTER SKILLS

Operative Systems. Windows (very good), Unix/Linux (good).

Programming Languages. Matlab (very good), Fortran77 (good), C (good).

Productivity Programs. Latex (very good), Microsoft Office (Excel, Frontpage, Outlook, Word) (very good).

PUBLICATIONS

- [14] F. Gardini, G. Vacca, *Virtual Element Method for Second Order Elliptic Eigenvalue Problems*. Submitted.
- [13] D. Boffi, D. Gallistil, F. Gardini, L. Gastaldi, *Optimal convergence of adaptive FEM for eigenvalue cluster in mixed form*. To appear in Mathematics of Computation.
- [12] D. Boffi, R.G. Durán, F. Gardini, L. Gastaldi, *A posteriori error analysis for nonconforming approximation of multiple eigenvalues*. Mathematical Methods in the Applied Sciences, 40 (2017), no. 2, 350-369.
- [11] D. Boffi, N. Cavallini, F. Gardini, L. Gastaldi, *Mass preserving distributed lagrange multiplier approach to immersed boundary method*. (Proceedings of the V International Conference on Computational Methods for Coupled Problems in Science and Engineering), in: Coupled Problems 2013, pp. 323-334, S. Idelsohn, M. Papadrakakis, and B. Schrefler (Eds). Cimne.
- [10] D. Boffi, N. Cavallini, F. Gardini, L. Gastaldi, *Stabilized stokes element and local mass conservation*. Bollettino U.M.I., (9) V (2012), no. 3, 543-573.
- [9] D. Boffi, N. Cavallini, F. Gardini, L. Gastaldi, *Local mass conservation of Stokes finite elements*. Journal of Scientific Computing , 52 (2012), no. 2, 383-400.
- [8] D. Boffi, F. Gardini, L. Gastaldi, *Some remarks on eigenvalue approximation by finite elements*. In: Frontiers in Numerical Analysis - Durham 2010, pp.1-77. Springer Lecture Notes in Computational Science and Engineering, 85 (2012).
- [7] D. Boffi, N. Cavallini, F. Gardini, L. Gastaldi, *Immersed boundary method: performance analysis of popular finite element spaces*. (Proceedings of the IV International Conference on Computational Methods for Coupled Problems in Science and Engineering), in: Coupled Problems 2011, pp. 1-12, M. Papadrakakis, E. Onate and B. Schrefler (Eds). Cimne.
- [6] A. Gangiani, F. Gardini, G. Manzini, *Convergence of the mimetic finite difference method for eigenvalue problems in mixed form*. Comp. Meth. Appl. Mech. Engrg., 200 (2011), no. 9-12, 1150-1160.
- [5] F. Gardini, *Mixed Approximation of Eigenvalue Problems: a Superconvergence Result*. M2AN Math. Model. Numer. Anal., 43 (2009), no. 5, 853-865
- [4] F. Gardini, *On a Superconvergence Result for Mixed Approximation of Eigenvalue Problems*. Numerical Mathematics and Advanced Applications, (Springer-Verlag),(2006), 243-251
- [3] F. Gardini, *A Posteriori Error Estimates for an Eigenvalue Problem Arising from Fluid-Structure Interaction*. In Computational fluid and solid mechanics 2005, Third MIT Conference on Computational Fluid and Solid Mechanics, June 14-17, 2005, K.J. Bathe editor, 228-231
- [2] F. Gardini, *Discrete Compactness Property for Quadrilateral Finite Element Spaces*. Numer. Methods Partial Differential Equations 21 (2005), no. 1, 41-56
- [1] F. Gardini, *A Posteriori Error Estimates for an Eigenvalue Problem Arising from Fluid-Structure Interaction*. Istituto Lombardo (Rend. Sc.) 138 (2004), 17-34

Thesis

- [1] F. Gardini. *A posteriori error estimates for eigenvalue problem in mixed form*, PhD Thesis, University of Pavia (Italy). Advisor: Prof. Daniele Boffi.
- [2] F. Gardini. *Proprietà di compattezza discreta per spazi di elementi finiti su quadrilateri*, Laurea in Mathematics, University of Pavia (Italy). Advisor: Prof. Daniele Boffi.