CURRICULUM VITAE

Mattia de' Michieli Vitturi

SCIENTIFIC/PROFESSIONAL CURRICULUM VITAE

Education

September 2004

Università degli Studi di Pisa, Pisa, Italy
Degree: PhD in Mathematics
Members of commision: Prof. Alain Dervieux (Institut National de Recherche en Informatique et Automatique, Sophia Antipolis, France), Prof. Luciano Andrea Catalano (Politecnico di Bari, Italy), Prof. Giovanni Lombardi (Università degli Studi di Pisa, Italy)
Ph.D. Project: "Approximate Gradient-based Methods for Optimum Shape Design in Aerodynamics"
Advisor: Dr. F. Beux (Scuola Normale Superiore di Pisa, Italy)

June 1998

Università degli Studi di Pisa, Pisa, Italy
Degree: B.A. and M.Sc. in Mathematics
M.Sc. Thesis topic: Linear Quadratic Control of Parabolic Systems
Advisor: Prof. Paolo Acquistapace (Università degli Studi di Pisa, Dipartimento di Matematica).

Professional Positions

September 2010 – Present. Marie Curie researcher at the School of Earth and Space Exploration of the Arizona State University and at the Italian National Institute of Geophysics and Volcanology, Pisa Section, for the project MAMMA (Magma Ascent Mathematical Modelling and Analysis) funded by the European Community.

Other professional activities

February 2002 – September 2002. Numerical models consultant at the Institute of Geosciences and Georesources of the Italian National Research Council.

October 2003 – February 2004. Numerical consultant at the Department of Aerospace Engineering, University of Pisa, in the framework of the EXPLORIS (Explosive European Risk and Decision Support for EU Populations Threatened by Volcanoes) European Project, on the "Development and implementation of discretization schemes and algorithms for the numerical simulation of pyroclastic flows".

June 2004. Editorial and computer consultant at the Department of Mathematics, University of Pisa, for the editing of a publication on the non-Euclidean geometries.

June 2004 – August 2004. Research associate on short term contract with the INGV, Section of Pisa, in the framework of the European Project EXPLORIS (Explosive European Risk and Decision Support for EU Populations Threatened by Volcanoes), for the development of a new "Immersed Boundaries" technique modelling the boundary condition of pyroclastic flows.

August 2004 – February 2005. Numerical models consultant at the Department of Civil Engineering of the University of Pisa, with a contract for the "Study and Development of a mathematical model of constructed wetlands with vertical subsurface flow".

December 2004. Editorial and computer consultant at the Department of Mathematics, University of Pisa, for the editing of a publication on the mathematical aspects of cartography.

June 2005 - December 2005. Post-Doctoral Fellowship at the Department of Civil Engineering of the University of Pisa for the "Numerical modelling and mathematical implementation of a constructed wetlands system with vertical subsurface flow".

January 2006 – February 2006. Research associate on short term contract at the Department of Aerospace Engineering, University of Pisa, for the numerical modelling and simulation of turbulent volcanic jets.

January 2006 – April 2007. Research fellowship at the National Institute of Geophysics and Volcanology, Section of Pisa, for the "Development and application of mathematical models for explosive eruptions".

March 2007 – April 2007. Web consultant for the McGraw-Hill publisher.

June 2007 – September 2007. Numerical model consultant at the Department of Civil Engineering of the University of Pisa, for the development of mathematical models increasing the spatial resolution of portable capacitive sensors.

May 2007 – August 2010. Researcher with temporary contract at the Italian National Institute of Geophysics and Volcanology, Pisa Section. The activity is mainly focused on the development and application of mathematical models to the quantification of the dynamics and risk of explosive eruptions, within the AIRPLANE project (Italian Multidisciplinary Network on Earthquakes and Volcanoes).

Other professional responsibilities

Member of the commission for the assignation of a scholarship at the Italian National Institute of Geophysics and Volcanology, Pisa Section, for the "Physical-mathematical modelling of explosive eruptions and their riskiness'.

Member of the "science divulgation" group of the Italian National Institute of Geophysics and Volcanology.

Co-organizer (Local Organizing Committee) of the 28th IUGG Conference on Mathematical Geophysics, Pisa, Italy, June 7-11 2010, sponsored by the Committee on Mathematical Geophysics of the International Union of Geodesy and Geophysics.

Professional visits

January 2007; January 2008; January - February 2009: School of Earth & Space Exploration, Arizona State University, Arizona, USA. Collaboration with Prof. Amanda Clarke for the numerical modelling of magma ascent. Several seminars have been given during the visits and, in January 2009, also a short course on Mathematical and Numerical Methods which attracted a wide range of students, post-docs and faculty.

July 2012: Department of Earth and Environmental Sciences Section for Mineralogy, Petrology and Geochemistry, Ludwig-Maximilians-University Munich, Germany. Collaboration with Dr. Bettina Scheu and Dr. Ullrich Küppers for the comparison between numerical models results and laboratori experiments on magma fragmentation.

PARTICIPATION AT WORKSHOPS, MEETINGS AND SCHOOLS

May 2006. European EXPLORIS project (explosive eruption risk and decision support for eu populations threatened by volcanoes) final workshop (Naples, Italy).

July 2006. XV Summer School on parallel and high performance computing at CINECA (Casalecchio di Reno, Bologna, Italy).

August 2008. Short Course on "Recent developments in explosive volcanism" organized by the IAVCEI Commission on Explosive Volcanism (CEV) (Reykjavik, Islanda, 2008).

October 2008. Short Course on "OpenFOAM: Foundation Course", organized by SGI Education Services & Training (Munich, Germany).

October 2008. Short Course on "OpenFOAM: Advanced Course", organized by SGI Education Services & Training (Munich, Germany).

January 2009. CEV Workshop on "Eruption dynamics and regimes: integrated techniques of measurement and modelling" (Clermont-Ferrand, France).

October 2009. IAVCEI Commission on Explosive Volcanism Workshop on "Advances in studies of volcanic plumes and pyroclastic density currents" (Clermont-Ferrand, France).

December 2009. "Communicating your Science" workshop, organized by the American Geophysical Union (San Francisco, USA).

January 2012. MeMoVolc Scientific Meeting "Measuring and modelling volcano eruption dynamics 1" (Clermont Ferrand, France).

February 2012. NEMOH (Numerical, Experimental and stochastic Modelling of vOlcanic processes and Hazard) Kick Off Meeting (Pisa, Italy).

July 2012. Short course on "Melts, Glasses, Magmas", organized by the Department of Earth and Environmental Sciences Section for Mineralogy, Petrology and Geochemistry, Ludwig-Maximilians-University (Munich, Germany).

September 2012. Short course of the International School of Geophysics "Understanding Geological Systems for Geothermal Energy", EMFCSC (Erice, Sicily, Italy).

PARTICIPATION IN PROJECTS

Participation to the activity of the research team TROPICS ("*Transformations et Outils Informatiques Pour le Calcul Scientifique*") of the French National Institute for Research in Computer Science and Control, for the development of new algorithms for the computational fluid-dynamics.

Participation to the scientific activity of the Research Unit of the University of Pisa for the project "Dynamics of fluids and conservation laws" *funded* by the *Italian* Ministry of Education, University and Research (*MIUR*).

Participation to the research activity of the project "Polishing municipal secondary effluent for stream rehabilitation" funded by the Italian Ministry for the Environment, Land and Sea within the Italian-Israeli Cooperation on Environmental Technologies – Project 6.

Participation to the research activity of the Research Unit C4 – Solid Earh Simulator, for the project FIRB "Sviluppo nuove tecnologie per la protezione e difesa del territorio dai rischi naturali" FUMO, *funded* by the *Italian* Ministry of Education, University and Research (*MIUR*).

Participation to the research activities for the European project No. EVR1-CT-2002-40026 "EXPLORIS" (Explosive European Risk and Decision Support for EU Populations Threatened by Volcanoes).

Participation to the research activities of the Project SPEED "Scenari di Pericolosità per la Prevenzione del Rischio dei Vulcani della Campania", for research and monitoring activity aimed at risk mitigation in case of reactivation of Vesuvius and Campi Flegrei, funded by the Italian Civil Protection and the Campania Region.

Participation to the research activity of the Research Unit UR4 "Pericolosità Vulcanica" of the project AIRPLANE – Multidisciplinary reserach platform on earhquakes and volcanoes –, *funded* by the *Italian* Ministry of Education, University and Research (*MIUR*).

Participation to the MeMoVolc (Measuring and MOdelling of VOLCano eruption dynamics) research network funded by the European Science Foundation (2011-2016).

Participation to the Initial Training Network under the European Communify FP7 NEMOH (Numerical, Experimental and stochastic Modelling of volcanic processes and Hazard).

Partecipation to the research activity of the Research Unit 02 of the project V1 INGV-DPC (Italian National Institute of Geophysics and Volcanology- Department of Civil Protection) "Valutazione della pericolosità vulcanica in termini probabilistici" (2012-2013).

PARTICIPATION AT CONFERENCES

ECCOMAS-CFD 2001, European Congress on Computational Methods in Applied Sciences and Engineering, Swansea/Galles, UK, 2001.

CMMSE 2002, International Conference on Computational and Mathematical Methods in Science and Engineering, Alicante, Spain, 2002.

XVI CSYS, Chesapeake Sailing Yacht Symposium, Annapolis, USA, 2003.

ICCMSE 2003, International Conference of Computational Methods in Sciences and Enginnering, Kastoria, Greece, 2003.

EXPLORIS final workshop, Progetto Europeo "explosive eruption risk and decision support for Eu populations threatened by volcanoes", Napoli, Italy, 2006.

XXIV IUGG General Assembly, Perugia, Italy, 2007.

SPEED Kick Off Meeting, progetto SPEED – Scenari di Pericolosità e Danno, Roma, Italy, 2007.

XXVII CMG, Conference on Mathematical Geophysics, Longyearbyen, Norway, 2008.

IAVCEI 2008, International Association of Volcanology and Chemistry of the Earth's Interior, General Assembly, Reykjavik, Island, 2008.

AGU 2009 (American Geophysical Union) Fall Meeting, San Francisco, USA, 2009.

XXVIII CMG, Conference on Mathematical Geophysics, Pisa, Italy, 2010.

AGU 2010 (American Geophysical Union) Fall Meeting, San Francisco, USA, 2010.

Soufrière Hills Volcano 15 Years On Conference, MVO, Montserrat, UK, 2011.

AGU 2011 (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

Sustainable geothermal exploitation in urbanized environments: the Southern and Central Italy volcanic areas, Naples, Italy, 2012.

ABSTRACTS PRESENTED AT WORKSHOPS AND CONFERENCES

M. de' Michieli Vitturi*, F. Beux, G. Lombardi, A. Dervieux*, "Optimum shape design for turbulent viscous flows around complete configurations of 2D flying sails", CMMSE 2002

(International Conference on Computational and Mathematical Methods in Science and Engineering), Alicante, Spain, 2002 .

G. Lombardi, F. Beux, ***M. de' Michieli Vitturi***, "Analysis of 2D coupled sails: use of an optimization technique based on turbulent viscous flows", XVI CSYS **(Chesapeake Sailing Yacht Symposium)**, Annapolis (USA), 2003.

M. de' Michieli Vitturi*, F. Beux*, "Nonlinear pressure and temperature waves propagation in fluid saturated rock", ICCMSE 2003 (International Conference of Computational Methods in Sciences and Enginnering), Kastoria, Greece, 2003.

G.F. Gronchi, A. Milani, ***M. de' Michieli Vitturi****, Z. Knezevic*, "Orbit Determination with Very Short Arcs: Admissible Regions", 35th Meeting of the AAS Division on Dynamical Astronomy, Cannes, France, 2004.

T. Esposti Ongaro, ***M. de' Michieli Vitturi****, F. Beux, M.V. Salvetti, A. Neri*, "Improved numerics for the simulation of pyroclastic flows", EGU (European Geosciences Union) General Assembly 2004 , Nice, France.

T. Esposti Ongaro, A. Neri, C. Cavazzoni, G. Erbacci, G. Macedonio, M.V. Salvetti, F. Beux, M. de' Michieli Vitturi, "Towards the three dimensional multiphase flow simulation of volcanic columns and pyroclastic flows", IAVCEI 2004 General Assembly, Pucon, Chile, 2004.

M. de' Michieli Vitturi*, F. Beux*, "An approximate gradient-based method for optimum shape design in aerodynamics", VII SIMAI (Società Italiana di Matematica Applicata e Industriale), Venice, Italy, 2004.

A. Neri, T. Esposti Ongaro, G. Menconi, ***M. de' Michieli Vitturi****, C. Cavazzoni, G. Erbacci, P. Baxter*, "4D simulation of explosive eruption dynamics at Vesuvius, AGU 2006 Fall meeting, San Francisco, USA, 2006.

M. de' Michieli Vitturi*, F. Favilli*, "Sona drawings, mirror curves and pattern design", 3rd International Congress on Ethnomathematics: Cultural Connections and Mathematical Manipulations, Auckland, New Zealand, 2006.

M. de' Michieli Vitturi*, T. Esposti Ongaro, A. Neri*, "A Lagrangian model for ballistics", XXIV IUGG General Assembly, Perugia, Italy, 2007.

D. Giraldi, ***M. de' Michieli Vitturi****, M. Zaramella, A. Marion, R. Iannelli*, "Hydrodynamics of vertical subsurface flow constructed wetlands: tracer tests with Rhodamine WT and numerical modelling ",WETPOL 2007, 2nd international sumposium on wetland pollutant dynamics and control, Tartu, Estonia, 2007.

D. Giraldi, ***M. de' Michieli Vitturi****, R. Iannelli*, "FITOVERT: a dynamic numerical model of subsurface vertical flow constructed wetlands", SIDISA International Symposium on Sanitary and Environment, Florence, Italy, 2008.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B.Voight*, "Effects of conduit geometry on magma ascent dynamics in dome-forming eruptions", EGU (European Geosciences Union) General Assembly, Vienna, Austria, 2008.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B.Voight*, "A 1.5 D transient model for magma ascent dynamics", XVII CMG (Conference on Mathematical Geophysics), Longyearbyen, Norway, 2008.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B.Voight*, "Influence of conduit geometry on dome-forming magma ascent", IAVCEI (International Association of Volcanology and Chemistry of the Earth's Interior) General Assembly , Reykjavik, Island, 2008.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B.Voight*, "Modeling transient effects of magma ascent dynamics in dome-forming eruptions", IAVCEI (International Association of Volcanology and Chemistry of the Earth's Interior) General Assembly , Reykjavik, Island, 2008.

T. Esposti Ongaro, S. Barsotti, ***M. de' Michieli Vitturi****, M. Favalli, A. Longo, L. Nannipieri, A. Neri, P. Papale, G. Saccorotti, and S. Tarquini*, "From models to advanced 4D visualization tools: Developing a comprehensive framework for collaborative research in physical modelling and hazard assessment of volcanic phenomena", EGU (European Geosciences Union) General Assembly, Vienna, Austria, 2009.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B.Voight*, "Transient effects of magma ascent dynamics along a geometrically variable dome-feeding conduit", EGU (European Geosciences Union) General Assembly, Vienna, Austria, 2009.

A. Neri, S. Barsotti, ***M. de' Michieli Vitturi****, T. Esposti Ongaro, G. Macedonio, L. Nannipieri, B. Voight, A. Clarke, C. Cavazzoni, G. Erbacci et al.*, "Modelling of explosive eruption plumes and conduits", ESF workshop "Eruption dynamics and regimes: Integrated techniques of measurements and modelling", Clermont-Ferrand, France, 2009.

A. Neri, ***M. de' Michieli Vitturi****, T. Esposti Ongaro*, "*Lagrangian simulation of large volcanic particles*", CEV Workshop on "Eruption dynamics and regimes: integrated techniques of measurement and modelling", Clermont-Ferrand, France, 2009.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B.Voight*, "The effects of time-varying chamber and surface pressure on dome-building eruptions", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2009.

T. Esposti Ongaro, S. Barsotti, ***M. de' Michieli Vitturi****, M. Favalli, A. Longo, L. Nannipieri, A. Neri, P. Papale, G. Saccorotti,* "Volcano Modelling and Simulation gateway (VMSg): A new web-based framework for collaborative research in physical modelling and simulation of volcanic phenomena", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2009.

B. Voight, L. Chardot, D. Hidayat, A. T. Linde, S. I. Sacks, A. B. Clarke, R. Faroozan, O. Melnik, S. Sparks, R. Stewart, ***M. de' Michieli Vitturi***, "Conduit evacuation dynamics for Vulcanian explosions", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2009.

M. de' Michieli Vitturi, A.B. Clarke, A. Neri, B. Voight, "Modelling extrusion cycles of dome-forming eruptions", XVIII CMG (Conference on Mathematical Geophysics), Pisa, Italy, 2010.

M. de' Michieli Vitturi, A.B. Clarke, A. Neri, B. Voight, "Extrusion cycles of dome-forming eruptions", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2010.

M. de' Michieli Vitturi, R. Arrowsmith, A. Fornaciai, M. Favalli, S. Tarquini, "Erosional modification of cinder cones explored using non-linear diffusion with spatially variable diffusivity and applied to the 2002-2003 scoria cone complex (C2002) at Mount Etna, Italy", EGU (European Geosciences Union) General Assembly, Vienna, Austria, 2011.

M. de' Michieli Vitturi, A.B. Clarke, A. Neri, B. Voight, "Conduit dynamics of extrusion and explosion cycles at the Soufrière Hills volcano, Montserrat", Soufrière Hills 15 years on Anniversary scientific conference, Montserrat, 2011.

G. La Spina, M. de' Michieli Vitturi, "Numerical modeling of shock tube experiments for two-phase flow", Rittman Conference, Catania, Italy, 2011.

M. de' Michieli Vitturi, M. Todesco, A. Neri, T. Esposti Ongaro, E. Tola, G. Rocco, "Intorudcing "È VIVO! Virtual Eruptions on a Supercomputer". A DVD aimed at sharing results from numerical simulations of explosive eriptions", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

M. de' Michieli Vitturi, R. Arrowsmith, "2D nonlinear diffusive numerical simulation of geomorphic modifications to simple landforms", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

M. de' Michieli Vitturi, A.B. Clarke, A. Neri, B. Voight, "Assessing the influence of disequilibrium crystallization and degassing during magma ascent in effusive and explosive eruptions", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

A.B. Clarke, M. de' Michieli Vitturi, K. Chojnicki, J.C. Phillips, "The initial stages of explosive eruptions: insights gained from comparisons between laboratory experiments and numerical models", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

S. Colucci, M. de' Michieli Vitturi, A. Neri, D.M. Palladino, "An integrated model of magma chamber, conduit and column for the analysis of the evolution of sustained explosive eruptions", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

A.B. Clarke, K. Chojnicki, M. de' Michieli Vitturi, J.C. Phillips, "Improving multi-phase models of explosive eruptions: comparison of models against scaled laboratory experiments and field observations", AGU (American Geophysical Union) Fall Meeting, San Francisco, USA, 2011.

M. de' Michieli Vitturi, "Disequilibrium processes (degassing and crystallization) and the comparison and validation of modeling results with field and/or laboratory experiments", MeMoVolc Meeting, Clermont Ferrand, France, 2012.

M. Burton, M. de' Michieli Vitturi and D. Granieri, "Novel gas measurement and fluid flow modelling approaches; potential applications in geothermal energy production", Sustainable geothermal exploitation in urbanized environments: the Southern and Central Italy volcanic areas, Naples, Italy, 2012.

B. Carr, A.B. Clarke, L. Vanderkluysen, M. de' Michieli Vitturi, "Transition in Eruption Style at Merapi Volcano (Java, Indonesia); insight form Satellite Thermal Infrared Images and Numerical Modeling", AOGS-AGU (WPGM) Joint Assembly 2012.

J.F. Smekens, A.B. Clarke, G. Moore, M. de' Michieli Vitturi, "Constraining the Dynamics of Periodic Behavior at Mt. Semeru, Indonesia, Combining Numerical Modeling and Field Measurements of Gas Emission", AOGS-AGU (WPGM) Joint Assembly 2012.

PUBLICATIONS IN ISI JOURNALS

Milani, G.F. Gronchi, ***M. de' Michieli Vitturi*** *and Z. Knezevic*, "Orbit Determination with Very Short Arcs. I Admissible Regions", *Celestial Mechanics*, Vol. 90, 2004.

M. de' Michieli Vitturi *and F. Beux*, "Nonlinear Pressure and Temperature Waves in Fluid Saturated Rocks", *Mathematical and Computer Modelling*, pp. 769-782, Vol. 42, issue 7-8, Elsevier Science, 2005.

M. de' Michieli Vitturi *and F. Beux*, "A discrete gradient-based approach for aerodynamic shape optimisation in turbulent viscous flow", *Finite Elements in Analysis and Design,* pp. 68-80, Vol,. 23, issue 1, 2006.

Neri, T. Esposti Ongaro, G. Menconi, ***M. de' Michieli Vitturi****, C. Cavazzoni, G. Erbacci and P.J. Baxter*, "4D simulation of esplosive eruption dynamic at Vesuvius", *Geophys. Res. Lett.*, 34, L04309, doi:10.1029/2006GL028597, 2007.

M. de' Michieli Vitturi*, T. Esposti Ongaro, A. Neri, M.V. Salvetti and F. Beux*, "An immersed boundary method for compressible multiphase flows: application to the dynamics of pyroclastic density currents", *Computational Geosciences*, vol.11, num.3, pp.183-198, doi:10.1007/s10596-007-9047-9, 2007.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri and B. Voight,* "Effects of conduit geometry on magma ascent dynamics in dome-forming eruptions"*, Earth and Planetary Science Letters,* 172, pp. 567-578, doi: 10.1016/j.epsl.2008.05.025, 2008.

T. Esposti Ongaro, A. Neri, G. Menconi, ***M. de'Michieli Vitturi****, P. Marianelli, C. Cavazzoni, G. Erbacci and P.J. Baxter*, "Transient 3D numerical simulations of column collapse and pyroclastic density current scenarios at Vesuvius", *Journal of Volcanology and Geothermal Research*, 178, pp. 378-396, doi: 10.1016/j.jvolgeores.2008.06.036, 2008.

D. Giraldi, ***M. de' Michieli Vitturi****, M. Zaramella, A. Marion and R. Iannelli,* "Hydrodynamics of vertical subsurface flow constructed wetlands: tracer test with rhodamine WT and numerical modelling", *Ecological Engineering*, 35, pp. 265-273, doi: 10.1016/j.ecoleng.2008.06.004 (2009).

D. Giraldi, ***M. de' Michieli Vitturi*** *and R. Iannelli*, "FITOVERT: a dynamic model of subsurface vertical flow constructed wetlands", *Environmental Modelling and Software*, 25, pp. 633-640 (2010).

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri and B. Voight,* "Transient effects of magma ascent dynamics along a geometrically variable dome-feeding conduit", Earth and Planetary Science Letters*, 295*, 541 – 553 (2010).

M. de' Michieli Vitturi*, A. Neri, T. Esposti Ongaro, S. Lo Savio and E. Boschi,* "Lagrangian modelling of large volcanic particles: Application to Vulcanian explosions", Journal of Geophysical Research, American Geophysical Union*, 115*, B08206 (2010).

G. La Spina and ***M. de' Michieli Vitturi***, "High resolution finite volume central schemes for a compressibile two-phase model", SIAM Journal on Scientific Computing (2012).

PUBLICATIONS SUBMITTED OF IN PREPARATION FOR ISI JOURNALS

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri and B. Voight,* "Extrusion cycles during dome-building eruptions", submitted to Earth and Planetary Science Letters.

M. de' Michieli Vitturi*, R.J. Arrowsmith,* "Two dimensional nonlinear diffusive numerical simulation of geomorphic modifications to cinder cones", submitted to Earth Surface Processes and Landforms.

M. de' Michieli Vitturi*, G. La Spina and E. Romenski*, "A compressible single temperature conservative two-phase model: characteristic analysis and numerical examples", submitted to Communications in Computational Physics.

K.N. Chojnicki, A.B. Clarke, J.C. Phillips and ***M. de' Michieli Vitturi****,* "Experimental study of interphase drag in the high-acceleration phases of explosive volcanic eruption plumes", in preparation.

S. Colucci, ***M. de' Michieli Vitturi****, A. Neri, D.M. Palladino*, "An integrated model of magma chamber, conduit and column for the analysis of the evolution of sustained explosive eruptions", in preparation.

PUBLICATIONS IN INTERNATIONAL REFEREED (NON ISI) JOURNALS

M. de' Michieli Vitturi, "Approximate Gradient-based Methods for Optimum Shape Design in Aerodynamics", Tesi di Dottorato in Matematica, Università di Pisa, 2004.

G. Lombardi, F. Beux, ***M. de' Michieli Vitturi****,* "Analysis of 2D coupled sails: use of an optimization technique based on turbulent viscous flows", Proceedings of the 16th Chesapeake Sailing Yacht Symposium, 2003.

M. de' Michieli Vitturi*, F. Beux, G. Lombardi and A. Dervieux*, "Optimum shape design for turbulent viscous flows around complete configurations of 2D flying sails", *Journal of Computational Methods in Science and Engineering*, pp. 43-55, Vol.4 Issue 1 Part B, Cambridge International Science Publishing, 2004.

M. de' Michieli Vitturi, *F. Favilli*, "Sona drawings, mirror curves and pattern design", Proceedings of the 3rd International Congress on Ethnomathematics: Cultural Connections and Mathematical Manipulations, Auckland, New Zealand, 2006.

PUBLICATIONS AND TECH-REPORTS NOT REFEREED

M. de' Michieli Vitturi, "Geometria della sfera", Progetto Alice, n. 18, Vol. VI, 2005.

R. Iannelli, D. Giraldi, F. Castrogiovanni, ***M. de' Michieli Vitturi****, A. Romeo*, Polishing Municipal Secondary Effluent For Stream Rehabilitation – Final Report. Italian – Israeli Cooperation on Environmantal Technologies: Proposal 6, 2006.

A. Neri, T. Esposti Ongaro, G. Menconi, ***M. de' Michieli Vitturi****, C.Cavazzoni, G. Erbacci, P.J. Baxter*, Maps of area invaded by the flow and affected by the fallout for different scenarios - Part A: 4D simulation of explosive eruption dynamics at Vesuvius, EXPLORIS Deliverable D7.1,

A. Neri, ***M. de' Michieli Vitturi****, T. Esposti Ongaro, P. Marianelli, M. Todesco*, Prodotto D.2.3.2 Progetto SPEED, "Mappe delle principali azioni pericolose associate alle colate piroclastiche del Vesuvio e Campi Flegrei tramite simulazioni 2D ", 2007.

T. Esposti Ongaro, P. Marianelli, M. Todesco, ***M. de' Michieli Vitturi****, A. Neri, , C.Cavazzoni, G. Erbacci,* Prodotto D.2.3.3 Progetto SPEED, "Mappe tematiche, geo-referenziate e digitali, delle principali azioni pericolose associate alle colate piroclastiche del Vesuvio e Campi Flegrei tramite simulazioni 3D (derivanti da prodotti e lavori già realizzati)", 2007.

R. Iannelli, ***M. de' Michieli Vitturi****, D. Giraldi, E. Perrone,* "Fitovert User Manual", Dipartemento di Ingegneria Civile, Università di Pisa, 2008.

G. Macedonio, A. Neri, A. Folch, ***M. de' Michieli Vitturi****,* "CPIUC 2.0/F90 Source Guide", Istituto Nazionale di Geofisca e Vulcanologia, Sezione di Pisa, published online on Volcano modelling and simulation Gateway (http://vmsg.pi.ingv.it), 2010.

M. de' Michieli Vitturi*, A.B. Clarke, A. Neri, B. Voight,* "DOMEFLOW Source Guide", Istituto Nazionale di Geofisca e Vulcanologia, Sezione di Pisa, published online on Volcano modelling and simulation Gateway (http://vmsg.pi.ingv.it), 2010.

TEACHING EXPERIENCE

Academic year 1999 – 2000. Teaching assistant for the Courses of Fundamentals of Mathematics (Degree in Biological Sciences, University of Pisa).

Academic years 2001/02, 2002/03, 2003/04 and 2004/05. Teaching assistant for the courses of Fundamentals of Mathematics (Degree in Environmental Sciences, University of Pisa).

Academic years 2002/03, 2003/04 and 2004/05. Lecturer for the courses of Introduction to Mathematics (Degree in Environmental Sciences Geosciences, University of Pisa).

Academic year 2003/04. Mathematics tutor at the Faculty of Mathematics, Physics and Natural Sciences.

January- February 2009. Short course on Mathematical and Numerical Methods at the Arizona State University, USA.

Academic year 2008 – 2009. Co-supervision of the 'Laurea' dissertation (UK Master Level Equivalent): "Simulazioni matematiche di letti pilota di fitodepurazione con diverse macrofite" (Mathematical simulations of pilot constructed wetland beds with different macrophytes), G. Mannucci, University of Pisa.

Academic year 2009-2010. Lecturer at the University of Pisa for the M.Sc. course at the Department of Mathematics on "Introduction to mathematical models in Geophysics and Volcanology".

Academic years 2009 – 2011. Co-Advisor of the Ph.D student S. Colucci of the Department of Earth Sciences, Sapienza, University of Rome, Italy, for the part of the project involving the numerical simulations of explosive events.

Academic year 2010 – 2012. Advisor of the Ph.D student G. La Spina of the Ph.D. School of Mathematics of the University of Pisa, Italy, for a project on the mathematical modelling of magma ascent in the conduit.

Academic year 2011-2012. Lecturer at the Arizona State University for the M.Sc. course on "Numerical Methods for Geophysical Fluid Dynamics".

SEMINARS AND OUTREACH ACTIVITIES

Academic years 2000-2001, 2001-2002 and 2002-2003. Participation to the advisory activities organized by the University of Pisa for the high school students.

Academic year 2004-2005. Invited talk on "Mathematics and America's Cup" for the Week of Mathematics organized by the Department of Mathematics of the University of Pisa.

Academic year 2005-2006. Invited talk on "Mathematics and Volcanology" for the Week of Mathematics organized by the Department of Mathematics of the University of Pisa.

Academic year 2005-2006. Collaboration with the Italian journal for mathematics education "Progetto Alice", in order to introduce non-Euclidean geometries to high-school students, with application to problems of cartography.

Academic year 2005-2006. Collaboration with the Mathematics Education research group of the Department of Mathematics of the University of Pisa for the study of mathematical aspects hidden in traditional activities belonging to non-Western cultures.

Academic year 2006-2007. Invited talk on "What is a physical-mathematical model?" for the Week of Mathematics organized by the Department of Mathematics of the University of Pisa.

Academic year 2006-2007. Invited talk on "LPAC: A Lagrangian model for the calculation of ballistic trajectories of volcanic blocks" for the "environmental Fluid Dynamics" seminars at the Department of Mechanical and Aerospace Engineering of the Arizona State University.

Academic years 2007-present. Participation to the activities of the "science divulgation" group of the Italian National Institute of Geophysics and Volcanology.

Academic year 2008-2009. Internal talk at the Italian National Institute of Geophysics and Volcanology, Pisa Section, on "Modelling the steady-state and transient effects of magma ascent dynamics in dome-forming eruptions".

Academic year 2009-2010. Internal talk at the Italian National Institute of Geophysics and Volcanology, Pisa Section, on "Introduction to open source bibliography reference manager softwares".

Academic year 2009-2010. Collaboration with the Museum of Natural History and Territory, University of Pisa, for the organization of the educational laboratory "Volcanoes: the fireworks of Nature".

Academic year 2011-2012. Invited talk wit the tile "Journey to the Center of the Eartch" at the outreach event "A tu per tu con la matematica" (Face to face with mathematics).