CURRICULUM VITAE

Chiara Paola Montagna

Personal data

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phone	+39 0508311947
date of birth	26.08.1979
place of birth	Milano
citizenship	Italian

Research interests

Magma thermo-fluid dynamics in volcanic systems: physical and numerical modeling;

Volcano geophysics: physical and numerical modeling, monitoring data analysis and interpretation;

Computational fluid dynamics of compressible and incompressible multi-phase, multi-component flows, specifically targeted at magmatic processes;

Scientific communication;

Diversity, equity and inclusion in STEM.

Current working position

Researcher at Istituto Nazionale di Geofisica e Vulcanologia (INGV, National Institute for Geophysics and Volcanology), sezione di Pisa, Italy.

Work experience

10.2007 - 2.2008	Contract researcher at INGV, Pisa.
3.2008 - 12.2011	Post-doctoral researcher at INGV Pisa.

1.2012 - 2.2013	Post-doctoral research associate at Rice University Department of Earth Science, Houston, TX, U.S.A..

Education

1998	High School Diploma (scientific studies), 60/60, Liceo scientifico "F. Lussana", Bergamo.
24.3.2003	Degree in Physics, 110/110 cum laude, Università degli Studi di Pisa.
22.9.2003	Master Degree in Physics, 110/110 cum laude, Università degli Studi di Pisa. Thesis *"Drift-kinetic theory of magnetic reconnection in collisionless plasmas"*, under the supervision of Prof. Francesco Pegoraro.
17.11.2008	Ph.D. Degree in Applied Physics, at the Physics Department of the University of Pisa, with the thesis *"Stationary plasmas in Vlasov theory"*, under the supervision of Prof. Francesco Pegoraro.

Languages

Italian	Mother tongue.
English	Fluent.
German	Good.

Informatics

Operating systems	Linux, MacOS and Windows.
Applications	Good knowledge of the most common softwares (document editing, internet browsing, email clients).
Programming languages	FORTRAN77, FORTRAN90, C, C++, python, Julia, R, bash, MATLAB and Mathematica.

Peer reviewed publications

L. Insolia, S. Guerrier, C.P. Montagna, M.-P. Victoria-Feser, L. Caricchi (2024) *"Estimation and uncertainty quantification of magma interaction times using statistical emulation"*, Volcanica 7(2), 525. doi:10.30909/vol.07.02.525539

C. Pelullo, S. Chakraborty, C.P. Montagna, I. Arienzo, R.J. Brown, M. D'Antonio, S. de Vita, C. D'Oriano, M. Nazzari, L. Pappalardo, P. Petrosino (2024) *"A multi-methodological approach to record dynamics and timescales of the plumbing system of Zaro (Ischia Island, Italy) "*, Contributions to

Mineralogy and Petrology 179, 54. doi:10.1007/s00410-024-02138-9

L. Caricchi, C.P. Montagna, A. Aiuppa, J. Lages, G. Tamburello, P.Papale (2024) *"CO_2 flushing triggers paroxysmal eruptions at open conduit basaltic volcanoes. "*, Journal of Geophysical Research: Solid Earth 129, e2023JB028486.https://doi.org/10.1029/2023JB028

S. Colucci, F. Brogi, C.P. Montagna, G. Sottili, P. Papale (2024) *"Short-term magma-carbonate interaction: A modelling perspective "*, Earth and Planetary Letters 628, 118592. doi:10.1016/j.epsl.2024.118592

D. Carbone, F. Cannavò, C.P. Montagna, F. Greco (2023), *"Gas buffering of magma chamber contraction during persistent explosive activity at Mt. Etna volcano."*, Communications Earth and Environment 4, 471. doi:10.1038/s43247-023-01149-x

F. Brogi, S. Colucci, J. Matrone, C.P. Montagna, M. De' Michieli Vitturi, P. Papale (2022), *"MagmaFOAM-1.0: a modular framework for the simulation of magmatic systems"*, Geoscientific Model Development 15, 3773–3796. doi:10.5194/gmd-15-3773-2022

C.P. Montagna, P. Papale, A. Longo (2022), *"Magma chamber dynamics at the Campi Flegrei Caldera, Italy"*. In: G. Orsi, M. D'Antonio, L. Civetta (eds). Campi Flegrei. Active Volcanoes of the World. Springer, Berlin, Heidelberg. doi:10.1007/978-3-642-37060-1_7

A. Farina, J. Matrone, C.P. Montagna, F. Rosso (2021), *"Modeling of a gas slug rising in a cylindrical duct and possible applications to volcanic scenarios"*, Rendiconti Lincei - Matematica e Applicazioni 31(4), 917-937. doi:10.4171/RLM/920

M. Bagagli, C.P. Montagna, P. Papale, A. Longo (2017), *"Signature of magmatic processes in strainmeter records at Campi Flegrei (Italy)"*, Geophysical Research Letters 44(2), 718. doi:10.1002/2016GL071875

S. Colucci, P. Papale, C.P. Montagna (2017), *"Non-Newtonian flow of bubbly magma in volcanic conduits"*, Journal of Geophysical Research: Solid Earth 122(3), 1789-1804. doi:10.1002/2016JB013383

P. Papale, C. P. Montagna, A. Longo (2017), *"Pressure evolution in shallow magma chambers upon buoyancy-driven replenishment"*, Geochemistry, Geophysics, Geosystems 18(3), 1214-1224. doi:10.1002/2016gc006731

C. P. Montagna, P. Papale, A. Longo, M. Bagagli (2017),

"Magma chamber rejuvenation: insights from numerical models". In: J. Gottsmann, J. Neuberg, B. Scheu (eds). Volcanic Unrest - From Science to Society. Springer. doi:10.1007/11157_2017_21

D. Morgavi, I. Arienzo, C.P. Montagna, D. Perugini (2017), *"Magma mixing: history and dynamics of an eruption trigger"*. In: J. Gottsmann, J. Neuberg, B. Scheu (eds). Volcanic Unrest - From Science to Society. Springer. doi:10.1007/11157_2017_30

M. Polacci, M. De' Michieli Vitturi, et al. (2017), *"From magma ascent to ash generation: Investigating volcanic conduit processes by integrating experiments, numerical modeling, and observations"*, Annals of Geophysics 60(6), S066. doi:10.4401/ag-7449

C.P. Montagna, P. Papale, A. Longo (2015), *"Timescales of mingling in shallow magmatic reservoirs"*. In: L. Caricchi, J.D. Blundy (eds), Chemical, Physical and Temporal Evolution of Magmatic Systems, Geological Society, London, Special Publications 422, 6. doi: 10.1144/SP422.6

C. P. Montagna, H. M. Gonnermann (2013), *"Magma flow between summit and Pu'u 'Ō'ō at Kīlauea Volcano, Hawai'i*, Geochemistry, Geophysics, Geosystems 14, 2232. doi: 10.1002/ggge.20145

A. Longo, P. Papale, M. Vassalli, G. Saccorotti, C. P. Montagna, A. Cassioli, S. Giudice, E. Boschi (2012), *"Magma convection and mixing dynamics as a source of Ultra-Long-Period oscillations"*, Bulletin of Volcanology 74 (4), 873. doi:10.1007/s00445-011-0570-0

M. Vassalli, A. Longo, C. P. Montagna, G. O'Brien, C. Bean, L. Bisconti, P. Papale, G. Saccorotti (2009), *"An integrated method to model volcanic processes and associated geophysical signals"*. In: C. J. Bean, A. K. Braiden, I. Lokmer, F. Martini, G. S. O'Brien (eds). The VOLUME project, VOLcanoes: Understanding subsurface mass moveMEnt. Dublin: The Volume Consortium.

A. Longo, M. Barsanti, P. Papale, M. Vassalli, C. P. Montagna, L. Bisconti, G. Saccorotti (2009), *"A numerical code for the simulation of magma-rocks dynamics"*, Communications to SIMAI Congress 3, 237. doi:10.1685/CSC09237

C. Montagna, F. Pegoraro (2008), *"Vlasov equilibria: varying the temperature or the density distributions"*, Communications in Nonlinear Science and Numerical Simulation, 13 (1), 147. doi:10.1016/j.cnsns.2007.05.012

C. Montagna, F. Pegoraro (2007), *"Vlasov-Maxwell plasma*

equilibria with temperature and density gradients: Weak inhomogeneity limit", Physics of Plasmas 14, 042103. doi:10.1063/1.2718911

F. Ceccherini, C. Montagna, F. Pegoraro, G. Cicogna (2005), *"Two-dimensional Harris-Liouville plasma kinetic equilibria"*, Physics of Plasmas 12, 52506. doi:10.1063/1.1899083

Software

C.P. Montagna, `pyFlushing`: a python tool to simulate CO_2 flushing in a magma column through equilibrium steps. Source code.

F. Brogi, S. Colucci, C.P. Montagna, `MagmaFOAM`: a modular framework for the simulation of magmatic systems based on the open source computational fluid dynamics software OpenFOAM. Release.

S. Colucci, C.P. Montagna, `syntheticSignals`: a suite of MATLAB scripts to produce and analyze synthetic geophysical signals from complex underground sources. Releases, source code.

Funding

2.2017 - 2.2020 MIUR-PRIN (Italian Government) 'Advanced atomic interferometer for gravity and quantum physics experiments with applications to geophysics', co-PI, €56500.

2018 INGV FISR (internal call) 'Time scales of magma chamber evolution', PI, €9346.

2021 - 2022 INGV Pianeta Dinamico (internal call) 'CHOPIN - volCanoatmospHere-iOnosPhere connectIoN', co-PI, €25800.

Seminars and invited presentations

13.1.2008 Department of Physics, University of York, U.K.. *"Stationary plasmas in Vlasov theory."*

17.5.2010 Department of Physics, University of Pisa, Italy. *"Physico-mathematical models of magma fluid dynamics in volcanic systems."*

15.7.2010 Department of Physics, Centre for Fusion, Space and Astrophysics, University of Warwick, U.K.. *"Stationary plasmas in Vlasov theory."*

22.10.2010 Department of Geophysics, University of Hamburg, Germany. *"Magma convection and mixing in complex reservoirs as source of geophysical signals."*

22.11.2011	Istituto Nazionale di Geofisica e Vulcanologia, sezione di Pisa. *"Simulazioni numeriche di mixing di magmi e segnali geofisici associati"*.
4.9.2012	USGS Hawaiian Volcano Observatory. *"Magma flow between summit and Pu'u 'Ō'ō at Kīlauea Volcano, Hawai'i"*.
11.12.2018	AGU Fall Meeting 2018, Washington DC. *"Deciphering Volcanic Unrest through Forward-Modeled Monitoring Datasets"*.
14.12.2021	AGU Fall Meeting 2021, New Orleans, LA. *"Messengers from Depth: Impact of Fluid-Magma Interaction on Gas Measurements and Eruptive Dynamics at Active Volcanoes."*.
	More than 50 presentations at international conferences.

Advising

8.2008 - 12.2011	Davide Giudice, postdoctoral researcher at INGV Pisa.
3.2013 - 8.2021	Simone Colucci, postdoctoral researcher at INGV Pisa - now researcher at INGV Pisa.
12.2014 - 8.2016	Matteo Bagagli, master student from the Department of Earth Sciences, University of Pisa, at INGV Pisa - now postdoctoral researcher at INGV Pisa.
6 - 9.2015	Patrizia Canepa, intern from a computational fluid dynamics course held by DLTM La Spezia at INGV Pisa.
3-2018 - ongoing	Federico Brogi, postdoctoral researcher at INGV Pisa - now research staff at INGV Pisa.
3 - 12.2019	Jacopo Matrone, Masters thesis at Department of Mathematics, University of Florence - now R&D at Bertolotti.
2022-2025	Owen McCluskey, PhD student at the Department of Earth Sciences, University of Pisa; EU Horizon Europe ITN fellow within the IMPROVE project.
2022-2025	Gabriel Girela Arjona, PhD student at the Department of Earth Sciences, University of Pisa; EU Horizon Europe ITN fellow within the IMPROVE project.

Service

Reviewer for Physics of Plasmas; Physics of Fluids; Journal of Geophysical Research, Geophysical Research Letters, Journal of Volcanology and Geothermal Research, Earth and Planetary Science Letters, Geology, Physics of Fluids, Nature Communications Earth and Environment.

Reviewer for NSF - Geophysics panel.

	Moderator for EarthArXiv, Earth-Science-focused preprint server.
	Editor for Volcanica.
	Member of selection committees for post-doctoral and research scientist positions within and outside INGV; member of MsC thesis committees in Mathematics and Earth Sciences.
2021	Organizing Committee for Rittmann Conference for Young Researches 2021, organized by Italian Association for Volcanology (AIV). Editor of the associated abstract volume doi:10.13127/misc/59.
	Member of European Geosciences Union (EGU), American Geophysical Union (AGU), International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) and Associazione Italiana di Vulcanologia (AIV).
2018 - 2019	Science Committee member of GMPV (Geochemistry, Mineralogy, Petrology and Volcanology) Division of EGU (European Geosciences Union).
	Member of the Steering Committee for the IAVCEI Commission on Volcanic and Igneous Plumbing Systems (VIPS) - responsible for Events and Outreach; editor for the eVolcano VIPS contributions.
	Convener of sessions at IAVCEI, AGU and EGU meetings.

Teaching

9 - 12.2006	Tutor for the course Mathematics 0, Faculty of Engineering at the University of Pisa.
3 - 11.2007	Teaching assistant, lab teacher and exams for the course General Physics, Degree course in Environmental Sciences and Technologies at the University of Pisa.
10.2008 - 02.2010	Teaching assistant and exams for the course General Physics, Degree course in Information Engineering at the University of Pisa.
2013 - 2014	Guest lecturer for the course "The OpenFOAM framework for the development of numerical models for geophysical applications and research", hosted at the National Institute of Geophysics and Volcanology, Pisa, Italy.
03.2015	NEMOH Short Course "Thermo-fluid Dynamics in Computational Volcanology", Pisa, Italy.

01.2020	Conférence Universitaire De Suisse Occidentale - Doctoral Program in Mineral Sciences - course "Fluid Dynamic Modeling in Volcanology", Geneva, Switzerland.
2020 - 2023	Universities of Pisa, Florence and Siena - Doctoral Program in Earth Sciences - course "Thermodynamics of multi-phase mixtures and applications to magmatic systems".
2023	University of Pisa - Doctoral Program in Earth Sciences - course "Multiphase Flows and Computational Fluid Dynamics for Earth Sciences ".

Outreach

05.05.2010	School laboratory "Volcanoes: nature's fireworks", for the Museum of Natural History and Territory in Calci, Pisa, Italy.
11 - 18.09.2010	Coordinator of the INGV Volcanological Information Center at Stromboli, Aeolian Islands, Italy.
2014, 2015, 2024	ScienzAperta, INGV-organized outreach activities for schools and public.
2024	Scientific Commission premio Asimov 2023/2024: evaluation of book reviews from students.
2011 - now	European Researcher's Night.
2015 - now	Lessons at primary and secondary schools.
02.2019 - now	Memeber of INGV communication working group; responsible for dissemination of volcano science.

Pisa, February 28, 2025