

CURRICULUM VITAE ET STUDIORUM
MAURIZIO PETRELLI (PhD)

PERSONAL DATA

name: Maurizio Petrelli
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current position: Associate Professor, University of Perugia

RESUME

Maurizio Petrelli works as Associate Professor in petrology and volcanology at the Department of Physics and Geology, University of Perugia. In 2001, he graduated with honor in Geology at the University of Perugia. In February 2006, he got a Ph.D. discussing a thesis titled "Non-Linear Dynamics in Magma Interaction Processes: Implications for the Timescales of Magma Hybridization." This work received an award from the Società Italiana di Mineralogia e Petrologia (SIMP) for the best Ph.D. Thesis in Petrology for the year 2006.

Since 2002, he has carried out intense laboratory work focused on the development of analytical protocols for geochemical analysis by Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS). Currently, he is the scientific manager of the LA-ICP-MS laboratory of the Department of Physics and Geology, University of Perugia.

Current studies focus on the petrological, volcanological, and geochemical characterization of magmatic systems with particular emphasis on time-scales estimates of magmatic processes. To do that, he combines numerical simulations, experimental petrology investigations, and the study of natural samples. Since 2016, he has developed a new research line at the Department of Physics and Geology, University of Perugia focused on Machine Learning techniques applied to petrological and volcanological studies.

He has achieved the habilitation as Full (I Fascia) professor by the "Ministero dell'Istruzione Ministero dell'Università e della Ricerca (MIUR)" the year 2021.

NUMBER OF PUBLICATIONS, H-INDEX

90, 19 – SCOPUS (<https://goo.gl/su2PJ9>)

EDUCATION AND HABILITATIONS

June 2021 – **Habilitation to the role of Full Professor (Prima Fascia) in the Italian Universities** – Italian “Ministero dell'Istruzione dell'Università e della Ricerca (MIUR)”

April 2017 – **Habilitation to the role of Associate Professor (Seconda Fascia) in the Italian Universities** – Italian “Ministero dell'Istruzione dell'Università e della Ricerca (MIUR)”

February 2006 – **Ph.D. Degree in Earth Sciences** – University of Perugia, Italy

Thesis: “Transition to chaos and implications for time-scales of magma hybridization during mixing processes in magma chambers”. *Supervisor:* Prof. G. Poli

July 2001 – **Master Degree in Geology** – University of Perugia, Italy – 110/110 cum laude

Thesis: “Determination of travertine provenance from ancient buildings using self-organizing maps and fuzzy logic”. *Supervisor:* Prof. G. Poli

PROFESSIONAL APPOINTMENTS

Dec 2021 – Now

University of Perugia: **Associate Professor**

Scientific Activities: petrological, volcanological and geochemical characterization of magmatic systems. Application of Machine Learning techniques to petrological and volcanological studies.

Dec 2018 – Dec 2021

University of Perugia: **Assistant Professor (RTD-b), tenure track (3 years)**

Scientific Activities: petrological, volcanological and geochemical characterization of magmatic systems. Application of Machine Learning techniques to petrological and volcanological studies.

Aug 2015 – now

Istituto Nazionale di Fisica Nucleare (INFN): **Scientific Association**

Scientific Activities: Petrological and geochemical study of meteorite samples to unravel their origin and evolution.

- Aug 2014 – Dec 2018 University of Perugia: **Researcher (RTD-a), fixed term (3 + 2 years)**
Scientific Activities: Unravel the evolution and time-scales of magmatic systems by combining numerical simulations and analytical data.
- Nov 2009 – Aug 2014 University of Perugia: **Post-Doc, Contract Researcher - Collaborator**
Scientific Activities: Study of the evolution and time-scales of magmatic systems.
- Nov 2005 – Nov 2009 University of Perugia: **Post Doc Fellow**
Scientific Activities: Study of trace elements mobility in igneous systems experiencing magma mixing.
- Dec 2003 – Jan 2004 ENEA: **Contract Researcher:** XIX Italian Antarctic Expedition
Scientific Activities: Study of the magma mixing process in the Northern Foothills and Dry Valleys (Victoria Land) areas.
- Nov 2001 – Nov 2005 University of Perugia: **PhD student**
Ph.D. Project: “Transition to chaos and implications for time-scales of magma hybridization during mixing processes in magma chambers”.

DEVELOPMENT OF ANALYTICAL FACILITIES

- Nov 2002 – Now University of Perugia: **Development of the LA-ICP-MS Laboratory**
Laboratory Activities: Development of the Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) laboratory. In 2001, he started the development of the LA-ICP-MS laboratory at the Department of Geology, University of Perugia. Since 2002, he successfully run the LA-ICP-MS with activities that includes the development of analytical protocols, the analysis of natural and experimental samples, and the support of external users during the analysis. Currently, the LA-ICP-MS lab in Perugia hosts two LA-ICP-MS systems and it is actively involved in several scientific projects.

TEACHING ACTIVITY

2019 – now	University of Perugia, Master degree in Geological Sciences and Technologies. Teaching course in “Introduction to experimental petro-volcanology”.
2019 – now	University of Perugia, Master degree in Geological Sciences and Technologies. Teaching course in “Mathematical methods in Earth Sciences”.
Feb 2020	Leibniz Universität Hannover Institut für Mineralogie, Short course (16 h) in “Introduction to Python Programming in Earth Sciences”.
Dec 2018	Department of Petrology & Geochemistry, Eötvös University Budapest (ELTE), Short course (16 h) in “Introduction to Python Programming in Earth Sciences”.
2017 – 2019	University of Perugia, Master degree in Geological Sciences and Technologies. Teaching course in “Data analysis and data interpretation in geological sciences”.
2015 – 2016	University of Perugia, Master degree in Geological Sciences and Technologies. Teaching course in “Igneous Petrology”.
2014 – now	University of Perugia, Doctorate Schools in “Science and Tecnology for Physics and Geology” and “Earth System and Global Changes”. International Short Course on “Application of Laser Ablation Inductively Coupled Plasma Mass Spectrometry to Earth Sciences.” (http://pvrg.unipg.it/laicpms2021/)

AWARDS

2016 - Microsoft Azure Research Award (CRM:0518576), Microsoft Corporation.

2006 – *PhD Thesis Award*: Società Italiana di Mineralogia e Petrografia (SIMP).

2002 – *Master Thesis Award*: Associazione “per un sorriso Monica De Carlo” – ONLUS.

COMMUNITY INVOLVEMENT

- 2020 – Now American Mineralogist, **Associate Editor**
- 2015 – 2019 American Mineralogist, **Guest Associate Editor** for the special collection entitled “Dynamics of Magmatic Processes”.
- Jun 2020 **Organizer** of a thematic session at the Goldschmidt 2020 in Virtual mode: "Constraining Petrological and Geochemical Variations in Magmas to Capture the Evolution of Volcanoes over Space and Time".
- May 2020 **Organizer** of a thematic session at the EGU General Assembly in Virtual mode: "The Dynamics of Magmatic Plumbing System".
- Apr 2019 **Organizer** of a thematic session at the EGU General Assembly in Vienna (Austria): "Rates, timescales and mechanisms of magmatic and volcanic processes: from mantle source to emplacement or eruption".
- Dec 2018 **Organizer** of a thematic session at the AGU Fall Meeting in Washington DC (USA): "Origin and Timescales of Magmatic Systems: Discussing Ages, Rates, Transport, and Storage Processes of Magmas from the Source to Emplacement or Eruption".
- Dec 2017 **Organizer** of a thematic session at the AGU Fall Meeting in New Orleans (USA): "Processes of Magma Crystallization from Depth to Surface".
- Nov 2016 **Organizer** of a thematic session at the Cities on Volcanoes 9 in Puerto

Varas (Chile): "Mind the Gap! Techniques to overcome multi-scale issues in geological and geomorphic processes".

Jun 2016 - now

Organizer of the international workshop entitled "Application of Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) to Earth Sciences" in Perugia.

Apr 2016

Organizer of a thematic session at the 2016 European Geosciences Union General Assembly in Vienna (Austria): " Mind the Gap! Techniques to overcome multi-scale issues in geological and geomorphic processes".

Aug 2015

Organizer of a thematic session at the 2015 Goldschmidt conference in Prague (Czech Republic): "Dynamics of Magmatic Processes: From Magma Mixing to Crystal Residence Time".

SELECTED SCIENTIFIC PUBLICATIONS

Please refer to my Scopus record for the complete list of publications (<https://goo.gl/su2PJ9>)

1. **Petrelli M.** (2021). Introduction to Python in Earth Science Data Analysis. 250 pp. Springer.
2. **Petrelli M.**, Caricchi L., Perugini D. (2020). Machine Learning Thermo-Barometry: Application to Clinopyroxene-Bearing Magmas. Journal of Geophysical Research: Solid Earth, doi: 10.1029/2020JB020130
3. **Petrelli M.**, Zellmer G.F., (2020). Rates and Timescales of Magma Transfer, Storage, Emplacement, and Eruption. In Dynamic Magma Evolution , Geophysical Monograph Series, 254, American Geophysical Union and Wiley.
4. **Petrelli M.**, El Omari K., Spina L., Le Guer, Y., La Spina G., Perugini D., 2018. Timescales of water accumulation in magmas and implications for short warning times of explosive eruptions.

Nature Communications, doi: 10.1038/s41467-018-02987-6

5. **Petrelli M.**, Bizzarri R., Morgavi D., Baldanza A., Perugini D., 2017. Combining machine learning techniques, microanalyses and large geochemical datasets for tephrochronological studies in complex volcanic areas: New age constraints for the Pleistocene magmatism of central Italy.

Quaternary Geochronology, doi: 10.1016/j.quageo.2016.12.003

6. **Petrelli M.**, Perugini D., 2016. Solving petrological problems through machine learning: the study case of tectonic discrimination using geochemical and isotopic data. **Contributions to Mineralogy and Petrology**, doi: 10.1007/s00410-016-1292-2

7. **Petrelli M.**, El Omari K., Le Guer Y., Perugini D., 2016. Effects of chaotic advection on the timescales of cooling and crystallization of magma bodies at mid crustal levels. **Geochemistry, Geophysics, Geosystems**, doi: 10.1002/2015GC006109

8. **Petrelli, M.**, Perugini, D., Poli, G., 2011. Transition to chaos and implications for time-scales of magma hybridization during mixing processes in magma chambers. **Lithos** 125, 211-22

Perugia, 10/02/2022

Sincerely

Maurizio Petrelli

