

# CURRICULUM VITAE

## FOR

### MARA MURRI

(Last update May 2017)

#### I. PERSONAL DETAILS AND CONTACTS

Date of birth: February 4<sup>th</sup> 1992  
City of birth: Milan, Italy  
Nationality: Italian  
E-mail: [mara.murri01@universitadipavia.it](mailto:mara.murri01@universitadipavia.it)  
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Google scholar: <https://scholar.google.it/citations?user=PIviHOUAAAAJ&hl=en>

#### II. ACADEMIC RECORD AND CAREER

**2016-2019 PhD research (XXXII cycle)**

*Dissertation:* Elastic geobarometry methods: calibration of the Raman shifts in terms of deviatoric stresses and test on synthetic host-inclusion pairs

*Place:* Department of Earth and Environmental Sciences, University of Pavia, Italy.

*Advisors:* M.C. Domeneghetti, B. Mihailova, R.J. Angel and M. Prencipe.

**2017 Raman and IR spectroscopy of solids Course** at the University of Hamburg (Germany)

**2017 Culture della Materia for Mineralogy**

**2017 Density Functional Theory Course**, within the framework of the PhD programme at the University of Turin (7,5 CFU)

**July 2016 Master degree - Applied Geological Sciences, 110/110 cum laude**

*Dissertation:* The role of Fe content on the Fe-Mg exchange reaction in augite

*Place:* Department of Earth and Environmental Sciences, University of Pavia, Italy.

*Advisors:* Prof.ssa M.C. Domeneghetti, M. Alvaro

**2016 High-Pressure Short Course** (2 ECTS) Bayerisches Geoinstitut Universität Bayreuth D-95440 Bayreuth/Germany. February 22<sup>nd</sup>-26<sup>th</sup> 2016.

**2015-2016 Student teaching assistance** for the course of Mineralogy at the University of Pavia (a.y. 2015-2016).

**2015 Elasticity course**, within the framework of the PhD programme of the University of Pavia (3 CFU).

**2015 International Diamond School** “The nature of diamonds and their use in Earth’s study”. Bressanone-Brixen, 27-31<sup>st</sup> January 2015.

[http://www.indimedeia.eu/diamond\\_school\\_2015.htm](http://www.indimedeia.eu/diamond_school_2015.htm)

**July 2014 Bachelor degree – Geology, 110/110 cum laude**

*Dissertation:* Critical reassessment of the thermoelastic properties for diamond.

*Place:* Department of Earth and Environmental Sciences, University of Pavia, Italy.

*Advisors:* Prof.ssa M.C. Domeneghetti, M. Alvaro

**2011 Scientific High school degree, 80/100**

*Place:* Liceo scientifico N. Copernico, Pavia

### III. AWARDS

2017

**Grant AIC** at the Italian Crystallographic Association (AIC) 26th-29th June 2017. Perugia, I.

2016

**Student Helper** at the European Mineralogical Conference, 11<sup>th</sup>-15<sup>th</sup> September 2016, Rimini, I.

2016

**The Barringer Family Fund for Meteorite Impact Research** to support the research project titled: "Stacking Disorder in Diamonds as a Tool for Investigating Impact Craters." (\$5000, PI: Mara Murri)

### IV. SCIENTIFIC ACTIVITY

#### A. Main research topics:

My research is mainly focused on the investigation of terrestrial and extraterrestrial crystalline material relevant for the Earth and Planetary Science mainly using crystallographic and mineral physics tools.

**Diamond:** During my bachelor degree thesis, I have been working on the critical reassessment of the thermoelastic properties for diamonds. Beside the relevance for the use of diamond as tool (e.g. cutting and polishing applications) it has been shown that knowledge of its elastic properties and structure modification constitute the basis to use diamond for elastic geobarometric applications and impact cratering processes thus shedding lights on diamond formation processes in the Earth and Planetary bodies. Furthermore, the investigation of inclusions still entrapped in diamonds can provide crucial information on Earth's mantle state and processes.

**Meteorites:** During the master degree (MSc) thesis I've been involved in a project aimed to study to the Fe-Mg exchange reaction of crystalline material at high temperature conditions '*ex situ*' (i.e. high-temperature annealing and quenching experiments) by means of single-crystal X-ray diffraction using both point detector and area detector diffractometers (e.g. publication #1). These experiments are extremely relevant for geothermometric and geospeedometric investigation of Earth and planetary materials (e.g. publication #1,3). Determination of the closure temperature and cooling rate from mineral phases occurring in terrestrial and extraterrestrial minerals can be used to infer the thermal history of their host rocks.

**Geobarometry:** Currently I am studying host-inclusion pairs in order to determine their formation conditions by using single-crystal X-ray diffraction (SC-XRD) and micro-Raman spectroscopy. X-ray diffraction experiments allow the measure of thermoelastic properties of minerals and the determination of their equations of state (i.e. Volume against P-T parameters) that are the starting point to calculate the entrapment pressure of the host-inclusion system. The elastic properties of minerals are fundamental data to understand how the system behaves from such depth to Earth surface during exhumation processes.

#### B. Main collaborations

##### National:

Fabrizio Nestola (University of Padua, Italy)  
Matteo Alvaro (University of Pavia)  
M. Chiara Domeneghetti (University of Pavia, Italy)  
Ross J. Angel (Visiting professor, University of Padua, Italy)  
M. Prencipe (University of Turin.)

##### International:

Adrian Jones (UCL, London)  
Boriana Mihailova (University of Hamburg)

### C. Publications on peer reviewed journals

1. **M. Murri**, L. Scandolo, A. Fioretti, F. Nestola, M.C. Domeneghetti and M. Alvaro (2016). The role of Fe content on the Fe-Mg exchange reaction in augite. *American mineralogist* 101 (12), 2747-2750.
2. **Murri M.**, Cámara F., Adam J., Domeneghetti M.C., Alvaro M. (2017). Intracrystalline “geothermometry” assessed on clino- orthopyroxenes bearing synthetic rocks. *Geochimica et Cosmochimica acta* (submitted)
3. **M. Murri**, L. Scandolo, A. Fioretti, F. Nestola, M.C. Domeneghetti and M. Alvaro (2017) New insights on Theo’s Flow lava using intracrystalline thermometry on augites. *Geochimica et Cosmochimica acta* (in prep.)

### D. National and international conferences and meetings

#### 2015

1. **Murri M.**, Scandolo L., Alvaro M., Domeneghetti M.C., Fioretti A.M. Clinopyroxene Fe-Mg exchange reaction applied to Martian nakhlites. Congresso congiunto SIMP-AIV-SoGeI-SGI. September 2<sup>nd</sup> - 4<sup>th</sup> 2015. Florence, I

#### 2016

2. **M. Murri**, L. Scandolo, A.M. Fioretti, M.C. Domeneghetti, M. Alvaro. Fe-Mg exchange reaction in clinopyroxene and its application to the thermal history of planetary bodies. 47<sup>th</sup>Lunar and Planetary Science Conference 21<sup>st</sup> -25<sup>th</sup> March, Houston, Texas (USA).
3. **Murri M.**, Scandolo L., Fioretti A.M., Nestola F., Domeneghetti M.C., Alvaro M. New insights on Theo’s Flow Lava using intracrystalline thermometry on augites. European Mineralogical Conference 11<sup>th</sup>-15<sup>th</sup> September 2016, Rimini, I

#### 2017

4. Alvaro, M., **Murri, M.**, Mazzucchelli, M.L., Prencipe, M., Campomenosi, N., Angel, R.J. Elastic geobarometry for UHP metamorphic rocks International Eclogite Conference (IEC) 20<sup>th</sup>-29<sup>th</sup> August 2017. Åre, Sweden.
5. Campomenosi, N., Scambelluri, M., Alvaro, M., Mihailova, B., Nestola, F., Mazzucchelli, M.L., **Murri, M.**, Angel, R. J, Prencipe, M. Experimental evidence on natural host-inclusion mineral systems to characterize the role of geometry and size of the inclusions for Raman elastic geobarometry. International Eclogite Conference (IEC) 20<sup>th</sup>-29<sup>th</sup> August 2017. Åre, Sweden.
6. **Murri M.**, Mazzucchelli M.L., Prencipe M., Mihailova B., Scambelluri M., Campomenosi N., Angel R.J., Alvaro M. Ab initio simulation on Quartz (SiO<sub>2</sub>) under hydrostatic stress vs isotropic strain. Italian Crystallographic Association (AIC) 26<sup>th</sup>-29<sup>th</sup> June 2017. Perugia,I.
7. Campomenosi, N., Scambelluri, M., Alvaro, M., Mihailova, B., Nestola, F., Mazzucchelli, M.L., **Murri, M.**, Angel, R. J, Prencipe, M. Geometry and size effect on Raman shift in natural host-inclusion system: an experimental validation. Congresso Congiunto AIV-SGI-SIMP-SOGEI 3<sup>rd</sup>-6<sup>th</sup> September 2017.Pisa, I.
8. **Murri M.**, Mazzucchelli M.L., Prencipe M., Mihailova B., Scambelluri M., Campomenosi N., Angel R.J., Alvaro M. How does Quartz respond to deviatoric stresses? Ab initio calculations on SiO<sub>2</sub> tectosilicate Congresso Congiunto AIV-SGI-SIMP-SOGEI 3<sup>rd</sup>-6<sup>th</sup> September 2017.Pisa, I.
9. Alvaro M., Jones A.P., McMillan P.F., Salzmann C.G., **Murri M.**, Domeneghetti M.C., Nestola F., Prencipe M., Dobson D., Hazael R., Moore M., Vishnevsky S., Logvinova A.M., Sobolev N.V. Structure

characterization of impact natural diamond from Popigai crater. Congresso Congiunto AIV-SGI-SIMP-SOGEI 3<sup>rd</sup>-6<sup>th</sup> September 2017.Pisa, I.

10. **Murri M.**, Jones A.P., McMillan P.F., Salzmann C.G., Alvaro M., Domeneghetti M.C., Nestola F., Principe M., Dobson D., Hazael R., Moore M., Vishnevsky S., Logvinova A.M., Sobolev N.V. Structure characterization of impact natural diamond from Popigai crater. 80<sup>th</sup> Annual Meeting of the Meteoritical Society 23<sup>rd</sup>-28<sup>th</sup> July, Santa Fe, New Mexico (USA).

Mara Murri