Gabriele Mogni

Education

2009–2014 DPhil (PhD) research degree in the physics of shock compression of condensed matter, Clarendon Laboratory, University of Oxford.

2005–2009 *BSc, MSc (Hons)* in 'Natural Sciences' with specialisation in Physics, *Upper Second-Class*, Cavendish Laboratory, University of Cambridge.

1991–2005 *European Baccalaureat* (Italian Section) with a grade average of *93.08%*, European School of Brussels I.

Core Competencies

Programming and IT skills

- Python and Fortran programming languages, as well as the basics of C, to write computational physics programs.
- GUI toolkit (wxPython) to construct graphical user interfaces (GUI) of scientific programs.
- NumPy, SciPy, and Matplotlib numerical libraries to analyse scientific data.
- Linux command-line to perform tasks in the Linux operating system.
- Latex and Markdown scripting languages for writing professional documents.
- ABINIT, VASP, CASTEP and Quantum Espresso *ab-initio* quantum chemistry codes to perform Density Functional Theory calculations.
- LAMMPS molecular dynamics code to simulate the static and shock compression of solids.
- The AIRSS code for performing ab-initio crystal structure prediction calculations via the random structure search method.
- PHON and PHONOPY codes to perform phonon dispersion calculations in solids.
- Ability to execute parallel computational codes in supercomputing clusters.
- Experience with Git version control system.

Relevant Experience

2019–present Work experience as technical consultant for the European Materials Modeling Council (EMMC), in collaboration with Goldbeck Consulting Ltd., in an effort to make materials modeling more accessible and convenient to the wider European industry.

2018–2019 Work experience at Exabyte.io in San Francisco, where I contributed to the development of the online documentation for their Materials Discovery Cloud platform.

2017–2018 Post-doctoral research at the IMPMC institute in Sorbonne University in Paris, France, in the field of ab-initio crystal structure prediction of high-pressure alloys for geophysical applications. This work will soon be published in several separate publications.

2016–2017 Performed work as a freelancer for Software for Chemistry & Materials (SCM) to expand the ADF modelling software package.

2015–2016 Performed computational physics calculations for academic researchers, which led to the creation of my own consulting company. I also developed the Quantum Server project, a professional social network for specialists in computational science and engineering with over 10,000 members both on Facebook and LinkedIn. The homepage of this project can be found at www.qscomputing.com

2009–2014
- Thesis title: 'Simulations of shock-induced phase transitions in silicon'.
- The biggest achievement was finding that shear stress in silicon under shock compression is relieved via a direct phase-transition (β-tin).
- I developed new code scripts to analyse the data outputs of various phase-transition simulations.
- I used my initiative:
  - for example, I developed a new method to replace standard formulations of Gibbs free energy to study phase transitions under non-hydrostatic stress.

Interpersonal skills
- During my DPhil, I took part in several experimental campaigns at the Lawrence Livermore National Laboratory and the SLAC National Accelerator Laboratory:
  - I investigated the effects of laser-induced shock-waves on solid targets.
  - I explained my results from a computational physics point of view and understood theirs from a material science perspective.
  - Performing new experiments with other researchers improved my ability to prioritise important experiments over urgent ones.
  - These experimental efforts resulted in the publishing of articles in high-impact journals:
    - Mogni *et al.*, *Phys. Rev.* B 89, 064104 (2014).
    - Suggit *et al.*, *Nat. Commun.* 3, 1224 (2012).
    - Higginbotham *et al.*, *Phys. Rev.* B 88, 104105 (2013).

Presentation skills
- Microsoft PowerPoint to present scientific data in seminars (2011 APS Topical Conference on Shock Compression of Condensed Matter, 2012 Annual Meeting of the Institute of Shock Physics at Imperial College, 2014 Seminar at Cambridge University) as well as posters in conferences (2010 Omega Laser Facility Users Group Workshop, 2012 National Ignition Facility User Group Meeting).

Voluntary work
- Summer 2008: self-motivated, paid work experience at the JET-EFDA Nuclear Fusion Research Centre in Culham, Oxfordshire.
- Summer 2007: self-motivated, voluntary work experience at the IRMM-GELINA Particle Accelerator in Geel, Belgium.

Language skills
- Italian: native proficiency.
- English: full professional proficiency.
- French: working proficiency.

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