Andrea Pedrielli

Scientific Curriculum Vitae

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Personal information

Name	Andrea	Sex	M
Surname	Pedrielli	Nationality	Italian
Place e date of birth	Bologna, Jenuary, 1988	Driving licence	A,B

Current position

2014-present (Trento) **PhD student Civil, Environmental and Mechanical Engineering**
*University of Trento, Fondazione Bruno Kessler-ECT**
Research topic:
Numerical simulations on energy storage and deformation of "3D" graphene and related materials under the supervision of Prof. Nicola M. Pugno (UniTn) and co-advised by Dr. Giovanni Garberoglio (FBK-ECT*)
The project focuses on the properties of three dimensional graphene nanostructures and related materials such as graphene frameworks. In particular the mechanical and gas absorption performances of this materials are assessed mainly using Molecular Dynamics and Grand Canonical Monte Carlo simulations.

Education and training

2011-2014 (Bologna) **Master degree in Physics of Matter 108/110**
University of Bologna, IMM-CNR
With an experimental master's thesis of title:
Integrazione tecnologica di grafene cresciuto per deposizione chimica da fase vapore per applicazioni termiche e termoelettriche
(Technological integration of CVD graphene for thermal and thermoelectrical applications) under the supervision of Prof. Daniela Cavalcoli (UniBo) and co-advised by Dr. Vittorio Morandi (IMM-CNR) and Dr. Luca Ortolani (IMM-CNR)

Courses

2014 (Bologna) **School**
CNR-IMM, Bologna, Italy and the Italian Society for Microscopical Sciences(SISM)
5th Theoretical course on Transmission Electron Microscopy in Materials Science. 30 hours.

2015 (Trieste) **School**
Abdus Salam International Centre for Theoretical Physics (ICTP)
School in Computational Condensed Matter Physics: From Atomistic Simulations to Universal Model Hamiltonians. 86 hours.

Computational Physics and Computer skills

Operative systems
Linux, Windows

Programming and markup languages
C, Python, LaTeX

Computational Physics
LAMMPS (Classical Molecular Dynamics),
DFTB+ (Density Functional Tight Binding)

Analysis
ImageJ, Gwyddion

Experimental skills

Electron Microscopy
SEM (good), TEM (basic)

Graphene
Transfer and cleaning of CVD graphene, micrometric oxigen patterning

Language skills

Italian	Mother tongue
English	Working knowledge

Scientific interests

Theory
My scientific interests focus on nanoscopic (graphene, carbon nanotubes, nanowires) and nanostructured materials (graphene nanofoams). More in general I am interested in the emergent properties of materials, mechanical metamaterials, semiclassical method for treating electrons (Wave Packet Molecular Dynamics, Electron Force Field. I am also interested in relations between Game Theory and Physics.

Experiments
I am interested in CVD graphene growth and its technological integration for device applications. Electron microscopy, such as SEM and TEM techniques.

Research Summary

Master Thesis and PhD

During the master thesis I have developed a procedure to pattern graphene membranes in oxigen plasma, a first step towards its technological integration. During this period I have gained the laboratory skills to work with graphene (transfer, characterization etc.). After that, during the PhD course, I moved from an experimental to a computational approach always keeping a close contact with experimental groups that deal with graphene. I started to model graphene nanostructures, in particular graphene foams (see publications section), using Molecular Dynamics. Currently I am working on multiscale modeling of graphene foams, gas absorption in pillared graphene nanostructures and electronic properties of nanoscopic materials such as nanowires.

List of publications

International Peer-Reviewed

A. Pedrielli; S. Taioli; G. Garberoglio; N.M. Pugno, *Designing graphene based nanofoams with nonlinear auxetic and anisotropic mechanical properties under tension or compression* in CARBON, v. 111, (2016), p. 796-806. - DOI: 10.1016/j.carbon.2016.10.034

Master Thesis (Italian)

A. Pedrielli (2014) Integrazione tecnologica di grafene cresciuto per deposizione chimica da fase vapore per applicazioni termiche e termoelettriche.
URL http://amslaurea.unibo.it/id/eprint/7613