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Pedro Brandimarte

Résumé

Background in computational and theoretical physics, and mathematics. I've been working mostly on theoretical modeling and on the development of numerical methods for multi scale simulations applied to nanotechnology. I carry extensive experience on scientific software development, with a deep knowledge on algorithms, abstract data structures, hybrid parallel programming and high-performance computing. I'm always very enthusiastic about tackling problems out of my comfort zone and working out challenging problems in a cooperative environment.

Areas of Expertise

Programming languages and parallel computing

Advanced	Python, C/C++, Fortran, MPI, shell script
Intermediate	R, Octave/MATLAB, OpenMP
Basic	Java, Ruby, Lua, CUDA

Operating systems

Linux

Key competencies

Computational physics, mathematical modeling, research, data analysis, statistics, machine learning, deep learning, algorithms, parallel computing, communication skills

Key Achievements

Research projects and grants

2018–2020 **A Novel Platform for Electronics and Quantum Electron Optics Based on Graphene Nanostructures (GRANAS)**.
grant: Spanish Ministry of Economy, Industry and Competitiveness

2010–2014 **Study of the Influence of Localized Vibrational Modes in Charge Transport Properties at Nanoscale Systems**.
grant: National Council of Technological and Scientific Development - CNPq

2006–2007 **CERN (European Organization for Nuclear Research) at ALICE (A Large Ion Collider Experiment)**.
grant: HELEN program (High Energy Latin American Network)

2004–2005 **Vacuum Quantum Noise Squeezing by Polarization Self-rotation**.
grant: National Council of Technological and Scientific Development - CNPq

Academic simulation codes (most relevant)

1. **MCMCneuro** (`https://github.com/brandimarte/MCMCneuro`) data driven graph model for neuronal interactions using Bayesian statistics and Markov Chain Monte Carlo. [C, shell, R]
2. **KPM** (`https://github.com/brandimarte/kpm`) kernel polynomial method implementation using Chebyshev expansion for disordered lattices. [Fortran95, MPI]
3. **PhOnonS ITeratIVE VIBRATIONS** (`https://github.com/brandimarte/vibrations`) for vibrational and electron-phonon coupling analysis via first-principles. [C, shell]
4. **Inelastic Disorder** (`https://github.com/brandimarte/idisorder`) for transport on devices with random defects and inelastic scattering. [Fortran95, C++, MPI, CUDA]
5. **Inelastic SMEAGOL** (`https://bitbucket.org/brandimarte/smeagol-2.0` - closed access) for *ab initio* inelastic electronic transport of atomic scale devices. [Fortran95, MPI, OpenMP]
6. Contributor of **SIESTA/TranSIESTA** codes (`http://departments.icmab.es/leem/siesta`) for ab initio electronic structure and transport simulations. [Fortran, MPI, OpenMP]

Work Experience

Postdoctoral researcher

2017–present **Donostia International Physics Center - DIPC**, *Spain*.
Electronic structure and quantum transport in graphene-based nanostructures and networks.
funding: DIPC Foundation

2015–2017 **Centro de Física de Materiales - CFM**, *Spain*.
Development of tools and theoretical models for studying electron transport in nanoscale devices.
funding: European Commission, 7o Framework Programme, ICT Collaborative project

Scientific training

2006–2007 **CERN - European Organization for Nuclear Research**, *Switzerland*, ALICE experiment.
Development on the AliRoot framework for simulation at the ALICE Off-line group (950h).
funding: European Commission, programme América Latina - Formación Académica (ALFA)

2004–2005 **Universidade de São Paulo**, *Brazil*, Coherent Manipulation of Atoms and Light Laboratory.
Development of a magneto-optical trap experiment.
funding: National Council of Technological and Scientific Development (CNPq/PIBIC)

Supervision

2019 **Donostia International Physics Center - DIPC**, *Spain*, Supervisor.
Electronic properties and tight-binding parametrization of twisted bi-layer graphene.
student: Itsaso Blanco, University College London, Faculty of Maths and Physical Sciences.

2018 **Donostia International Physics Center - DIPC**, *Spain*, Supervisor.
Code development for evaluating bond order of graphene-based structures via graph theory.
student: Amaia Juaristi Arrizabalaga, Universidad del País Vasco, Departamento de Matemáticas.

Teaching

2008 **Educafro**, *Cohab de Taipas and Cohab Brasilândia*.
Teacher of physics and mathematics (volunteer).

2004–2005 **Universidade de São Paulo**, *Brazil*, Instructor.
Experimental Physics III and IV.

Education

2008–2014 **Ph.D. in Physics**, *Universidade de São Paulo*, USP, Brazil.
Study of the influence of localized vibrational modes in charge transport properties at nanoscale systems.

2002–2007 **Bachelor in Physics**, *Universidade de São Paulo*, USP, Brazil.

Complementary education

2009–2014 **Bachelorin Applied and Computational Mathematics**, *Universidade de São Paulo*, USP, Brazil.
Concluded 65% of the courses (1350h).

Languages

Portuguese	Mother Tongue	
English	Fluent	*Understand well, speak well, read well, write well*
Spanish	Advanced	*Understand well, speak well, read well, write reasonably*
French	Intermediate	*Understand well, speak reasonably, read well, write reasonably*

Scientific Production

Author of **12** publications in high-quality peer-reviewed journals, **7 as first theory author**, with average impact factor **8.48** and all in **Q1** (citation metrics at scholar.google.com/citations?hl=en&user =P-rSYmoAAAAJ). Reviewer of scientific journals, including *ChemistrySelect*, *Physica Status Solidi*, *The Journal of Physical Chemistry*, *Journal of Physics. Condensed Matter*, and *The European Physical Journal*. Attended and presented work in scientific conferences/workshops worldwide (Germany, Hong Kong, USA, Spain, Denmark, Austria and Brazil), whose complete list can be found at lattes.cnpq.br/8885012919924529.