

Pedro Brandimarte

Résumé

Background in computational and theoretical physics, and mathematics. I carry extensive experience in software development, with a deep knowledge on algorithms, abstract data structures, hybrid parallel programming and high-performance computing. I am fascinated by the changes of paradigm that machine learning algorithms pose against traditional programming, as well as new forms of computing such as quantum computing. I am always very enthusiastic about tackling problems out of my comfort zone and working in a cooperative environment.

Areas of Expertise

Programming languages

Advanced PYTHON, C++, C, FORTRAN, SHELL SCRIPT
Intermediate R, OCTAVE/MATLAB
Basic JAVA, RUBY, LUA

Operating systems

Linux, Windows and MacOS

Key competencies

- Research, Computational Physics, Mathematical Modeling, Data Analysis
- Probability Theory, Statistics, Linear Algebra
- Algorithms, Abstract Data Structures, Parallel Computing, HPC
- Machine Learning Techniques, Deep Learning, Data Science, Data Analytics
- Communication Skills, Problem-Solving, Teamwork, Teaching/Training Skills, Goal-Oriented

Open source codes

- 1 Contributor of Auto Kernel Generator - **AKG** (gitee.com/mindspore/akg/tree/master), a polyhedral based optimizer and code generator for operators in deep neural networks. Part of the **MindSpore** project (www.mindspore.cn/en), an open source all scenario deep learning computing framework. [PYTHON, C++]
- 2 **MCMCneuro** (github.com/brandimarte/MCMCneuro) data driven graph model for neuronal interactions using Bayesian statistics and Markov Chain Monte Carlo. [C, SHELL, R]
- 3 Contributor of **SIESTA/TranSIESTA** codes (departments.icmab.es/leem/siesta) for *ab initio* electronic structure and transport simulations. [FORTRAN, MPI, OPENMP]
- 4 **KPM** (github.com/brandimarte/kpm) kernel polynomial method implementation using Chebyshev expansion for disordered lattices. [FORTRAN95, MPI]
- 5 **PhOnonS ITeRatIve VIBRATIONS** (github.com/brandimarte/vibrations) for vibrational and electron-phonon coupling analysis via first-principles. [C, SHELL]
- 6 **Inelastic Disorder** (github.com/brandimarte/idisorder) for transport on devices with random defects and inelastic scattering. [FORTRAN95, C++, MPI, CUDA]
- 7 **Inelastic SMEAGOL** (bitbucket.org/brandimarte/smeagol-2.0 - request access) for *ab initio* inelastic electronic transport of atomic scale devices. [FORTRAN95, MPI, OPENMP]

Work Experience

- 2021–present **Huawei Technologies, France**
Parallel computing / Accelerator programming research engineer at Paris Research Center.
- 2020–2021 **Alerion Tec, Spain**
Software engineer on computer vision, parallel imaging processing, autonomous localization and mapping.
- Postdoctoral researcher**
- 2017–2020 **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, 7th 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 **Bachelor in Applied and Computational Mathematics, Universidade de São Paulo, USP, Brazil**
Concluded 65% of the courses (1350h).

Languages

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

Scientific Production

Author of **17** publications in high-quality peer-reviewed journals, **11 as first theory author**, with average impact factor **8.64** 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.