

Filipe L. Q. Junqueira

RESEARCH ASSOCIATE · SCHOOL OF PHYSICS AND ASTRONOMY

University of Nottingham

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Core Education

Physics PhD researcher/Post-doctoral Researcher

Nottingham, UK

UNIVERSITY OF NOTTINGHAM AND KING'S COLLEGE LONDON

2016 - 2019, 2022-Present

- Towards 3D printing with atoms, a NC-AFM and STM study on controlled atom manipulation on GaAs(110) and Cu(111).
- Supervisor: Prof. Philip Moriarty
- Funded by EPSRC and Science without Borders. Thesis submission expected by mid 2025
- Long term DFT collaborator with Prof. Lev Kantorovitch, Kings College London

Engineering Degree - Civil/Electrical emphasis

São Paulo, Brazil

POLI (POLYTECHNIC SCHOOL OF ENGINEERING FROM THE UNIVERSITY OF SÃO PAULO)

Jan. 2006 - Jun. 2012

- POLI is a 5 (up to 7 year) engineering course, arguably considered equivalent to UK's Masters degree.
- Final average mark equivalent to UK's 2.1 honours.

Work Experience

University of Nottingham

Nottingham, UK

POST-DOC

Jan 2022 - Present

- Research associate with the same nanoscience group with Prof. Philip Moriarty - School of Physics and Astronomy at the University of Nottingham.
- Mostly working with Ab-initio methods (in particular Density Functional Theory) to simulate Non-contact atomic force microscopy experiments.
- A lot of emphasis on Machine Learning techniques using HPC, in particular support-vector machine, deep learning and more

Cortex-Intelligence

São Paulo, Brazil

INTELLIGENCE ANALYST

Feb. 2015 - Jul. 2015

- Used proprietary software to analyse big data from clients. Used internal and crawled data.
- Clients would hire cortex-intelligence and outsource key data analysis.
- Responsible for Rede Globo (largest broadcast network in Brazil), Suzano (largest pulp and paper company in Latin America) and BASF accounts.
- Lead a team of interns and analysts.

Family Business

São Paulo, Brazil

PARTNER

Jun. 2013 - Dec. 2014

- Project and development of a real estate project at a family owned land.
- Responsible for the financial analysis, negotiations of the deal, due diligence and data analysis of real estate market in the region to stability what the strategy was (both the product, pricing and timing of residential development).

BR Properties S.A.

São Paulo, Brazil

INVESTMENT AND INTELLIGENCE ANALYST

Feb. 2011 - May. 2013

- BR Properties was at the time the largest Real Estate company in Latin America, focused mainly on existing commercial AAA buildings.
- Responsible for financial viability analysis, negotiations, due diligence and deal closing (mostly acquisitions).
- Lead the intelligence department which feed analysed data internally. Reported directly to the CIO and CEO.
- Notable deals include Ventura Tower acquisition (£200 million deal) and the BTG bank merge in which the company acquired the equivalent of £1.5 billion.

Naval Engineering - POLI-USP

São Paulo, Brazil

SCIENCE INTERNSHIP | SUPERVISION: PROF. BERNARDO LUIS RODRIGUES DE ANDRADE

Jan. 2009 - Jan. 2010

- Project and structural analysis of hydrofoils for a Catamaran (a hobie cat).
- Used finite elements (linear triangular element) for most of the analysis using Ansys and Rhino.

Math Department - USP

São Paulo, Brazil

SCIENCE INTERNSHIP | SUPERVISION: PROF. ELÓI MEDINA GALEGO

Jan. 2007 - Jul. 2009

- Mentorship-like project in which we would study real analysis and subjects such as group theory, number theory and some topology.
- Example of activities where alternative proofs to well-established theorems such as for example the Gauss theorem.

Skills

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|-------------------------------------|--|
| Programming Languages | C, Python, Fortran, Bash/ZSH, LaTeX, C++(beginner), typescript (beginner). |
| Data Science tools/libraries | Numpy, Pandas/Polars, Scikit, Tensorflow/Pytorch, opencv(Python), MateforDummies, manim, SPIEPy. |
| Operating Systems | Linux (Daily/Main OS), MacOS, Windows. |
| Misc Apps | Blender (over 8 years of experience), DaVinci Resolve, MatLab/Octave, Neovim, PyCharm, VSCode, Office package, . |
| DFT Tools | VASP, TETR, Lev00, Pymatgen, Chimera, CP2K and some Abinit. |
| Web Frameworks | Three.js, React (beginner), Flask(beginner). |
| Lab Skills | Experiment designing, UHV LT STM/AFM operation, LT/VT Omicron and Unisoku and NIXSW (I09 Hut at Diamond). |
| Languages | English (fluent), Portuguese (fluent), Spanish (intermediate), French (intermediate), Italian (beginner). |

Select Publications

Embedding human heuristics in machine-learning-enabled probe microscopy

Published

MACHINE LEARNING: SCIENCE AND TECHNOLOGY - IOP PUBLISHING | DOI: 10.1088/2632-2153/AB42EC

2020

- Oliver M Gordon and Filipe L Q Junqueira and Philip J Moriarty.

Scanning tunneling state recognition with multi-class neural network ensembles

Published

REVIEW OF SCIENTIFIC INSTRUMENTS - AIP PUBLISHING | DOI: 10.1063/1.5099590

2019

- O. Gordon and P. D'Hondt and L. Knijff and S. E. Freeney and F. Junqueira and P. Moriarty and I. Swart.

Chemical shielding of H₂O and HF encapsulated inside a C₆₀ cage

Published

NATURE - COMMUNICATIONS CHEMISTRY - DOI: 10.1038/S42004-021-00569-0

2020

- Samuel P Jarvis , Filipe Junqueira , Alex Saywell , Philipp Rahe , Salvatore Mamone , Simon Taylor , Adam Sweetman , Jeremy Leaf , Hongqian Sang , Lev Kantorovich , David Duncan , Tien-Lin Lee , Pardeep Kumar , Richard Whitby , Philip Moriarty , and Robert G Jones.
- An STM and XWS study. XWS performed at I09 hut at Diamond Light Source.

Atomic cranes for cyclic single vertical atom manipulations

Published

THE JOURNAL OF PHYSICAL CHEMISTRY LETTERS DOI: HTTPS://DOI.ORG/10.1021/ACS.JPCLETT.1C02271

2021

- David Abbasi-Pérez , Hongqian Sang , Filipe Junqueira , Adam Sweetman , J. Manuel Recio , Philip Moriarty and Lev Kantorovich.
- A DFT study.

Honors & Awards

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| 2007 | Top 5 , Best Control Project: Magnetic Levitation System | <i>POLI-USP, Brazil</i> |
| 2005 | Silver Medalist , Brazilian Physics Olympics - State division, OBF | <i>Goiânia, Brazil</i> |
| 2005 | 5th place , Math Olympics of Goias State | <i>Goiânia, Brazil</i> |
| 2004 | Bronze Medalist , Brazilian Physics Olympics - State division, OBF | <i>Goiânia, Brazil</i> |

Personal Interest

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| Academic | DFT, Solid State Physics, single atom manipulation, ML Techniques |
| Sports | DOTA2, Brazilian Jiu-jitsu. |
| Music | Guitar/piano. Overall I'm a huge Music geek! |
| Misc | I love sailing and I plan to one day to sail to Antarctica. |