

Personal Informations

Work Address:

ICN2
UAB Campus Bellaterra
Barcelona, Spain

Education

- 2018–2023 **Ph. D. - Theoretical–Chemical Physics & Material Science**, *University of York*, York, United Kingdom
Royal Society funded doctoral position in charge-spin interconversion effects and spin transport phenomena.
Supervisor: *Dr. Aires Ferreira*
- 2016–2018 **MSc in Condensed Matter Physics**, *University of Roma Tre*, Rome, Italy
Final assessment 110/110 with Honours
Thesis: *Nonlinear sigma model approach to the coupled spin-charge dynamics in the presence of Rashba Spin-Orbit coupling*.
Supervisor: *Prof. Roberto Raimondi*
- 2013–2016 **BSc in Physics**, *University of Roma Tre*, Rome, Italy
Final assessment 110/110 with Honours
Thesis: *Study of relativistic effects in Iron Line in AGN Ark120*.
Supervisor: *Prof. Giorgio Matt*

Employment

- 2023–ongoing **Research Position**, *ICN2: Catalan Institute of Nanoscience and Nanotechnology*, Barcelona, Spain
Data exploration and statistics with machine learning algorithms, device modelling and characterization of solid-state materials employing integrated suite FORTRAN-based programs, analysis through python interfaces.
- 2021 **Temporary Research Position**, *University of York*, York, United Kingdom
Characterization of dry blood samples for cancer diagnosis via Raman spectroscopy and image analysis. My primary duty covered the machine-learning-based statistical analysis of imaging data to spot differences between healthy and cancerous red blood cells and compare the results against the related Raman spectra.
- 2017–2018 **Teaching Assistant**, *University of Roma Tre*, Roma, Italia
- 2016–2017 **Hardware/Software lab**, Roma, Italia

Publications

- 1) Alessandro Veneri, David T.S. Perkins, Csaba G. Péterfalvi, Aires Ferrera, *Twist-Angle Controlled Collinear Edelstein Effect in van der Waals Heterostructures*, Phys. Rev. B 106, L081406 (2022)
- 2) Alessandro Veneri, David T.S. Perkins, Aires Ferreira, *Nonperturbative approach to interfacial spin-orbit torques induced by Rashba effect*, Phys. Rev. B 106, 235419 (2022)
- 3) Alessandro Veneri, Stuart A. Cavill, David T.S. Perkins, Marko D. Petrović, Branislav K. Nikolić, Aires Ferreira, *Magnetization switching in ferromagnet/topological-insulator bilayer systems driven by skew scattering* (In preparation).
- 4) Alessandro Veneri, Aires Ferreira, and David T.S. Perkins, *Microscopic Theory of the Spin Hall Effect in Twisted van der Waals Heterostructures* (In preparation).
- 5) Alessandro Veneri, Aires Ferreira, and David T.S. Perkins, *Interband Spin-Orbit Scattering Mechanism in Graphene* (In preparation).

Conferences and Seminars

- Mar 2021 **APS March Meeting**, Chicago, Illinois, USA. **Talk**
- Jul 2022 **Graphene 2022**, Aachen, Germany. **Poster**
- Aug 2021 **CMD29–Institute of Physics**, Online, **Talk**
- Mar 2021 **APS March Meeting**, Online, **Talk**
- Sept 2020 **NanoPT2020**, Online, **Talk**
- Jul 2020 **Graphene 2020**, Online, **Talk**

Skills and Achievements

- Computer science
- I developed a solid understanding of programming languages to predict and shed light on novel phenomena successfully, resulting in published works in high impact journals.
- Extensive knowledge of high-level coding languages such as **Python** and **Mathematica** allowed me to solve numerically and symbolically complex problems involving integration, differential operations, and algebraic manipulations. The support of high-performance computing with **FORTRAN** enabled further optimizations through cores parallelization with MPI and OpenMP libraries.
 - Efficient application of **Machine Learning** algorithms for regression and classification tasks, employing several techniques such as support vector machines, random forests, and deep learning with artificial neural networks (Tensorflow). I applied Sequential and Functional (e.g., wide-and-deep) API, static and dynamic models.
 - Experience in utilizing bash programming to develop and execute integrated suite computer programs, such as **Quantum Espresso** and **SIESTA**, for material modelling and electronic-structure calculations. .

- Science and Research
- I acquired experience with formulating original and innovative ideas for modelling and data designing by constantly relating to cutting-edge literature. I effectively adapted techniques and results from different research areas by **embracing change** and maintaining a **healthy level of scepticism**.
 - I effectively applied my knowledge in data mining to interpret and analyze an extensive variety of data types with statistical tools, machine learning algorithms, and artificial intelligence. I produced and encountered different types of data structures, such as Pandas dataframe, XML, JSON, and shapefile in the context of **GIS analysis, physics, and biophysics**.
 - Good knowledge of Geographic information system and remote sensing in the context of the Python language
 - Ability to deliver my projects by designing **clear presentations** in international conferences, seminars, and non-expert audiences. Excellent **writing skills** availed for publishing in scientific journals.
 - The constant **team work** and ability to provide and receive **appropriate feedback** resulted in a deeper understanding and wider view of any tackled problem.

Languages

Italian Native
English Fluent
Spanish Intermediate

Autorizzo il trattamento dei miei dati personali ai sensi del Dlgs 196 del 30 giugno 2003 e dell'art. 13 GDPR