Fernando Meneses

Physicist | Machine Learning Engineer | Data Scientist

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SUMMARY

I'm a physicist with expertise in Machine Learning applications, Data Science, experimental Quantum Sensing and Nanotechnology science. At my work, I combine my skills from both computing and physics fields in order to solve real-world problems and conduct high-quality research. I've worked in several international teams such us the University of Melbourne (Australia), the City College of New York (USA) and the National University of Cordoba (Argentina), sharing my perspectives with my teammates and learning from their insights. I'm always keen to find new challenges and apply my knowledge along with an interdisciplinary team to solve problems using original approaches.

SKILLS

Programming: Python, Tensorflow, Matlab, Fortran.
Analysis: Machine learning, Data science, Simulations, Development of Physical models.
Experimental: Sample preparation, electrochemical fabrication, Assembly of experimental setups, Operation of high-complexity equipment, Lithography, Cleanroom work.
Communication: Speaker in conferences, Teaching.
Leadership: Project leader, Supervisor, Interdisciplinary work.
Languages: English (C2, fluent), Spanish (C2, native).

EXPERIENCE

Associate Professor

Dic 2024 – Today

Artificial Intelligence and Magnetic Nanomaterials | **National University of Córdoba (Argentina)**

- Design of Artificial Intelligence algorithms applied to experiments, coded in Python/Tensorflow.
- Data analysis and development of physical models and simulations.
- Experimental research in magnetic nano-materials.
- Design of experimental setup for nano-materials fabrication.
- Project leader in Artificial Intelligence research.
- Supervision of master and PhD students.
- Writing and publication of peer-reviewed scientific articles.
- Presenter in international and national conferences.
- International collaborations in interdisciplinary teams, including chemists, engineers and physicists.
- Preparation of grant proposals.
- Teaching in major subjects in Physics degree.
- Preparation of teaching material and course design.

Supervisor: Prof. Paula Bercoff| paula.bercoff@unc.edu.ar

Post-doctoral Researcher

Feb 2022 – Nov 2024

Artificial Intelligence and Quantum Sensing | **University of Melbourne (Australia)**

- Design of Artificial Intelligence algorithms applied to experimental research, coded in Python/Tensorflow.
- Data analysis and development of physical models and simulations.
- Experimental research in quantum sensing using widefield diamond magnetometry.
- Assembly of experimental setup for magnetometry, combining optics and electronics.
- Nanometric-size sample preparation, using lithography techniques and clean-room operations.
- Project leader in Artificial Intelligence research.
- Supervision of master and PhD students.
- Writing and publication of peer-reviewed scientific articles.
- Presenter in international and national conferences.
- International collaborations in interdisciplinary teams, including chemists, engineers and physicists.
- Preparation of grant proposals.

Supervisor: Prof. Lloyd Hollenberg | lloydch@unimelb.edu.au

Post-doctoral Researcher

Feb 2021 – Feb 2022

Artificial Intelligence and Quantum Sensing | **City College of New York (United States)**

- Design of Artificial Intelligence algorithms applied to experimental research, coded in Matlab.
- Data analysis and development of physical models and simulations.
- Experimental research in quantum sensing using confocal diamond magnetometry.
- Assembly of experimental setup for magnetometry, combining optics and electronics.
- Software development for interfacing experimental hardware, coded in Matlab.
- Supervision of master students.
- Writing and publication of peer-reviewed scientific articles.
- International collaborations in interdisciplinary teams, including engineers and physicists.

Supervisor: Prof. Carlos Meriles | cmeriles@ccny.cuny.edu

Teaching Assistant

Mar 2014 – Dec 2020

Undergraduate subjects in Physics career | **FAMAF - Universidad Nacional de Córdoba (Argentina)**

- Lecturer, tutor in subjects: General Physics 2, General Physics 3, General Physics 4, Classic Mechanics, Quantum Mechanics 1.
- Development of exercise guides.
- Online tools for synchronous and asynchronous teaching.

Scanning Electron Microscope Technician

Mar 2016 – Dec 2019

Customer service | **LAMARX - Universidad Nacional de Córdoba (Argentina)**

- Operation of high-complexity equipment, sample preparation, data analysis and reports.

EDUCATION

Physics PhD
2015-2020

Nanotechnoly, Materials Science | **Universidad Nacional de Córdoba (Argentina)**

- Electrochemical fabrication of nanowires and thin films.
- Planning and development of experimental setup related to electrochemical experiments.
- Characterization of magnetic and structural properties by SEM/TEM microscopy, X-ray diffraction, VSM/SQUID magnetometry.
- Data analysis, programming in Fortran.
- Supervision of undergraduate students.
- Writing and publication of peer-reviewed scientific articles.
- Presenter in international and national conferences.
- International collaborations in interdisciplinary teams, including chemists and engineers.

Supervisor: Prof. Paula Bercoff| paula.bercoff@unc.edu.ar

Research Stay
Sep-Dec 2018

Nanotechnology and Magnetism | **Instituto de Ciencia de Materiales de Madrid (Spain)**

- Electrochemical fabrication of magnetic nanowires.
- Characterization of magnetic and structural properties by SEM microscopy, VSM/MOKE magnetometry.
- Writing and publication of peer-reviewed scientific articles.

Supervisor: Prof. Manuel Vázquez| mvazquez@icmm.csic.es

Research Stay
Oct-Dec 2015

Semiconductor nanowires | **Universität Leipzig (Germany)**

- Sample preparation using lithography techniques and micro-manipulation of individual nanowires.
- Characterization of magnetic and electrical transport properties by SQUID magnetometry/transport.
- Writing and publication of peer-reviewed scientific articles.

Supervisor: Prof. Pablo Esquinazi| esquin@physik.uni-leipzig.de

Physics Degree
2010-2015

Universidad Nacional de Córdoba, Argentina

PUBLICATIONS

- 13 publications in peer-reviewed journals and book chapters.
- 27 national and international conferences.
- ORCID: https://orcid.org/my-orcid?orcid=0000-0003-3616-2928

Publications list:

Machine learning and quantum diamond magnetometry applied to real-time object monitoring
First author. Manuscript in preparation (2025).

Stray magnetic field imaging of thin exfoliated iron halides flakes
First author. *Phys. Rev. B*, Vol. 109, 064416 (2024). DOI: https://doi.org/10.1103/PhysRevB.109.064416

Readout optimization for spin-based quantum sensing using the nitrogen-vacancy center in diamond
Co-author. Submitted to *Phys. Rev. Applied* (2024)

Detection of paramagnetic spins with an ultrathin van der Waals quantum sensor
Co-author. *ACS Nano*, Vol. 117, 13408-13417 (2023). DOI: https://doi.org/10.1021/acsnano.3c01678

Toward deep-learning-assisted spectrally resolved imaging of magnetic noise
First author. *Phys. Rev. Applied*, Vol. 18, 024004 (2022). DOI: https://doi.org/10.1103/PhysRevApplied.18.024004

Effective anisotropy in Fe-Ni nanowire arrays with strong dipolar interaction
Co-autor. *J. Magn. Magn. Mater.*, 024004 (2022). DOI: https://doi.org/10.1016/j.jmmm.2023.170929

Nickel nanobrush platform for a magnetic field-assisted electrochemical response enhancement
First author. *J. Sci-Adv Mater. Dev.*, 100469 (2022). DOI: https://doi.org/10.1016/j.jsamd.2022.100469

Coating of aluminum substrates with nanostructured Pd-Ni alloys by electrodeposition
First author. *Mater. Chem. Phys.*, Vol. 277, 125524 (2022). DOI: https://doi.org/10.1016/j.matchemphys.2021.125524

Enhanced in-plane magnetic anisotropy in thermally treated arrays of Co-Pt nanowires
First author. *MSEB*, Vol. 261, 114669 (2020). DOI: https://doi.org/10.1016/j.mseb.2020.114669

Magnetic and Electric Characterization of Different Ni Systems Comprising Cylindrical Nanowires
First author. In: Nanowire Arrays: Advances in Research and Future Directions, *Nova Science Publishers*, Vol. 24 (2020). ISBN 978-1-53618-460-0 (Hardcover) 978-1-53618-599-7 (eBook)

L10-FeNi ordered phase in AC electrodeposited iron-nickel biphasic nanowires
First author. *J. Alloys Compd.*, Vol. 766, 373-381 (2018). DOI: https://doi.org/10.1016/j.jallcom.2018.06.307

Temperature dependence of the effective anisotropy in Ni nanowire arrays
First author. *Curr. Appl. Phys.*, Vol. 18, 1240-1247 (2018). DOI: https://doi.org/10.1016/j.cap.2018.06.014

Influence of the porosity on the magnetic properties of Ni nanowires arrays
First author. *Revista Matéria*, Vol. 20, N° 3, 722-730 (2015). DOI: https://doi.org/10.1590/S1517-707620150003.0076

AWARDS

1st prize - Show us your Science Competition | University of Melbourne (Australia)
Faculty of Science Image Competition

Juan José Giambiagi Award | Argentinian Physics Association (Argentina)
Special Mention for best PhD thesis in Experimental Physics (2022).
Link: https://www.fisica.org.ar/2022/11/25/distinguidos-con-el-premio-juan-jose-giambiagi-2022/

University Award | National University of Cordoba (Argentina)
Special Mention for best GPA to the Physics career (2014).
Link: https://digesto.unc.edu.ar/bitstream/handle/123456789/44698/RR_1319_2015.pdf?sequence=1&isAllowed=y