

# Fernando Meneses

Physicist | Machine Learning Engineer | Data Scientist

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## SUMMARY

I am a physicist specializing in AI, Quantum Sensing, and Nanotechnology. With expertise in experimental research, data analysis, coding, and project management, I focus on integrating AI with physical experiments and simulations. I am passionate about working in interdisciplinary teams and solving complex problems through diverse expertise. My goal is to contribute to innovative projects, leveraging Physics-based insights and AI for impactful solutions.

## 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, Scientific writing.

**Leadership:** Project leader, Supervisor, Interdisciplinary work, Project management.

**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 nanomaterials.
- Design of experimental setup for nanomaterials 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](mailto:paula.bercoff@unc.edu.ar)

### Freelance Consultant

Jan 2025 – Today

Training Artificial Intelligence models | **Outlier (Remote)**

- Prompt engineering to train Artificial Intelligence models in Physics and Mathematics.
- Teaching and guidance for Artificial Intelligence models.
- Problem solving in Physics and Mathematical fields

- Supervision of Junior consultants, ensuring high-quality outcomes.

## **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](mailto: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](mailto: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, Quantum Mechanics 2.
- 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.

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## EDUCATION

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### Physics PhD

2015-2020

Nanotechnology, 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](mailto: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](mailto: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](mailto:esquin@physik.uni-leipzig.de)

### Physics Degree

2010-2015

Universidad Nacional de Córdoba, Argentina

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## PUBLICATIONS

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- 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 assisted tracking of magnetic objects using quantum diamond magnetometry**

First author, *Submitted, published on arXiv* (2025). <https://arxiv.org/abs/2502.14683>

**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-author. *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](https://doi.org/10.1016/j.jsamd.2022.100469) (Hardcover) [978-1-53618-599-7](https://doi.org/10.1016/j.jsamd.2022.100469) (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>

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## 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](https://digesto.unc.edu.ar/bitstream/handle/123456789/44698/RR_1319_2015.pdf?sequence=1&isAllowed=y)