Jose Nahuel **Freitas**

PhD in Physics. Researcher.

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Skills

Programming/Tools	Python, C/C++, Matlab, Julia, SQL, Pandas, Git, Jupyter, LaTeX, Linux.
Scientific Computing	NumPy/SciPy, Numba, Matplotlib, MPI.
Electronics	Circuit design and analysis. Programming of microcontrollers (PIC and Arduino).
Communication	Broad experience in teaching, presentation of results in international conferences, and science outreach.
Languages	Spanish, English

Experience

University of Luxembourg
Luxembourg

Postdoctoral researcher — *Oct. 2018 - PRESENT*

- Study of the energetics of information processing with electronic circuits from the point of view of modern stochastic thermodynamics.
- Design of experiments to test and study refrigeration cycles in electrical systems.
- Development of a long-term research plan and preparation of funding applications.

University of Mainz
Mainz, Germany

Short-term invited researcher — *Jun. 2018 - Oct. 2018*

- Mathematical modeling of a high-precision experiment with trapped ions to study the thermodynamical limits to the measurement of time.
- Design of an efficient algorithm for the analysis of very long time series and clock stability.
- Assisted in the supervision of a master student.

Saarland University
Saarbrucken, Germany

Postdoctoral researcher — *Jun. 2017 - Apr. 2018*

- Application of machine learning techniques for the computational description and manipulation of many-body quantum states.

University of Buenos Aires
Buenos Aires, Argentina

Doctoral researcher — *Apr. 2012 - Apr. 2017*

- Identification of fundamental limits for cooling in a family of driven quantum refrigerators.
- Study of heat transport in harmonic lattices, in particual crystals of trapped ions.
- Quantum simulation of magnetic materials in ion traps. Quantum correlations and decoherence.
- Design of a genetic algorithm for the optimization of ion crystal structure.

University of Buenos Aires, Physics department
Buenos Aires, Argentina

Assistant teacher — *Jun. 2009 - Jun. 2017*

- Teaching of several theoretical and experimental subjects such as Classical, Quantum and Statistical Mechanics, Electromagnetism, Fluid Mechanics, and Experimental Techniques.

Institute of Scientific and Technical Research for Defense (CITEDEF)
Buenos Aires, Argentina

Undergraduate student — *Apr. 2010 - Dec. 2010*

- Development of a coincide detector with nanosecond resolution.
- Quantum optical experiments with correlated photons.

Movilogic S.A.
Buenos Aires, Argentina

Software developer — *Mar. 2004 - Mar. 2006*

- Mobile/Web developer of sales applications (for early handheld devices like the Palm Treo).
- Database management.

Audiotel S.A.
Buenos Aires, Argentina

Software developer — *Mar. 2003 - Mar. 2004*

- Programming of IVR (Interactive Voice Response) applications.
- Management of PBX telephone systems.

Education

University of Buenos Aires — *Buenos Aires, Argentina.*

PhD in Physical Sciences — *Apr. 2012 - Apr. 2017*

- Thesis title: Thermodynamics and quantum simulations in ion traps
- Funded with a national level fellowship given by the Argentinian goverment.

University of Buenos Aires — *Buenos Aires, Argentina*

Licenciate in Physical Sciences — *Apr. 2006- Jun. 2011*

- Grade point average (GPA): 9.47 over 10

National Institute for Civil Aviation (INAC) — *Buenos Aires, Argentina.*

Avionics Technician — *Apr. 1997- Jun. 2002*

Publications

2019 **Stochastic and quantum thermodynamics of driven RLC Networks**
JN Freitas, JC Delvenne, M Esposito. *arXiv:1906.11233*

2019 **Cooling to Absolute Zero: The Unattainability Principle**
JN Freitas, R Gallego, L Masanes, JP Paz. *Thermodynamics in the Quantum Regime. Fundamental Theories of Physics, vol 195. Springer, Cham*

2018 **Neural Quantum Operations and Susuki-Trotter evolution of Neural Quantum States**
JN Freitas, G Morigi, V Dunjko. *IJQI Vol. 16, No. 08, 1840008 (2018)*

2018 **How much can we cool a quantum oscillator? A useful analogy to understand laser cooling as a thermodynamical process**
JN Freitas, JP Paz. *Phys. Rev. A 97, 032104*

2017 **Fundamental limits for cooling of linear quantum refrigerators**
JN Freitas, JP Paz. *Phys. Rev. E 95, 012146*

2016 **Automation of the Bechdel-Wallace test**
JN Freitas, M Rosenzvit, S Muller. *Journal of Ethics and Films*

2015 **Heat transport through ion crystals**
JN Freitas, E Martinez, JP Paz. *Physica Scripta, Volume 91, Number 1*

2014 **Analytic solution for heat flow through a general harmonic network**
JN Freitas, JP Paz. *Phys. Rev. E 90, 042128*

2012 **Dynamics of Gaussian discord between two oscillators interacting with a common environment**
JN Freitas, JP Paz. *Phys. Rev. A 85, 032118*

Post-Graduate Courses

2015 **Introduction Quantum Optics**, FCEyN, University of Buenos Aires
2014 **Introduction to Cellular and Molecular Biology**, FCEyN, University of Buenos Aires
2013 **Advanced topics on Thermodynamics and Statistical Mechanics**, FCEyN, University of Buenos Aires
2012 **Computational Neuroscience**, FCEyN, University of Buenos Aires
2012 **Neural Networks**, FCEyN, University of Buenos Aires