Jose Nahuel **Freitas**

PhD in Physics. Researcher.

(+352) 661035384 | nahuel.freitas@gmail.com | nfreitas | nahuel-freitas

Skills

Programming/Tools	Python, C/C++, Matlab, Julia, SQL, Pandas, Git, Jupyter, LaTeX, Linux.
Scientific Computing	NumPy/SciPy, Numba, Matplotlib/Seaborn, MPI, TensorFlow.
Electronics	Circuit design and analysis. Instrumentation. Programming of microcontrollers.
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*

- Application of modern stochastic thermodynamics to non-linear electronic circuits and probabilistic computing.
- 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.
- Design of an efficient algorithm for the analysis of very long time series and clock stability.

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.
- 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 **State dependent motional squeezing of a trapped ion: new method and applications**
M Drechsler, MB Farías, JN Freitas, CT Schmiegelow, JP Paz. *arXiv:1911.05810*

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