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/Seaborn, MPI, TensorFlow.
Electronics	Circuit design and analysis. Instrumentation. Programming of microcontrollers.
Communication	Ample experience in teaching, presentation of results in international conferences, and science outreach.
Languages	Spanish, English

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
- Calification: Outstanding
- 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

Experience

University of Luxembourg
Luxembourg

Research Associate
Oct. 2018 - PRESENT

- Application of modern stochastic thermodynamics to electronic circuits and probabilistic computing.
- 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

Research Associate
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.

Publications

2020	**Work statistics across a quantum phase transition** Z Fei, JN Freitas, V Cavina, HT Quan, M Esposito. *arxiv:2002.07860*
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

Conferences

QQQ Workshop on Quantum open systems, thermodynamics, and probability   *Milan, Italy*

- Invited Talk: Stochastic and quantum thermodynamics of driven RLC networks
- Authors: JN Freitas, JC Delvenne, M Esposito   *18-21 February 2020*

StatPhys27 - Internation Conference on Statistical Physics   *Buenos Aires, Argentina*

- Poster: Stochastic and quantum thermodynamics of driven RLC networks
- Authors: JN Freitas, JC Delvenne, M Esposito   *8-12 July 2020*

Quantum ThermoDynamics Conference (QTD2019)

Espoo, Finlandia

- Invited Talk: Design of heat pumps with parametrically driven linear electrical circuits
- Authors: JN Freitas, JC Delvenne, M Esposito

23-28 June 2019

Quantum Techniques in Machine Learning

Verona, Italia

6-8 November 2017

Fifth Quantum Thermodynamics Conference (QTD5)

Oxford, Reino Unido

- Poster: 'Fundamental limits for cooling of linear quantum refrigerators'
- Authors: JN Freitas, JP Paz.

13-17 March 2017

XVIII Giambiagi winter school: Quantum Chaos and Control

Buenos Aires, Argentina

- Contributed Talk: 'Fundamental limits for cooling of linear quantum refrigerators'
- Authors: JN Freitas, JP Paz.

25-29 July 2016

TECNOx 1.0 Competition

Buenos Aires, Argentina

- Poster: 'A detector of Dengue virus based on RNA switches'
- Authors: JN Freitas, A Aptekmann, B Guzovsky.

12-22 April 2016

III Quantum Information School and Workshop

Paraty, Brasil

- Poster: 'Dynamics of the Gaussian quantum discord between two oscillators interacting with a common environment'
- Authors: JN Freitas, JP Paz.

1-12 August 2011

Mentoring

Co-Supervision PhD Student

Luxembourg

Mohammad Sadeq Salehi Kadijani, University of Luxembourg

Jun. 2019 - PRESENT

Co-Supervision invited PhD Student

Luxembourg

Zhaoyu Fei, invited PhD Student from the University of Peking

Oct. 2019 - Jan. 2020

Co-Supervision Master Student

Mainz, Germany

Martin Wagener, University of Mainz

Jun 2018 - Oct. 2018