

# Carlos Pineda

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## Personal Information

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Date of Birth : 29th March 1977  
Place of Birth : Bogotá, Colombia  
Nationality : Colombian

## Higher Education

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### Ph. D. Physics

Instituto de Física, Universidad Nacional Autónoma de México June 2003–present.  
(Advisor, Dr. Thomas Seligman)

### Physics Master

Instituto de Física, Universidad Nacional Autónoma de México. January 2002–May 2003.

### B.S. (5-years program in Physics)

Facultad de Ciencias, Universidad Nacional de Colombia, September 1996–December 2001

### Summa cum Laude

Thesis: Transport Properties on Classical Ratchets (Advisor, Dr. Thomas Dittrich)

## Research experience

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### Research Assistant

Research Center for Quantum Information, Bratislava, Slovakia. August 2005

Under the supervision of Dr. Vladimir Buzek, we studied the properties of concurrence and purity of Bell states under the influence of unital and non-unital quantum local operations.

**Research Assistant** Facultad de Física y Matemáticas, Universidad de Ljubljana, Ljubljana, Eslovenia. Junio-Julio de 2004 y Agosto-Septiembre de 2003

With the research done, under the supervision of Dr. Tomaž Prosen, we acquired new tools in order to complete the Ph.D. thesis. We studied quantum correlations, and decoherence of quantum many body systems, both from a numerical and analytical point of view.

**Research Assistant** Centro Internacional de Ciencias, Cuernavaca, México. Febrero 2002-presente

The aim of this project is to obtain the Doctor degree. We shall focus in quantum information and quantum chaos, under the supervision of Dr. Thomas H. Seligman.

**Research Assistant** Center for Nonlinear Studies, Theoretical Division, Los Alamos National Laboratory, Los Alamos. Junio-Agosto 2002

Summer research under the supervision of Dr. Gennady Berman involved quantum dynamics calculations of quantum computation models, namely Ising Computer. Research also involved development and enhancement of new quantum protocols.

**Research Assistant** Caos y Complejidad Group, Universidad Nacional de Colombia, Bogotá. February 2000–December 2001

Research under the supervision of Dr. Thomas Dittrich and Dr. Diogenes Campos involved the research of quantum physics in phase space, and transport properties of classical ratchets.

## Honors

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- Honor Roll. Universidad Nacional Autónoma de México, 2002-present.
- Graduated with the highest GPA of the Faculty of Sciences of the National University of Colombia **Summa cum Laude**. December 2001.
- Meritorial Thesis. Outstanding Dissertation Award given by the National University of Colombia, June 2001.
- Honor Roll. Physics Department, National University of Colombia, 1996-2001.
- Honor Mention. International Asiatic and Pacific Mathematics Olympics, 1994.

## Publications

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- C. Pineda, T. H. Seligman, “Evolution of pairwise entanglement in a coupled n-body system”, eprint [quant-ph/0503177](https://arxiv.org/abs/quant-ph/0503177), Accepted for publication in PRA.
- G. L. Celardo, C. Pineda, and M. Znidaric, “Stability of the quantum Fourier transformation on the Ising quantum computer”, *International Journal of Quantum Information* **3**, **3**, 441–462.
- G. P. Berman, D. I. Kamenev, R. B. Kassman, C. Pineda, and V. I. Tsifrinovich, “Method for implementation of universal quantum logic gates in a scalabel Ising spin quantum computer”, *International Journal of Quantum Information* **1**, **1**, 52–78.
- W. Acevedo, C. Pineda, and T. Dittrich. In F. Beck, M.-Th. Hutt, and U. Luttge, editors, *Nonlinear Dynamics and the Spatiotemporal Principles of Biology*, volume **332** of Nova Acta Leopoldina. Wissenschaftliche Verlagsgesellschaft, Stuttgart, 2003.
- W. Acevedo, C. Pineda, and T. Dittrich, “Matracas clásica hamiltonianas y disipativas”, *Revista Colombiana de Física* **34**, **1**, 380 (2002).

## Current Research Interests

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- Spectral correlations
- Quantum computation
- Lochsmith echos
- Ising spin chain
- Decoherence and quantum chaos

## Workshops and Seminars (participation with work)

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- Chaos, Decoherence and Fidelity Decay, "Entanglement decay in a generic environment", Cuernavaca, México, November 28 – December 17, 2005
- Energy relaxation versus phase relaxation in many-body systems, "Spectral correlations among different symmetry sectors", Cuernavaca, México, October 24 – November 5, 2005
- Low Dimensional Systems in Quantum Optics, "Entanglement decay in a generic environment", Cuernavaca, México, September 12 – 30, 2005
- Quantum Simulations via Analogues, "Evolution of pairwise entanglement in a coupled n-body system", MPIPKS Dresden, July 25 – 28, 2005
- Quantum Chaos in the XXI Century, "The Kicked Ising model, some applications", Cuernavaca, México, August de 2004.
- PASI, "Stability of quantum Fourier transformation on Ising quantum computer", Buzios, Brasil December 2003.
- Quantum Entanglement and Information Processing, "Amplitude errors in the Ising quantum computer", Les Houches, Francia, July 2003.
- 8th International Conference on Squeezed States and Uncertainty Relations "Amplitude Errors in the Ising Quantum Computer", Puebla, México, June 2003.
- Stability if quantum computation, "Amplitude errors in quantum protocols", Cuernavaca, México. March 2003.
- XIX Congreso nacional de Física, "Classical Hamiltonian and dissipative ratchets", Manizales, Colombia. August 2001.
- Quantum Chaos: Theory and Application, "Hamiltonian and dissipative ratchets", Cuernavaca, México. July 2001.
- Latinamerican School of Physics ELAF XXXIII, "Classical Ratchets", Cuernavaca, México. June 2001.
- V Encuentor nacional de estudiantes de Física, "Physics and reality", Cali, Colombia. June 1998.

## Programming Skills

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- Fortran 77, Fortran 90, c, c++.
- Mathematica.
- System administrator of Centro Internacional de Ciencias (2003)
- Extensive use of Linux and Win OS.

## Other Activities

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- Professor for the course “Quantum information and quantum optics” in the National University of Mexico (January–June 2005)
- Students Representative to the Board of Directors. Physics Department, National University of Colombia. 1998–2000.
- Devoted guitar player and big fan of jazz music.

## References

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Professor **Thomas Seligman**  
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Centro Internacional de Ciencias  
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Profesor **Tomaž Prosen**  
Department of Physics,  
Faculty of Mathematics and Physics,  
University of Ljubljana,  
Universidad Nacional de Colombia.  
Jadranska 10, SI - 1000 Ljubljana, Slovenia.  
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