

## **Luis Gregorio Moyano**

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Born 29 April 1974, Mendoza, Argentina. Argentine citizenship.

## **Present position**

**Telefónica Investigación y Desarrollo**

Madrid, Spain

Researcher Jr. at Complex Systems Group - IT Systems

September 1, **2008** - Today.

## **Education and training**

**Universidad Carlos III de Madrid**

Madrid, Spain

Postdoctoral Position at Grupo Interdisciplinar de Sistemas Complejos (GISC)

Departamento de Matemáticas,

March 15, **2007** - August 31, **2008**.

**Centro Brasileiro de Pesquisas Físicas**

Rio de Janeiro, Brazil

PhD in Physics

September **2001** - April **2006**

Supervisor: Prof. Constantino Tsallis.

**Instituto Balseiro**

Bariloche, Argentina

MSc in Physics

August **1997**- December **2000**

Supervisors: Prof. Damián Zanette and Prof. Guillermo Abramson.

## **Fellowships and Research Visits**

- Invited Research Visitor at Hokkaido University, Sapporo, Japan.  
November 15 - December 15, **2006**.
- Invited Research Visitor at Instituto de Física, Universidad Autónoma de México, México.  
August 01 - October 15, **2006**.
- Invited Research Visitor at Santa Fe Institute, New Mexico, USA.  
May 01 - July 31, **2006**.
- PCI Fellowship from CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico), for NextComp Project, involving parallel simulations at NCSA facilities (National Center for Supercomputing Applications, Urbana, IL, USA).  
Rio de Janeiro, Brazil.  
November **2005** - April **2006**.

- Invited Research Visitor at Santa Fe Institute, New Mexico, USA.  
April 01 - June 30, **2005**.
- Fellowship from CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico),  
for PhD in Physics at CBPF.  
Rio de Janeiro, Brazil.  
September **2001** - September **2005**.
- Fellowship from CNEA (Comisión Nacional de Energía Atómica) for MSc in Physics at  
Instituto Balseiro.  
Bariloche, Argentina.  
August **1997** - December **2000**.

## Research Interests

- Complex systems, Nonlinear dynamics, Coupled chaotic systems.
- Cooperation, Evolutionary game theory, Dynamics in complex topologies.
- Complex networks, Statistical physics applied to social and economical sciences.
- Technological networks, Optical networks, Optimization algorithms in complex networks.
- Foundations of statistical mechanics, nonextensive statistical mechanics.
- Computer science (molecular dynamics and parallel programming).

## Publications

- E. Moro, J. Vicente, L.G. Moyano, A. Gerig, J. D. Farmer, G. Vaglica, F. Lillo and R.N. Mantegna, “Market Impact and Trading Profile of Large Trading Orders in Stock Markets”, *submitted to Phys. Rev. E* (2009), [arXiv:0908.0202].
- L. G. Moyano and A. Sánchez, “Evolving learning rules and emergence of cooperation in spatial Prisoner’s Dilemma ”, *Journal of Theoretical Biology* **259**, (2009) 84-95, [arXiv:0805.2071v3].  
*Selected for Complexity Digest: see issue 12, article 7.2*
- L.G. Moyano, A. Robledo, “ $q$ -deformed statistical-mechanical property in the dynamics of trajectories en route to the Feigenbaum attractor”, *Phys. Rev. E* **77**, (2008) 036213, [arXiv:0801.2948v2].
- S.D. Queirós, L.G. Moyano, J. de Souza and C. Tsallis, “A nonextensive approach to the dynamics of financial observables” *Eur. Phys. J. B* **55**, (2007) 161, [physics/0601222].
- L.G. Moyano, C. Anteneodo, “Coordinate distributions and anomalous diffusion in the HMF model”, *Phys. Rev. E* **74**, (2006) 021118, [cond-mat/0601518].
- L.G. Moyano, C. Tsallis, M. Gell-Mann, “Numerical indications of a  $q$ -generalised central limit theorem”, *Europhys. Lett.* **73**, (2006) 813 [cond-mat/0509229].  
*One of the ten most downloaded articles during 2006 from Europhysics Letters.*

- L.G. Moyano, Ana P. Majtey, Constantino Tsallis, “Weak chaos and metastability in a symplectic system of many long-range-coupled standard maps”, *Eur. Phys. J. B* **52**, (2006) 493, [cond-mat/0602513].
- F. Baldovin, L.G. Moyano and C. Tsallis, “Boltzmann-Gibbs thermal equilibrium distribution for classical systems and Newton Laws: A computational discussion”, *Eur. Phys. J. B* **52**, (2006) 113, [cond-mat/0402635].
- L.G. Moyano, G. Abramson, and D.H. Zanette, “Synchronization learning of coupled chaotic maps”, *Eur. Phys. J. B* **22**, (2001) 223 [nlin.AO/0010007].

## Conference Proceedings

- J.P. Cárdenas, J. Salcedo, R.M. Benito, M.L. Mouronte and L.G. Moyano, “Fixed-pathways dynamics in technological networks” *submitted* (2010).
- L.G. Moyano, M.L. Mouronte Lopez, L. Boto Espada and M.L. Vargas, “Complex networks and cost propagation”, *IEEE Canadian Journal of Electrical and Computer Engineering*, *in press* (2010).
- M. L. Mouronte, M.L. Vargas, L.G. Moyano, F.J. García Algarra and L.S. Del Pozo, “Modification Propagation in Complex Networks”, *Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering*, **4**, Part 1, (2009) 435.
- A. Robledo, L.G. Moyano, “Dynamics towards the Feigenbaum attractor”, *Brazilian Journal of Physics*, **39** (2009) 364.
- M. L. Mouronte, R. M. Benito, J. P. Cárdenas, A. Santiago, V. Feliú, P. van Wijngaarden and L.G. Moyano, “Complexity in Spanish optical fiber and SDH transport networks”, *Computer Physics Communications* **180** (4) (2009) 523.
- L.G. Moyano, D. Silva and A. Robledo, “Labyrinthine pathways towards supercycle attractors in unimodal maps”, *Central European Journal of Physics*, **7** (2009) 591 [0706.4415v1].
- L.G. Moyano and A. Sanchez, “Prisoner’s dilemma on a network of heterogenous agents: cooperation and learning co-evolution”, *Proceedings of the Workshop Net-Works 2008*, Pamplona, *in press* (2008).
- A. Robledo, L.G. Moyano, “Some aspects of the dynamics towards the supercycle attractors and their accumulation point, the Feigenbaum attractor”, in *Complexity, Metastability and Nonextensivity*, eds. S. Abe, H.J. Herrmann, P. Quarati, A. Rapisarda and C. Tsallis, *American Institute of Physics Conference Proceedings* **965** (New York, 2007).
- L.G. Moyano, J. de Souza and S.D. Queirós, “On the multi-fractal structure of traded volume in financial markets”, *Physica A* **371**, (2006) 118, [physics/0512240].
- J. de Souza, L.G. Moyano and S.D. Queirós, “On statistical properties of traded volume in financial markets”, *Modern Problems in Complexity*, *Eur. Phys. J. B* **50**, (2006) 165, [physics/0510112].

- Marcelo P. de Albuquerque, A.M. de Almeida, L.H.P. Lessa, Marcio P. de Albuquerque, N. Alves, L.G. Moyano, C. Tsallis, “Molecular dynamics application for long-range interacting systems on a computational grid environment”, *Proceedings of the IV Workshop on Computational Grids and Applications*, (2006) 79.
- J.A. Marsh, M.A. Fuentes, L.G. Moyano, C. Tsallis, “Influence of global correlations on central limit theorems and entropic extensivity”, *Physica A* **372**, (2006) 183, [cond-mat/0604007].
- L.G. Moyano, A.P. Majtey, C. Tsallis, “Weak Chaos in large conservative system Infinite-range coupled standard maps”, *Complexity, Metastability and Nonextensivity* (World Scientific Singapore, 2005), Eds. C. Beck, A. Rapisarda and C. Tsallis [cond-mat/0501035].
- F. Baldovin, L.G. Moyano, A.P. Majtey, A. Robledo and C. Tsallis, “Ubiquity of metastable-to-stable crossover in weakly chaotic dynamical systems”, *Physica A* **340**, (2004) 205, [cond-mat/0312407].

### Congress participation:

- “2009 IEEE Toronto International Conference Science and Technology for Humanity TIC-STH 2009”, Ryerson University, September 26-27, **2009**, Toronto, Canada. *Talk session*.
- “Complejidad: nuevos retos en la ciencia y en la tecnología”, Universidad Rey Juan Carlos de Madrid, May 11-12, **2009**, Madrid, Spain. *Presential*.
- Invited talk: Universidad Carlos III de Madrid, Telecommunications Department, Leganés, Spain, ”Complex networks: Basic concepts and some applications to technology”, April 1, **2009**.
- “MS2009 - Open Innovation Fair’, 4th Management Summit”, Palacio Municipal de Congresos de Madrid, March 5, **2009**, Madrid, Spain. *Poster session*.
- “BCNetWORKSHOP 2008, Trends and perspectives in complex networks”, Universitat de Barcelona, December 10-12, **2008**, Barcelona, Spain. *Presential*
- “International Conference Modelling and Computation on Complex Networks and Related Topics”, Universidad de Navarra, Pamplona, Spain, 9-11 June **2008**. *Talk session*.
- “Research Fair 2008, Telefónica I+D”, Telefónica de España, November 14, **2008**, Madrid, Spain. *Poster session*.
- “COMPLEX’2009, The First International Conference on Complex Sciences: Theory and Applications”, February 23-25, **2009**, Shanghai, China. *Talk session*.
- “XV Congreso de Física Estadística - FisEs08”, Facultad de Ciencias. Universidad de Salamanca Departamento de Física Aplicada. Universidad de Salamanca, Salamanca, Spain, March 27-29, **2008**. *Poster session*.
- “StatPhys 23, the 23rd International Conference on Statistical Physics of the International Union for Pure and Applied Physics (IUPAP)”, July 9-13 **2007**, Genova, Italy. *Poster session*.

- “Complexity, Metastability And Nonextensivity”, 1-5 July **2007**, Catania, Italy. *Talk session.*
- “Econophysics Colloquium 2006 and Third Bonzenfreies Colloquium Program”, November 23-25 **2006**, Tokyo, Japan. *Talk session.*
- “IV Workshop on Grid Computing and Applications”, June 2 **2006**, Curitiba, Paraná, Brazil. *Poster session.*
- “LAWNP 05: IX Latin American Workshop on Nonlinear Phenomena”, Oct. 23-28 **2005**, San Carlos de Bariloche, Rio Negro, Argentina. *Poster session.*
- “III Workshop in computational grids and applications” , Jan. 31- Feb. 2 **2005**, Petrópolis, Rio de Janeiro, Brazil. *Poster session.*
- Ettore Majorana Foundation and Centre for Scientific Culture - “31st Workshop of the International School of Solid State Physics: Complexity, metastability and nonextensivity”, 20-26 Jul. **2004**, Erice, Sicily, Italy. *Talk session.*
- “XXVII Encontro Nacional de Física da Matéria Condensada” , May 04-08 **2004**, Poços de Caldas, Minas Gerais, Brazil. *Talk session.*
- International Workshop on: “Trends and Perspectives on Extensive and Non- Extensive Statistical Mechanics”, in Honour to the q-60th Birthday of Constantino Tsallis, Nov. 19-21 **2003**, Angra dos Reis, Brazil. *Poster session.*
- “LAWNP 03: VIII Latin American Workshop on Nonlinear Phenomena”, Sep. 28-Oct. 3 **2003**, Salvador, Bahia, Brazil. *Poster session.*
- “NEXT2003: Second Sardinian International Conference on News and Expectations in Thermostatistics”, Sep. 21-28 **2003**, Villasimius, Cagliari, Italy. *Poster session.*
- “XXVI Encontro Nacional de Física da Matéria Condensada”, May 06-10 **2003**, Caxambu, Minas Gerais, Brazil. *Poster session.*
- IUPAP International Conference on “Quantum Entanglement, Complexity and the Physical Basis for Quantum Computation”, Dec. 2-8 **2002**, Rio de Janeiro, Brazil.
- “Simpósio em Homenagem ao Professor S. R. Salinas, Tendências da Física Estatística no Brasil: Escala e Complexidade”, Nov. 24-27 **2002**, Campos do Jordão, São Paulo, Brazil. *Poster session.*
- “Escuela de invierno J.J. Giambiagi”, Jul. 23-28 **2001**, Buenos Aires, Argentina.
- “Reunión Anual de la Asociación Física Argentina”, Sep. 13 **2000**, Buenos Aires, Argentina. *Poster session.*
- “Reunión Anual de la Asociación Física Argentina”, Sep. 23-30 **1998**, La Plata, Argentina. *Poster session.*

### Patents:

“Procedure for optical network traffic optimisation through advanced simulated annealing techniques”, Luis G. Moyano, Mary Luz Mouronte, Maria Luisa Vargas (*pending*)

## Others

- Referee for Physica A and Physics Letters A.
- Participant of the FP7-ICT-2009-4 project: **OEPI** “Solution and Services Engineering for Measuring, Monitoring, and Management of Organizations Environmental Performance Indicators”.
- Interview at Madrid I+D “Ciencia y Sociedad” (February 2009)  
<http://www.madrimasd.org/cienciaysociedad/resenas/lecturas/detalleLectura.asp?id=37>

### Languages:

Spanish (native), English (fluent), Portuguese (fluent), Italian (reads), French (reads).

### Programming Languages:

- *Serial programming*: C, Fortran, Basic.
- *Object oriented*: C++, Python, Java, Visual Basic.
- *Parallel*: CHARM++, MPI (Message Passing Interface).
- *Others*: BASH shell scripting, HTML, L<sup>A</sup>T<sub>E</sub>X.

### Operating Systems:

Linux (any flavor), MacOS X, Solaris, MS-Windows.

### Mathematical Applications:

Mathematica, GNU R, Maple, Matlab, Grace batch scripting, arbitrary precision libraries.

### Miscellaneous:

Linux system administration, strong verbal and written communication skills, excellent troubleshooting and debugging skills.

Luis G. Moyano  
November 5, 2009