

CURRIVULUM VITAE: MIGUEL A. MUÑOZ

Biographical sketch: I studied in Granada, Spain, where I received his Ph.D. in physics. I continued my postdoctoral training for about five years, working at IBM in Yorktown Heights, NY; the University of California, San Diego; Università di Roma 1 La Sapienza, Italy; and the International Center for Theoretical Physics (ICTP) in Trieste, Italy. I have been at the University of Granada since 1999, where I am a full professor in physics. My research covers different aspects of statistical physics, stochastic processes, self-organized criticality, and nonlinear physics, ranging from theoretical issues to interdisciplinary applications, specially in neuroscience. I presently serve as an editorial board member for Physical Review E and is associate editor of Scientific Reports, and was recently nominated “outstanding refere” by the Americal Physical Society. I have published more than 150 papers in International Journals, including 20 in Physical Review Letters, 5 in PNAS, 1 in Nature Communicationns, 1 Review of Modern Physics, etc. My h index is 39.

Education:

- B.S. Physics, University of Granada, June 1990. Award of the University to the best student.
- Master degree in Physics, University of Granada, October 1991.
- Ph. D. in Physics, University of Granada, May 1994. Awards of the University of Granada and of Academy of Sciences to be best Ph. D. thesis in 1994.

Professional experience. Appointments:

- Full Professor (Universidad de Granada). December 2010 - Present.
- Professor (Univ. de Granada). Oct. 2001- Dec. 2010
- Profesor Ayudante (Universidad de Granada), Sept, 2000 -Sept. 2001
- Research contractor U. of Granada. March 1999 - Sept. 2000.
- Postdoc at the International Center for Theoretical Physics (ICTP), UNESCO, Trieste (ITALY). Oct. 1998-March 1999
- Postdoct at Dipartimento di Fisica, Università di Roma “La Sapienza” Roma (Italy). (European Union, Marie Curie, Fellowship, 1996-1998).
- Postdoct at IBM Watson Research Center. New York (U.S.A.) Director: G.

Grinstein. (NATO and Universidad de Granada fellowships, 1994-1996).

Significant Teaching experience

- Many years of Experience teaching at the University of Granada: Statistical Mechanics, Advanced Statistical Mechanics, Master course on Scale invariance, the Renormalization Group and their interdisciplinary applications, Master course on Complex networks and applications in neuroscience.
- Master courses at Universities in Madrid, Barcelona, Paris, Parma, Belo Horizonte (Brazil) on Complex Systems and Criticality.
- Large experience in the coordination and management of Master and Ph. D Programs. Involved in the Academic commission directing two PhD. programs: “Program in Physics and Mathematics: FISYMAT” and “Program in Physics” (Both of them Masters and Ph.D Programs of Excellence according to the Spanish Ministry classification).
- Twenty year experience co-organizing the pedagogical “Granada Seminars on Computational Physics” (ergodic.ugr.es/CP) focused in training international graduate students and postdocs.

Some recent publications (see my profile in scholargoogle for a more updated list)

- M. A. Muñoz, *Criticality and Dynamical scaling in living systems* Review of Modern Physics **90**, 031001 (2018).
- S. di Santo, P. Villegas, R. Burioni, and M.A. Muñoz, *Landau-Ginzburg theory of cortex dynamics: Scale-free avalanches emerge at the edge of synchronization*, Proc. Natl. Acad. Sci (USA) **115**, E1356–E1365, (2018),
- M Martinello, J Hidalgo, S di Santo, A Maritan, D Plenz, M. A. Muñoz, *Neutral theory and scale-free neural dynamics*, Phys Rev. X **7**, 041071 (2017).
- M. A. Muñoz, S Pigolotti, M Cencini, D Molina, *Stochastic spatial models in ecology: a statistical physics approach*, J. Stat. Phys. . (2017).
- Paolo Moretti and M. A. Muñoz, *Griffiths phases and the stretching of criticality in brain networks*, **Nature Comm.** **4**:2521 (2013).
- J. Hidalgo, I. Grilli, S. Suweis, M. A. Muñoz, J. Banavar, and A. Maritan *Information-based fitness and the emergence of criticality in living systems*, **Proc. Nat. Acad. of Sci.** 2014 111 10095-10100.

- J. M. Cortés, M. Desroches, S. Rodrigues, R. Veltz, M. A. Muñoz, and T. Sejnowski, *Short-term synaptic plasticity in the deterministic Tsodyks-Markram model leads to unpredictable network dynamics*, **Proc. Nat. Acad. of Sci.** **110**, 16610-16615 (2013).
- P. Villa Martn, J.A. Bonachela, S. Levin, and M.A. Muñoz, *Eluding Catastrophic shifts*, **Proc. Nat. Acad. of Sci.** PNAS 2015 112 E1828-E1836;
- J. M. Cortés, D. Marinazzo, M.A. Muñoz *Editorial for the Research Topic: Information-based methods for neuroimaging: analyzing structure, function and dynamics* Front. Neuroinform. doi: 10.3389/fninf.2014.00086
- M. A. Muñoz, R. Juhász, C. Castellano, and G. Ódor, *Griffiths phases on complex networks*, **Phys. Rev. Lett.** **105**, 128701 (2010).
- L. Donetti, P. I. Hurtado and M. A. Muñoz, *Entangled networks, synchronization, and the optimal network topology*, **Phys Rev. Lett.** **95**, 188701 (2005).
- S. di Santo, R. Burioni, A. Vezzani and M.A. Munoz, *Self-organized bistability*, **Phys. Rev. Lett.** **116**, 240601 (2016).
- F. Benitez, C. Duclut, H. Chaté, B. Delamotte, I. Dornic, and Miguel A. Muñoz, *Langevin equations for reaction-diffusion processes*, **Phys. Rev. Lett.** **117**, 100601 (2016).
- P. Villegas, J.M. Ruiz, J. Hidalgo, and M.A. Muñoz, *Intrinsic noise and deviations from criticality in Boolean gene-regulatory networks*, Scientific Reports **6** 34743 (2016). doi: 10.1038/srep34743
- P. Villa Martn, J. Hidalgo, R. Rubio de Casas, and M.A. Muñoz, *Eco-evolutionary Model of Rapid Phenotypic Diversification in Species-Rich Communities*, Plos Comp- Biol. 12, e1005139 (2016). ■
- V. Buendía, M.A. Muñoz, and S. Manrubia, *Limited role of spatial self-structuring in emergent trade-offs during pathogen evolution*, Sci. Rep. **8** 12476 (2018). ■

Awards: • Academy of Sciences of Granada Award in Physics to the best undergraduate curriculum, 1990. • University of Granada award for the best graduated student curriculum, 1990. • University of Granada award to the PhD thesis, 1994. • Award of the University of Granada to the Excellence in research, 2007.

Ph.D. Thesis Advisor: Pedro L. Garrido (Universidad de Granada)

Collaborators: T. Sejnowski (Salk Institute, La Jolla, UCSD, USA), Simon Levin (Princeton, USA), H. Chat (Saclay, France), G. Grinstein and Yuhai Tu (IBM Yorktown research center, NY, USA), A. Maritan (U. Padua, Italy), J. Banavar (U. Maryland), L. Pietronero, A. Gabrielli, C. Castellano, M. Cencini (Universita di Roma 1, La Sapienza, Italy), S. Johnson (U. Warwick, UK), T. Hwa (La Jolla, UCSD, San Diego, USA), M. Alava (U. Helsinki, Finland), R. Dickman (BeloHorizonte, Brazil), G. Odor (Budapest, Hungary).

Former PH. students: J.A. Bonachela (at Princeton university and now in Glasgow, UK), O. Al Hammal (Leeds, UK), J. Hidalgo (Padua, Italy), V. Dominguez-Garcia (Montpellier, France), Paula Villa (postdoc in Granada).

International Projects:

- Principal Investigator of the node in Granada of the European TMR COEVOLUTION AND SELF ORGANIZATION IN COMPLEX NETWORKS IST-2001-33555 (COSIN).
- Investigator in the European Network: FRACTAL STRUCTURES AD SELF-ORGANIZATION (ERBFMRXCT980183).
- Applications of Statmech to Bio-informatics. Spanish-Argentinian Excellence research Programme.

Postdoctoral fellows: C. Silva da Santos (Porto), L. Donetti (Parma), J. Hidalgo (Padua), V. Dominguez-Garcia (Montpellier, France), Paula Villa (Okinawa (Japan)).