Pablo Villegas Góngora

Curriculum Vitae

▬▬ Personal data

Date and place of birth: June 16, 1990 (El Ejido, Almería)

▬▬ Research interests

Statistical physics, phase transitions and criticality, stochastic processes, collective phenomena, biological physics.

▬▬ Education

2018-Today	**Period of Postdoctoral Orientation (POP)**, *University of Granada.*
2014-2018	**PhD in physics**, *University of Granada.* Dissertation: *"Phases and phase transitions in living matter."* Advisor: Miguel Á. Muñoz
2014-2015	**MSc in Teaching Compulsory and Pre-University Secondary Education, Vocational Training and Language Teaching**, *University of Granada.* Thesis: *"Educational applications in Vpython employing cooperative learning."* Advisors: Pablo I. Hurtado, Francisco de los Santos
2013-2014	**MSc FisyMat: Biomathematics**, *University of Granada.* Thesis: "*Synchronization: Study and applications of the Kuramoto model*". Advisors: Miguel Á. Muñoz, Paolo Moretti
2008-2013	**BSc+MSc in Physics (Licenciado en Física)**, *University of Granada.*

▬▬ Research experience

May-Aug 2017	**Mobility grant**, *University of Strathclyde (Glasgow, UK).* Advisor: J.A. Bonachela MASTS Marine Population Modelling Group. Department of Mathematics and Statistics. Funded by MINECO

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☺ *Articles*

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Apr 2015 - Today	**Doctoral grant**, *University of Granada*. Advisor: Miguel Á. Muñoz. Grant (FPI programme) at the Dept. Electromagnetism and Matter Physics. Funded by MINECO
2013-2015	**Scientific collaboration in the Statistical Physics Group**, *Dept. Electromagnetism and Matter Physics*, University of Granada.

Participation in Funded Projects …

Apr 2015 - Today	**Statistical physics of complex systems: From basical principles to the frontiers of matter physics, ecology and neuroscience**, *FIS2013-43201-P*, National Plan of I+D+i (MINECO).

Teaching…

2017-2018	**Computational physics (Degree in Physics)**, *University of Granada*, 1.5 credits.
2017-2018	**Physics of complex systems (Degree in Physics)**, *University of Granada*, 1.5 credits.
2016-2017	**Statistical physics (Degree in Physics)**, *University of Granada*, 1.5 credits.
2016-2017	**Computational physics (Degree in Physics)**, *University of Granada*, 2.2 credits.

▬▬▬ Publications

2018	**S.di Santo, P.Villegas, R.Burioni & M.A.Muñoz**, *Self-organized bistability: is it a relevant concept for brain dynamics?*, In preparation.
2018	**S.di Santo, P.Villegas, R.Burioni & M.A.Muñoz**, *Non-normality, reactivity, and intrinsic stochasticity in neural dynamics: a non-equilibrium potential approach*, arXiv preprint arXiv:1803.07858.
2018	**S.di Santo*, P.Villegas*, R.Burioni & M.A.Muñoz**, *Landau-Ginzburg theory of cortex dynamics: scale-free avalanches emerge at the edge of synchronization*, Proc. Natl. Acad. Sci., 115(7), E1356-E1365. (* Joint 1st autorhs).
2017	**S.di Santo, P.Villegas, R.Burioni & M.A.Muñoz**, *Simple unified view of branching process statistics: Random walks in balanced logarithmic potentials*, Phys. Rev. E, 95(3), 032115.
2016	**P.Villegas, J.M. Ruiz, J.Hidalgo & M.A.Muñoz**, *Intrinsic noise and deviations from criticality in Boolean gene-regulatory networks*, Sci. Rep. 6, 34743.
2014	**B.Moglia, E.Albano, P.Villegas & M.A.Muñoz**, *Interfacial depinning transitions in disordered media: revisiting an old puzzle*, J. Stat. Mech. Theory Exp., 2014(10), P10024.

2014 **P.Villegas, P.Moretti & M.A.Muñoz**, *Frustrated hierarchical synchronization and emergent complexity in the human connectome network*, Sci. Rep. 4, 5990.

Proceedings …

2016 **P.Villegas, J.Hidalgo, P.Moretti & M.A.Muñoz**, *Complex synchronization patterns in the human connectome network*, Proceedings of ECCS 2014: European Conference on Complex Systems (pp. 69-80). Springer International Publishing.

Talks

Jun 2016 **Kuramoto dynamics, glassy synchronization and rare regions in the human connectome**, *Quantitative Laws II: From physiology to ecology, from interaction structures to collective behavior*, Como (Italy).

May 2016 **Neuronal avalanches: synchronization and criticality in the brain**, *I Conferences for young researchers: fostering the interdisciplinarity*, Granada (Spain).

Oct 2015 **Complex synchronization patterns in the human connectome network**, *FISES 2015*, Badajoz (Spain).

Jun 2015 **Hierarchical synchronization and complex patterns in the human connectome network**, *Granada Seminar on Computational and Statistical Physics*, La Herradura (Spain).

Sep 2014 **Frustrated hierarchical synchronization and emergent complexity in the human connectome network**, *Summer School on Statistical Physics of Complex Systems*, IFISC (Palma de Mallorca, Spain).

Conferences and schools

Nov 2016 **III Scientific Conferences of the "Carlos I" Institute of Theoretical and Computational Physics**, Granada (Spain). Attendant and poster contribution.

Jun 2016 **Quantitative Laws II: From physiology to ecology, from interaction structures to collective behavior**, Como (Italy). Attendant and oral contribution.

May 2016 **I Conferences for young researchers: fostering the interdisciplinarity**, Granada (Spain). Attendant and oral contribution.

Oct 2015 **II Scientific Conferences of the "Carlos I" Institute of Theoretical and Computational Physics**, Granada (Spain). Attendant.

Oct 2015 **FISES 2015**, Badajoz (Spain). Attendant and oral contribution.

Sep 2015	**Net-Works 2015: Complex networks and their interdisciplinary applications**, Granada (Spain). Attendant and member of the local organizing committee.
Jun 2015	**13th Granada Seminar on Computational and Statistical Physics**, La Herradura (Spain). Attendant, oral contribution and member of the local organizing committee.
May 2015	**BIOMAT: Emergence and self-organization in social and biological systems**, Granada (Spain). Attendant.
Sep 2014	**Summer School on Statistical Physics of Complex Systems**, *IFISC*, Palma de Mallorca (Spain). Attendant, oral contribution and poster.
Apr 2014	**I Scientific Conferences of the "Carlos I" Institute of Theoretical and Computational Physics**, *Granada (Spain). Attendant.*

Languages

Spanish	**Mother tongue**.
2013	**Preliminary English Test (PET B1)**, *University of Cambridge*.
2013	**Intermediate English level (B1)**, *UGR*, Modern Language Centre (CLM).

Computer skills

- o OS: GNU/Linux, Windows
- o Document processing: LYX (LATEX), LibreOffice Writer, Word
- o Programming: Fortran, C, Python, LATEX, R
- o Parallel computing: OpenMP, PROTEUS (supercomputer center)
- o Others: Octave (Matlab clone), Maxima (Computer algebra system), Mathematica (Computer algebra system)

Others

Mar 2016	**Educational tools for peer production**, *20 hours*, Granada (Spain). Attendant.
Sep 2016	**Training days: Initiation to University Teaching for FPU and FPI PhD students**, *20 hours*, Granada (Spain). Attendant.

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