

# Curriculum Vitae

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## PERSONAL

Name: **Luis Alberto Martínez Vaquero**

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**Vrije Universiteit Brussel**, Pleinlaan 2, 1050 Brussels, Belgium

## PROFILE

Postdoctoral researcher with strong interest in the multidisciplinary study of complex systems and its application to social, ecological and biological systems. Background in physics, game theory and numerical simulations.

## EDUCATION

- B. Sc. in **Physics**, Universidad Complutense de Madrid, Spain (2004).
- M. Sc. (*Diploma de Estudios Avanzados*) in Astrophysics and Cosmology, Universidad Autónoma de Madrid, Spain (2006).
- Ph. D. in Astrophysics and Cosmology: numerical cosmological simulations, Universidad Autónoma de Madrid, Spain (2010).  
Title: *El Proyecto CLUES: Simulando el Universo Local*  
Distinction: *Sobresaliente Cum Laude* and *Doctor Europeus*

## POSITIONS

- Postdoctoral researcher (*FWO project*), Artificial Intelligence Lab, Vrije Universiteit Brussel (2013-present).  
Visiting researcher, Computer Science Department, Université Libre de Bruxelles (2013-present).
- Postdoctoral researcher, *Scholarship of the Alianza 4 Universidades Consortium*, Dpto. Matemáticas, Universidad Carlos III de Madrid (2010-2012).
- Teaching and Research Assistance, *Teaching Assistant position*, Dpto. Física Teórica, Universidad Autónoma de Madrid (2008-2010).
- Research Assistant, *PhD Scholarship of the Comunidad de Madrid*, Dpto. Física Teórica, Universidad Autónoma de Madrid (2005-2008).
- Research Assistant, *Scholarship associated to a research project*, Dpto. Física Teórica, Universidad Autónoma de Madrid (2005).

## INTERNSHIPS

- *Biomathematics Department, University of Vienna*, under the supervision of Karl Sigmund (3 months, 2011).
- *Astrophysikalisches Institut Potsdam (AIP)*, Germany (6 months in total, 2006-2009).

## SCHOLARSHIPS

- Postdoctoral Scholarship of the *Alianza 4 Universidades Consortium* (2010-2012).
- PhD Scholarship of the *Comunidad de Madrid* (2005-2008).
- *Universidad Complutense de Madrid* Scholarship for an initiation research (2003-2004).
- *Spanish National Scholarship* for undergraduate students (1999-2004)

## PUBLICATIONS

### Articles in journals:

- Redistribution of wealth as a vaccine against outbreaks of intolerance.  
*Martinez-Vaquero, L. A.; Cuesta, J. A.*  
*In preparation.*
- Apology and forgiveness evolve to resolve failures in cooperative agreements.  
*Martinez-Vaquero, L. A.; Han, T. A.; Pereira, L. M.; Lenaerts, T.*  
*Scientific Reports 5, 10639 (2015)*
- Spreading of intolerance under economic stress: results from a reputation-based model.  
*Martinez-Vaquero, L. A.; Cuesta, J. A.*  
*Phys. Rev. E 90, 022805 (2014)*
- Evolutionary stability and resistance to cheating in an indirect reciprocity model based on reputation.  
*Martinez-Vaquero, L. A.; Cuesta, J. A.*  
*Phys. Rev. E 87, 052810 (2013)*
- Generosity pays in the presence of direct reciprocity: A comprehensive study of  $2 \times 2$  repeated games.  
*Martinez-Vaquero, L. A.; Cuesta, J. A.; Sánchez, A.*  
*PLoS ONE 7, e35135 (2012)*
- Cold versus Warm Dark Matter simulations of a galaxy group  
*Libeskind, I.; Di Cintio, A.; Knebe, A.; Yepes, G.; Gottlöber, S.; Steinmetz, M.; Hoffman, Y.; Martinez-Vaquero, L. A.*  
*PASA 30, e039 (2013).*
- The luminosities of backplash galaxies in constrained simulations of the Local Group.  
*Knebe, A.; Libeskind, N. I.; Knollmann, S. R.; Martinez-Vaquero, L. A.; Yepes, G.; Gottlöber, S.; Hoffman, Y.*  
*MNRAS 412, 529-536 (2010).*
- The grouping, merging and survival of subhaloes in the simulated Local Group.  
*Klimontowski, J.; Łokas, E.L.; Knebe, A.; Gottlöber, S.; Martinez-Vaquero, L. A.; Yepes, G.; Hoffman, Y.*  
*MNRAS 402, 1899-1910 (2010).*
- Constrained simulations of the local universe - II. The nature of the local Hubble flow.  
*Martinez-Vaquero, L. A.; Yepes, G.; Hoffman, Y.; Gottlöber, S.; Sivan, M.*  
*MNRAS 397, 2070-2080 (2009).*
- The local Hubble flow: is it a manifestation of dark energy?  
*Hoffman, Y.; Martinez-Vaquero, L. A.; Yepes, G.; Gottlöber, S.*  
*MNRAS 386, 390- 396 (2008).*
- Constrained simulations of the local universe - I. Mass and motion in the local volume.  
*Martinez-Vaquero, L. A.; Yepes, G.; Hoffman, Y.*  
*MNRAS 378, 1601- 1608 (2007).*

### Other publications in journals:

- Equivalence of cooperation indexes: Comment on "Universal scaling for the dilemma strength in evolutionary games" by Z. Wang et al.  
*Martinez-Vaquero, L. A.; Grujic, J.; Lenaerts, T.*  
*Physics of Life Reviews, in press (2015).*

### Proceedings:

- Dynamical Game Theory.  
*Antonioni, A.; Martinez-Vaquero, L. A.; Mathis, N.; Peel, L.; Stella, M.*  
*CSSS 2014 proceedings of the Santa Fe Institute (2014).*
- Persistence of pollination systems.  
*Marquitti, F. M. D.; Wu, D.; Martinez-Vaquero, L. A.; Stella, M.; Antonioni, A.; Gräbner, C.; Krese, B.*  
*CSSS 2014 proceedings of the Santa Fe Institute (2014).*

- Conceptual and methodological insights from studying the proliferation of fishing techniques in the Logone Floodplain in Cameroon.  
*Garcia-Casademont, E.; Gorsky, G.; Gräbner, C.; Laborde, S.; **Martinez-Vaquero, L. A.***  
*CSSS 2014 proceedings of the Santa Fe Institue (2014).*
- High resolution simulations of the Local Group in the CLUES Project.  
***Martinez-Vaquero, L. A.**; Yepes, G.; Gottlöber, S.; Hoffman, Y.*  
*Highlights of Spanish Astrophysics VI, Proceedings of the IX Scientific Meeting of the Spanish Astronomical Society, pp. 259-264 (2011).*
- Near field comological simulations: Is Dark Energy playing a role in our Local Neighbourhood?  
***Martinez-Vaquero, L. A.**; Yepes, G.; Hoffman, Y.; Gottlöber, S.*  
*Mathematics and Astronomy: A Joint Long Journey. Proceedings of the International Conference. AIP Conference Proceedings, Volume 1283, pp. 166-174 (2010).*
- Understanding dark matter with Fermi and numerical simulations.  
*Cañadas, B.; **Martinez-Vaquero, L. A.**; Yepes, G.*  
*5<sup>th</sup> International Workshop on the Dark Side of the Universe. AIP Conference Proceedings, Volume 1178, pp. 90-96 (2009).*
- The CLUES project: Constrained Local Universe Simulations.  
*Yepes, G.; **Martinez-Vaquero, L. A.**; Gottlöber, S.; Hoffman, Y.*  
*5th International Workshop on the Dark Side of the Universe. AIP Conference Proceedings, Volume 1178, pp. 64-75 (2009).*
- Constrained Simulations of the Local Universe in Different Dark Matter Scenarios.  
*Yepes, G.; Gottlöber, S.; **Martinez-Vaquero, L. A.**; Hoffman, Y.*  
*The dark side of the Universe: 4th International Workshop on the Dark Side of the Universe. AIP Conference Proceedings, Volume 1115, pp. 80-91 (2009).*
- Constrained simulations of the local universe.  
***Martinez-Vaquero, L. A.**; Yepes, G.; Dover, Y.; Hoffman, Y.; Klypin, A.; Gottlöber, S.*  
*Galaxies in the Local Volume, Astrophysics and Space Science Proceedings, Springer Netherlands, pp. 305-306 (2008).*
- The MareNostrum Galaxy Formation Simulation Project.  
*Yepes, G.; **Martinez-Vaquero, L. A.**; Khalatyan, A.; Gottlöber, S.; Hoefl, M. ; Teyssier, R.*  
*Dark Galaxies and Lost Baryons, Proceedings of the International Astronomical Union, IAU Symposium, Volume 244, pp. 393-394 (2008).*
- Constrained Simulations of the Local Universe.  
*Yepes, G.; **Martinez-Vaquero, L. A.**; Hoffman, Y.; Gottlöber, S.; Klypin, A.*  
*Dark Galaxies and Lost Baryons, Proceedings of the International Astronomical Union, IAU Symposium, Volume 244, pp. 395-396 (2008).*
- Local Group candidates in cosmological simulations.  
***Martinez-Vaquero, L. A.**; Yepes, G.; Sivan, M.; Dover, Y.; Hoffman, Y.*  
*Highlights of Spanish Astrophysics IV, Proceedings of the Seventh Scientific Meeting of the Spanish Astronomical Society (2007).*
- Local Group candidates in cosmological simulations.  
***Martinez-Vaquero, L. A.**; Yepes, G.; Sivan, M.; Dover, Y.; Hoffman, Y.*  
*From dark halos to light, Proceedings of the XL1st Rencontres de Moriond, Thê' Giô'i Publishers, pp. 435-436 (2007).*

## CONFERENCES AND SEMINARS

### Communications to conferences (not published as proceedings):

- *Economic inequality favors the emergence of intolerance.*  
Conference of Complex Systems 2015 (Tempe, Arizona, 2015).
- *Emergence of revenge and forgiveness in commitments.*  
Physics Meets the Social Science. Granada Seminar on Computational and Statistical Physics (Granada, 2015).

- *Why does intolerance emerge under bad economic conditions?*  
International Conference on Computational Social Science (Helsinki, 2015).
- *Prevalencia de la generosidad en reciprocidad directa*  
XVIII Congreso de Física Estadística (Palma de Mallorca, 2012).
- *Emergence of responsive strategies in iterative games.*  
European Conference on Complex Systems (Vienna, 2011).
- *Invasion dynamics in iterative games.*  
Game Theory and Society (Zurich, 2011).
- *Emergencia de estrategias en juegos iterados con reciprocidad directa.*  
XVII Congreso de Física Estadística (Barcelona, 2011).

### **Communications to workshops:**

- *Promotion of cooperation through commitments in repeated games*  
Spatial Human Cooperation: from theory to experiments and back (Plön, 2014).
- *When do cheating and intolerance spread over a population?*  
Joint CRM-Imperial College School and Workshop in Complex Systems (Barcelona, 2013).
- *Emergencia de códigos morales por reputación.*  
IV Workshop del Programa de Modelización y Simulación de Sistemas Complejos (Madrid, 2012).
- *Ecosystem assembly for responsive strategies.*  
IX Workshop del Grupo Interdisciplinar de Sistemas Complejos (Madrid, 2012).
- *How warm can dark matter be?*  
2<sup>nd</sup> MultiDark Consolider Workshop (Santander, 2010).
- *Influence of the baryons and the warm dark matter in CLUES simulations*  
CLUES 2010 Workshop (Miraflores de la Sierra, 2010).
- *Constrained simulations of the Local Universe: Dark Energy in the Local Universe and high resolution constrained simulations.*  
The local universe: from dwarf galaxies to galaxy clusters (Jablonna, 2009).
- *Simulando el universo local*  
II Workshop ASTROCAM: Jóvenes Astrofísicos de la Comunidad de Madrid (Villaviciosa de Odón, 2007).
- *Constrained Simulations of the Local Universe.*  
Workshop on High Resolution Simulations of the Local Universe (Mizpe Ramon, 2007).
- *MareNostrum simulation: study of luminosities.*  
Workshop of the MareNostrum Galaxy Formation Project (Barcelona, 2007).

### **Seminars:**

- *Emergence of intolerance in reputation-based populations*, University of Namur (2015).
- *Stability of tolerance in reputation-based societies*, University of Manchester (2013).
- *Moral, cheating and intolerance in a reputation-based model*, Centre de Physique Théorique, Marseille (2013).
- *Does intolerance emerge naturally in a reputation world?*, Institute of Physics of Belgrade (2012).
- *Systematic study of responsive strategies through an invasion scheme*, University of Vienna (2011).
- *About games and invasions*, Petnica Science Centre, Serbia (2011).

### **Organization of conferences:**

- Winter Workshop on Complex Systems 2016 (WWCS 2016).  
*Steering committee member, Universidad Carlos III de Madrid (2016).*
- Winter Workshop on Complex Systems 2015 (WWCS 2015).  
*Main organizer, Vrije Universiteit Brussel (2015).*

- 4<sup>th</sup> Belgian Network Research Meeting.  
*Scientific committee member, Université Libre de Bruxelles (2014).*
- The Dark Side of Universe, DSU 2006.  
*Organizing committee member, Universidad Autónoma de Madrid (2006).*

#### **Attendance to other conferences and courses:**

- Complex Systems Summer School of the Santa Fe Institute (Santa Fe, 2014).
- Analysis of Complex Networks: Structure and Dynamics (Milan, 2013).
- Paradigmatic Models in Social Sciences (Milan, 2012).
- 75<sup>th</sup> Annual Meeting of the DPG and Spring Meeting of the Sections Condensed Matter and AMOP (Dresden, 2011).
- VII Workshop del Grupo Interdisciplinar de Sistemas Complejos (Madrid, 2011).
- I Workshop ASTROCAM: La Astrofísica en la Comunidad de Madrid (Madrid, 2006).
- VI Summer School of the Helmholtz Institute: Supercomputational Cosmology (Potsdam, 2006).
- Workshop of the European Dark Energy Network (Paris, 2005).
- Les Houches Predoctoral School: Dark Matter and Neutralinos (Les Houches, 2005).
- 29<sup>th</sup> Alpbach Summer School: Dark Energy and Dark Matter in the Universe (Alpbach, 2005).

#### **PARTICIPATION IN PUBLIC FUNDED PROJECTS**

- Towards an understanding of the interplay between other regarding preferences and group formation in strategic environments, *funded by FWO (2013-present).*
- Procesos dinámicos evolutivos: virus, ecosistemas y comportamientos sociales (PRODIEVO), *funded by MICINN (2012-2014).*
- Modelización y Simulación de Sistemas Complejos (MODELICO-CM), *funded by Comunidad de Madrid (2011-present).*
- Modelización, simulación y análisis de sistemas complejos (MOSAICO), *funded by MEC (2011).*
- AstroMadrid: Astrofísica y desarrollos tecnológicos en la Comunidad de Madrid, *funded by Comunidad de Madrid (2010-2011).*
- El Proyecto de Cosmología Numérica MareNostrum: un laboratorio virtual para el estudio del Universo, *funded by MICINN (2010).*
- Astroparticles in the Universe, *funded by the MICINN (2010).*
- Multimessenger Approach for Dark Matter Detection (MULTIDARK), *funded by MICINN (Consolider Ingenio) (2010-2015).*
- Astropartículas en el Universo: materia oscura, neutrinos y rayos cósmicos, *funded by MEC (2007-2009).*
- Red de Astrofísica de la Comunidad de Madrid (ASTROCAM), *funded by Comunidad Madrid (2006-2009).*
- Análisis teórico de la detección de materia oscura, *funded by MEC (2004-2007).*

#### **THESIS SUPERVISOR**

- Supervision of the master thesis *Joining direct and indirect reciprocity*, under the program *Master of Science in Applied Sciences and Engineering*, Vrije Universiteit Brussel (2015-present).

#### **TEACHING EXPERIENCE**

- Teaching Assistant in the master course *Computational Game Theory*, Vrije Universiteit Brussel (2013-present).
- Teaching Assistant in Physics to Biology and Chemistry undergraduate students, Universidad Autónoma de Madrid (2008-2010).

## COMPUTER SKILLS

- Programming in different languages: Fortran, Matlab, shell scripting, C, C++, ...
- Experience in using large international computational infrastructures: MareNostrum, JUMP, LRZ, DEISA consortium (2005-2010).
- Linux advanced user.

## OTHER

- **Scientific referee** for *Physical Review E*, *Journal of Theoretical Biology*, *BMC Evolutionary Biology*, *Physica A*, and *Games* journals (2012-present).
- **Council member** of the **Complex Systems Society** (2015-present).
- **Examining board member** of the Official University Entrance Examination, Universidad Autónoma de Madrid (2010).
- Participation in the international collaborations *CLUES Project* and *MareNostrum Numerical Cosmology Project* (2005-2010).
- **Training** courses in **Science and Technology Management**.
- **Teaching training** in Physics and Mathematics.