

PUBLICATIONS

JOURNAL PAPERS

- Izquierdo, L.R., Izquierdo, S.S. & Sandholm, W.H. (2018). EvoDyn-3s: A Mathematica Computable Document to Analyze Evolutionary Dynamics in 3-Strategy Games. *SoftwareX*, vol. 7, pp. 226-233. [<link>](#)
- Izquierdo, S.S. & Izquierdo, L.R. (2018). Mamdani Fuzzy Systems for Modelling and Simulation: A Critical Assessment. *Journal of Artificial Societies and Social Simulation*, vol. 21, no. 3. [<link>](#)
- Izquierdo, S.S., Izquierdo, L.R. & López-Pintado, D. (2018). Mixing and diffusion in a two-type population. *Royal Society Open Science*, 5(2) 172102. [<link>](#)
- Almudí, I., Fatás-Villafranca, F., Izquierdo, L.R. & Potts, J. (2017). The economics of utopia: a co-evolutionary model of ideas, citizenship and socio-political change. *Journal of Evolutionary Economics*. [<link>](#)
- Izquierdo, S.S., Izquierdo, L.R., Galán J.M. & Santos, J.I. (2016). Economía Artificial: una valoración crítica. *Revista de Métodos Cuantitativos para la Economía y la Empresa*, vol. 22, pp. 36-54. [<link>](#)
- Izquierdo, S.S. & Izquierdo, L.R. (2015). The "Win-Continue, Lose-Reverse" rule in oligopolies: robustness of collusive outcomes. *Advances in Complex Systems*, vol. 18, nos. 5 & 6. [<link>](#)
- Izquierdo, L.R., Olaru, D., Izquierdo S.S., Purchase, S. & Soutar, G.N. (2015). Fuzzy Logic for Social Simulation Using NetLogo. *Journal of Artificial Societies and Social Simulation*, vol. 18, no. 4 (1) [<link>](#)
- Izquierdo, L.R., Izquierdo S.S. & Vega-Redondo, F. (2014). Leave and let leave: A sufficient condition to explain the evolutionary emergence of cooperation. *Journal of Economic Dynamics & Control*, 46, pp. 91 - 113. [<link>](#)
- Almudí, I., Fatás-Villafranca, F. & Izquierdo, L.R. (2013). Industry dynamics, technological regimes and the role of demand. *Journal of Evolutionary Economics*, 23 (5), pp.1073-1098. [<link>](#)
- Izquierdo S.S. & Izquierdo L.R. (2013). Stochastic Approximation to Understand Simple Simulation Models. *Journal of Statistical Physics*. 151 (1-2), pp. 254 - 276. [<link>](#)
- Almudí, I., Fatás-Villafranca, F. & Izquierdo, L.R. (2012). Innovation, catch-up, and leadership in science-based industries. *Industrial and Corporate Change*. [<link>](#)
- Frenken, K., Izquierdo, L.R. & Zeppini, P. (2012). Branching innovation, recombinant innovation, and endogenous technological transitions. *Environmental Innovation and Societal Transitions*, 4, pp. 25–35. [<link>](#)
- Izquierdo, S. S. & Izquierdo, L. R. (2011). Strictly Dominated Strategies in the Replicator-Mutator Dynamics. *Games* 2(3) pp. 355-364. [<link>](#)
- Izquierdo, S.S., Izquierdo, L.R. & Vega-Redondo, F. (2010). The Option to Leave: Conditional Dissociation in the Evolution of Cooperation. *Journal of Theoretical Biology* 267(1) pp. 76–84. [<link>](#)
- Izquierdo, L.R. (2010). Book Review of "Complexity: A Guided Tour. Melanie Mitchell. (2009, New York: Oxford. University Press.)". *Artificial Life*. 16(3) pp.259-264. [<link>](#)
- Santos, J.I., Galán, J.M., Izquierdo, L.R. & Olmo, R. (2009). Aplicaciones de las TIC en el nuevo modelo de enseñanza de EEES. *Dirección y Organización*, no. 39, pp. 5-11. [<link>](#)
- Izquierdo, L.R., Izquierdo, S.S., Galán, J.M. & Santos, J.I. (2009). Techniques to Understand Computer Simulations: Markov Chain Analysis. *Journal of Artificial Societies and Social Simulation*, vol. 12, no. 1. [<link>](#).
- McAllister, R.R.J., Izquierdo L.R., Janssen, M.A. & Stafford Smith D.M. (2009). Research impact within the international arid literature: An Australian perspective based on network theory. *Journal of Arid Environments*, vol. 73, no. 9, pp. 862-871. [<link>](#)
- Galán, J.M., Izquierdo, L.R., Izquierdo, S.S., Santos, J.I., Olmo, R., López-Paredes, A. & Edmonds, B. (2009). Errors and Artefacts in Agent-Based Modelling. *Journal of Artificial Societies and Social Simulation*, vol. 12, no. 1. [<link>](#).
- Pascual, J.A., Galán, J.M., Izquierdo, L.R., Santos, J.I., Izquierdo, S.S., González, J. (2009). Una herramienta didáctica para la enseñanza de la teoría de juegos mediante internet. *EDUTEC, Revista Electrónica de Tecnología Educativa*, vol. 29. [<link>](#)
- Izquierdo, L.R., Galán, J.M., Santos, J.I. & Olmo, R. (2008). Modelado de sistemas complejos mediante simulación basada en agentes y mediante dinámica de sistemas. *Empiria. Revista de Metodología de Ciencias Sociales*, no. 16, pp. 85-112. [<link>](#)
- Smajgl, A., Izquierdo, L.R. & Huigen, M. (2008). Modeling Endogenous Rule Changes in an Institutional Context: the ADICO Sequence. *Advances in Complex Systems*, vol. 11, Issue 2, pp. 199–215. [<link>](#)
- Izquierdo, S.S., Izquierdo, L.R. & Gotts, N.M. (2008). Reinforcement Learning Dynamics in Social Dilemmas. *Journal of Artificial Societies and Social Simulation*, vol. 11, no. 2. [<link>](#)

- Izquierdo, L.R., Izquierdo, S.S., Gotts, N.M. & Polhill, J.G. (2007). Transient and asymptotic dynamics of reinforcement learning in games. *Games and Economic Behavior*, Volume 61, 2, pp. 259–276. <[link](#)>
- Izquierdo, S.S. & Izquierdo, L.R. (2007). The impact of quality uncertainty without asymmetric information on market efficiency. *Journal of Business Research*, Volume 60, Issue 8, pp. 858-867. <[link](#)>
- Izquierdo, S.S., Izquierdo, L.R. & Izquierdo, J.M. (2007). Publishing science in the digital age. The case of Neurocirugía. *Neurocirugía*, Volume 18, Issue 3, pp. 193-200. <[link](#)>
- Galán, J.M., Izquierdo, L.R., Izquierdo, S.S., López, A., Pascual, J.A., Posada, M., Santos, J.I. & Villafañez, F.A. (2007). Labexnet: un Laboratorio de Economía Experimental en Internet. *Revista Electrónica de Investigación y Evaluación Educativa*, Volume 13, Issue 1, pp. 105-125. <[link](#)>
- Izquierdo, L.R. & Polhill, J.G. (2006). Is your model susceptible to floating-point errors? *Journal of Artificial Societies and Social Simulation*, vol. 9, no. 4. <[link](#)>
- Polhill, J.G., Izquierdo, L.R., & Gotts N.M. (2006). What Every Agent-Based Modeller Should Know About Floating Point Arithmetic. *Environmental Modelling and Software*, 21 (3) pp. 283-309. <[link](#)>
- Galán, J.M. & Izquierdo, L.R. (2005). Appearances can be deceiving: lessons learned reimplementing Axelrod's "evolutionary approach to norms". *Journal of Artificial Societies and Social Simulation*, vol. 8, no. 3. <[link](#)>
- Polhill, J.G. & Izquierdo, L.R. (2005). Lessons learned from converting the Artificial Stock Market to interval arithmetic. *Journal of Artificial Societies and Social Simulation*, vol. 8, no. 2. <[link](#)>
- Polhill, J.G., Izquierdo, L.R., & Gotts N.M. (2005). The Ghost in the Model (and Other Effects of Floating Point Arithmetic). *Journal of Artificial Societies and Social Simulation*, vol. 8, no. 1 <[link](#)>.
- Izquierdo, L.R., Gotts, N.M. & Polhill, J.G. (2004). Case-Based Reasoning, Social Dilemmas, and a New Equilibrium Concept. *Journal of Artificial Societies and Social Simulation*, vol. 7, no. 3 <[link](#)>

OTHER PUBLICATIONS

- Izquierdo, L.R. (2017). NetLogo 6.0 Quick Guide. *Published at the official webpage of NetLogo*. <[link](#)>
- Izquierdo, S.S. & Izquierdo, L.R. (2015). The "Win-Continue, Lose-Reverse" rule in Cournot oligopolies: robustness of collusive outcomes. In Amblard, F., Miguel, F.J., Blanchet, A., Gaudou, B. (Eds.) *Advances in Artificial Economics. Lecture Notes in Economics and Mathematical Systems*, 676, pp 33-44. <[link](#)>
- Briz i Godino, I., Izquierdo, L.R., Álvarez, M., Caro, J., Galán, J.M., Santos, J.I., Zurro, D. (2014) Ethnoarchaeology of hunter-fisher-gatherers societies in the Beagle Channel (Tierra del Fuego): ethnographical sources and social simulation. *Revista de Arqueología Americana*, 32: 75-98.
- Izquierdo, L.R., Izquierdo, S.S., Galán, J.M. & Santos, J.I. (2013). Combining Mathematical and Simulation Approaches. In Edmonds, B. & Meyer, R. (ed.) *Simulating Social Complexity*, 235-272. Springer. <[link](#)>
- Galán, J.M., Izquierdo, L.R., Izquierdo, S.S., Santos, J.I., del Olmo, R. & López-Paredes, A. (2013). Checking Simulations: Detecting and avoiding errors and artefacts. In Edmonds, B. & Meyer, R. (ed.) *Simulating Social Complexity*, 95-116. Springer. <[link](#)>
- Izquierdo, L.R., Izquierdo, S.S. & Vega-Redondo, F. (2011). Learning and Evolutionary Game Theory. In N. M. Seel (ed.) *Encyclopedia of the Sciences of Learning*. ISBN: 978-1-4419-1427-9. Springer. <[link](#)>
- Izquierdo, L.R. & Izquierdo, S.S. (2011). Reinforcement Learning. In N. M. Seel (ed.) *Encyclopedia of the Sciences of Learning*. ISBN: 978-1-4419-1427-9. New York: Springer. <[link](#)>
- Izquierdo, L. R. (2010) *Advancing Learning and Evolutionary Game Theory with an Application to Social Dilemmas*. LAP Lambert Academic Publishing. ISBN: 978-3-8433-6133-0.
- Izquierdo, L.R. & Izquierdo, S.S. (2008). Dynamics of the Bush-Mosteller learning algorithm in 2x2 games. Chapter 11 in *Reinforcement Learning. Theory and Applications*, edited by Cornelius Weber, Mark Elshaw and Norbert Michael Mayer. I-Tech Education and Publishing, Vienna, Austria. ISBN: 978-3-902613-14-1.<[link](#)>
- Izquierdo, S.S. & Izquierdo, L.R. (2006). On the Structural Robustness of Evolutionary Models of Cooperation. *Lecture Notes in Computer Science* 4224, pp. 172-182. <[link](#)>
- Izquierdo, L.R. & Hanneman, R.A. (2006). Introduction to the Formal Analysis of Social Networks Using Mathematica. *Published in digital form at Wolfram Library*. <[link](#)>
- Izquierdo, L.R. & Gotts, N.M. (2005). The implications of case-based reasoning in strategic contexts. *Lecture Notes in Economics and Mathematical Systems* 564, pp. 163-174. <[link](#)>
- Izquierdo, S.S., Izquierdo, L.R., Galán, J.M. & Hernández, C. (2005). Market failure caused by quality uncertainty. *Lecture Notes in Economics and Mathematical Systems* 564, pp. 203-213. <[link](#)>

SELECTED CONFERENCE PAPERS

- Sandholm, W.H., Izquierdo, S.S. & **Izquierdo, L.R.** (2017). Best-experienced-payoff dynamics and cooperation in the centipede game. *3rd Annual Workshop on Complex Sociotechnical Systems*. 26th-28th April 2017, Madrid, Spain.
- Izquierdo, S.S., **Izquierdo, L.R.** & López-Pintado, D. (2017). To mix or not to mix? Diffusion and segregation in heterogeneous groups. *3rd Annual Workshop on Complex Sociotechnical Systems*. 26th-28th April 2017, Madrid, Spain.
- Izquierdo, L.R.** & Izquierdo, S.S. (2015). Artificial Economics: What, Why and How. *AE 2015 - 11th Artificial Economics Conference*. 3rd-4th September 2015, Porto, Portugal.
- Izquierdo, S.S. & **Izquierdo, L.R.** (2014). The "Win-Continue, Lose-Reverse" rule in Cournot oligopolies: robustness of collusive outcomes. *AE 2014 - 10th Artificial Economics Conference*. 2nd-3rd September 2014, Barcelona, Spain.
- Izquierdo, L.R.**, Izquierdo, S.S. & Vega-Redondo, F. (2013). Leave and let leave. A sufficient condition to explain the evolutionary emergence of cooperation. *CompleNet 2013. The 4th Workshop on Complex Networks*. 13th-15th March 2013, Berlin, Germany.
- Izquierdo, S.S., **Izquierdo, L.R.**, Vega-Redondo, F. & Weibull, J.W. (2009). To punish or leave? Conditional dissociation in the evolutionary emergence of cooperation. *Evolution of Cooperation - Models and Theories*. 15th-18th September 2009, Laxenburg, Austria.
- McAllister, R. & **Izquierdo, L.R.** (2007). Identifying fundamental principles to effectively shape social institutions in natural resource management. *8th Asia-Pacific Complex Systems Conference: Complex'07*. 2nd-5th July 2007, Gold Coast, Australia.
- Izquierdo, L.R.**, Izquierdo, S.S. & Gotts, N.M. (2007). Reinforcement Learning Dynamics in Social Dilemmas. *Proceedings of the Third International Model-to-Model Workshop, Marseille, France, 15th-16th March 2007*, pp. 82-101.
- Izquierdo, L.R.**, Izquierdo, S. S. & Polhill, J. G. (2006). EVO-2x2: a modelling framework to study the evolution of strategies in 2x2 symmetric games under various competing assumptions. *In Proceedings of the First World Congress on Social Simulation, Kyoto, Japan, Vol. 2*, pp. 273-280.
- Izquierdo, L.R.** & Galan, J.M. (2004). Appearances Can Be Deceiving: Lessons Learned Reimplementing Axelrod's "Evolutionary Approach to Norms". *European Social Simulation Association, 2nd Annual Conference*, Valladolid, Spain.

EDITORIAL AND REVIEWING WORK

- Member of the Editorial Board of *JASSS (Journal of Artificial Societies and Social Simulation)*.
- Member of the Scientific Committee of Artificial Economics 2015-2017, Conference on Complex Systems 2017, Winter Simulation Conference 2015, DRUID 2014-2016, World Congresses on Social Simulation (2006-2014), ESSA (European Social Simulation Association) Conferences 2009-2016, SIMULTECH 2013-2016, CompleNet 2013 and 2016, and II International Conference on Industrial Engineering and Industrial Management 2008.
- External Assessor of Paul Bell's PhD Thesis at the University of Queensland (Australia), and of Julia Poncela's PhD Thesis at the University of Zaragoza (Spain).
- Member of the Organising Committee of the II International Conference on Industrial Engineering and Management (2008) and web master of the conference website.
- Reviews conducted for: *Economic Theory, Journal of Business Research, American Political Science Review, Journal of Theoretical Biology, Physical Review E, Journal of Mathematical Psychology, Advances in Complex Systems, Artificial Life, Ecology and Society, Behavioural Processes, Environmental Modelling and Software, Simulation: Transactions of the Society for Modeling and Simulation, IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans*, and *International Environmental Agreements: Politics, Law and Economics*.

PREVIOUS PROFESSIONAL EXPERIENCE AND OTHER CONTRACTS

Consultant for Video-Game Company

- Employer: Contracted by **Valve Corporation**, Bellevue, Washington, USA. (May - June).
- Dates of appointment: May 2013 – June 2013.

Network Theorist and Agent-Based Simulation Modeller

- Employer: **CSIRO Sustainable Ecosystems**, Queensland Bioscience Precinct, 306 Carmody Road, St. Lucia, QLD 4067, Australia.
- Dates of appointment: May 2007 – August 2007.

Agent-Based Simulation Modeller (Postdoctoral position)

- Employer: **The Macaulay Institute**, Craigiebuckler, Aberdeen, AB15 8QH, UK.
- Dates of appointment: July 2002 – October 2006.

TEACHING ACTIVITY

- Responsible for teaching **University courses on Machine Learning, Finance, Introductory Economics, Microeconomics and Statistics** (both in Spanish and in English) during 12 academic years (2006-2018). *University of Burgos* (Spain). Level: Bachelor's.
- Responsible for teaching a **PhD course titled "Analysis of Complex Systems"** (2009-2012). *University of Burgos* (Spain). Level: Postgraduate.
- Invited by the **University of Valladolid** to run a 3-day workshop titled "*Introduction to Agent-based Modelling using NetLogo*". Soria (Spain), 9th-11th December 2015. Level: Postgraduate.
- Invited by the School of Business of the **University of Western Sydney** to run a 2-day workshop titled "*Introduction to Agent-based Modelling using NetLogo*". Sydney (Australia), 18th-19th November 2014. Level: Postgraduate.
- Invited teacher at the *ESSA Summer School in Social Simulation - 2014*, organised by the *European Social Simulation Association* and the **Universitat Autònoma de Barcelona**. Barcelona (Spain), 8th-12th September 2014. Level: Postgraduate.
- Invited teacher at the *Complexity Winter School 2012*, organised by the **Netherlands Organisation for Scientific Research** (NWO), Zandvoort (The Netherlands), 10th-14th December 2012. Level: Postgraduate.
- Invited teacher at the course *The economy as a complex evolving system: network theory, evolutionary models and computational tools*, organised by the **Network of Excellence DIMETIC**, Maastricht (The Netherlands), 11th-15th October 2010. Level: Postgraduate.
- Invited by the Geography Department and the Geoinformatics Training, Research, Education, and Extension (GeoTREE) Centre to run a 1-day seminar titled: "*Introduction to Agent-based Modelling using NetLogo 4.0*". **University of Northern Iowa**, Cedar Falls, USA, 2nd July 2008. Level: Postdoctoral.
- Invited teacher at the *Complex Systems Research Summer School 2007*, organised by the *Centre for Research in Complex Systems*, **Charles Sturt University**, Australia, 18th-30th November 2007. Level: Postgraduate.
- Invited instructor at the *8th Asia-Pacific Complex Systems Conference: Complex'07*. Gold Coast, Australia, 2nd-5th July 2007. Course imparted: "*Introduction to Agent-based Modelling using NetLogo*". Level: Postdoctoral.
- Invited teacher at the *Econo-socio-physics Research School 2007*, organised by the **University of Barcelona**, Barcelona, Spain, 12th-16th February 2007. Course imparted: "*Introduction to Agent-based Modelling*". Level: Postgraduate.

RECENT INVITED LECTURES

- Economics Department at the **University of Wisconsin-Madison** (Madison, USA). Juli Plant Grainger Theory Workshops Fall 2018. 5th October 2018.
- Economics Dept. at the **Universidad Pablo de Olavide** (Seville, Spain). 23rd January 2017.
- Economics Department at the **University of Wisconsin-Madison** (Madison, USA). Juli Plant Grainger Theory Workshops Fall 2016. 23rd September 2016.
- **Centre for Economic and International Studies** (University of Rome Tor Vergata, Italy). Riccardo Faini CEIS Seminars. 29th April 2016.
- Invited keynote speaker at Artificial Economics 2015 (Porto, Portugal). 4th September 2015.
- **Business School of the University of Western Australia** (Perth, Australia). Marketing Seminar Series. 5th November 2014.

- **School of Agricultural and Resource Economics of the University of Western Australia** (Perth, Australia). Seminar Series. 11th October 2013.
- **Business School of the University of Western Australia** (Perth, Australia). Marketing Seminar Series. 7th October 2013.
- Invited Speaker at the [4th Workshop on Complex Networks](#). 13th-15th March 2013, Berlin, Germany.
- **Valve Corporation** (Seattle, USA). 5th June 2012. Led to a 1-month contract as a consultant in June 2013.
- Center for Nonlinear Dynamics in Economics and Finance (CeNDEF) at **Amsterdam School of Economics** (Amsterdam, The Netherlands). Amsterdam School of Economics. 9th December 2011.
- **United Nations University** (Maastricht, The Netherlands). UNU-MERIT and MGSOG Joint Seminar Series. 15th September 2011.
- **SKEMA Business School** (Sophia-Antipolis, France). Economics Department. 2nd May 2011.
- Economics Department at the **University of Zaragoza** (Spain). 10th March 2011.
- **Institute for Biocomputation and Physics of Complex Systems (BIFI)** (Zaragoza, España). Seminar and Colloquia series. 13th May 2010.
- **Manchester Complexity Seminars** (Manchester Metropolitan Uni, UK). 16th June 2006.
- **Australian Research Council Centre for Complex Systems** (Brisbane, Australia). 11th May 2006.
- **University of Aberdeen's** MSc programme in E-Technology, e-Science and Grid Computing. Feb. 2006.

COMPUTING SKILLS

- Programming Languages with high expertise: Mathematica (see several demonstrations [here](#)) and Netlogo (see several models [here](#)). Basic knowledge of Matlab, HTML, CSS and Javascript. Github page: <https://github.com/luis-r-izquierdo>. All my models can be downloaded at <https://luis-r-izquierdo.github.io>.
- Excellent operational knowledge of Microsoft Office products, especially Word, Excel and Power Point. Operating Systems: Mac OS, Windows, MS-DOS, and some UNIX.

AWARDS

- **Distinguished PhD Thesis** at the EDAMBA [Thesis Competition](#) 2009 (EDAMBA: European Doctoral Programmes Association in Management and Business Administration).
- Third Prize in the Student Contest at the First World Congress on Social Simulation, Kyoto, Japan, 2006.
- Award granted by the European Social Simulation Association to attend the First World Congress on Social Simulation, Kyoto, Japan, August 2006.
- Award for best presentation. Postgraduate Student Seminar Day. Macaulay Institute (UK), 9th March 2006.
- Award for the best student's record in Industrial Engineering (2002). University of Valladolid (Spain).

COURSES AND PROGRAMMES

- Recent MOOC Courses: "Front-End JavaScript Frameworks: AngularJS" (2016, *The Hong Kong University of Science and Technology*), "Web Application Development with JavaScript and MongoDB" (2016, *University of London*), "Introduction to Meteor.js Development" (2016, *University of London*), "Front-End Web UI Frameworks and Tools" (2015, *The Hong Kong University of Science and Technology*), "HTML, CSS and JavaScript" (2015, *The Hong Kong University of Science and Technology*), "Machine Learning" (2014, *Stanford University*), "Statistical Learning" (2014, *Stanford University*), "The Data Scientist's Toolbox" (2014, *Johns Hopkins University*), and "Economics of Money and Banking" (2013, *Columbia University*). Total: More than 1 year.
- Advanced Mathematica Summer School 2008. Wolfram Research, Champaign-Urbana, USA. (2 weeks).
- Teaching Introductory Economics. Open University (Spain). 2008. (120 hours).
- Santa Fe Complex Systems Summer School 2005. Santa Fe Institute, New Mexico, USA. (4 weeks).
- COSI Summer School on "Complexity in Social Science". 2003. Baeza, Spain. (1 week).
- Summer Programme in History, Politics and Society 1997. University of Oxford. (3 weeks).