

# PABLO LOZANO

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## EDUCATION

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Universidad Carlos III de Madrid, **Ph.D. in Applied Mathematics** *Sept. 2018 - Present*

Awards: Full scholarship.

Research interests: Complex Systems, Evolutionary Game Theory, Behavioral Economics, Computational Social Systems, Agent-Based Modelling, Reinforcement Learning.

References: Ángel Sánchez (anxo@math.uc3m.es), Alberto Antonioni (alberto.antonioni@gmail.com).

Universidad Carlos III de Madrid, **M.S. in Mathematical Engineering** *Sept. 2016 - Aug. 2018*

Awards: Full scholarship.

Dissertation: Formation models of hierarchical societies.

Modules included: Numerical Methods, Game Theory, Multivariate Statistics, Stochastic Differential Equations, Simulation, Dynamical Systems, Mathematical Biology.

Universidad Carlos III de Madrid, **BSc in Industrial Engineering** *Sept. 2012 - Jun. 2016*

Minor in Electronics and Robotics.

Dissertation: Models for cooperation in dynamical networks with unreliable reputation.

Modules included: Control Theory, Algorithms, Software Engineering, Object-Oriented Programming, Computer Systems Modelling, Robotics, Power and Analog Electronics.

## WORK EXPERIENCE

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**PhD candidate** *Sept. 2018 - Present*

*Mathematics Department, Universidad Carlos III de Madrid*

Including teaching assistant duties at different levels. *Undergraduate level*: Linear Algebra to Biomedical Engineering, Industrial Engineering, Telecommunications Engineering, and Data Science and Computation Engineering degrees. *Other*: Introduction to programming with Python and MATLAB.

**Member** *Sept. 2016 - Present*

*GISC & UMICCS*

*Member of the Interdisciplinary Group in Complex Systems (GISC in Spanish) and of the Mixed Unit for Complexity and Social Sciences (UMMICS in Spanish).*

*GISC's twitter account community manager (@gisc\_group) since Jan. 2020.*

*Bi-weekly seminar organizer for GISC group at Universidad Carlos III de Madrid (2019-2021).*

**Lead teacher** *2020 - Present*

*Ironhack bootcamp*

*Teaching course on Machine Learning, Data Science and Analytics using Python and related frameworks.*

**Visiting scholar** *Jan. 2019 - Jun. 2019*

*EEB Department, University of Tennessee Knoxville*

*Research stay at Dr. Sergey Gavrilets' lab in the Ecology and Evolutionary Biology (EEB) department at UTK. Development of a model involving social norms within hierarchical societies.*

**Teaching assistant** *Sept. 2016 - Aug. 2018*

*Mathematics Department, Universidad Carlos III de Madrid*

*Undergraduate level*: Calculus I and II, for Energy Systems Engineering and Electrical Engineering.

**Laboratory technician**

Sept. 2015 - Dec. 2015

*Electronics Department, UC3M*

Intern as Laboratory Technician, in charge of manufacturing *ad-hoc* systems, and repairing circuits and PCBs, using professional (OrCAD) and free software (EAGLE).

**Industrial Systems Engineering**

Jun. 2015 - Sept. 2015

*Profit Innova*

Designing, manufacturing and calibration of a metal-cloth characterization system. Industrial systems tasks, maintaining internal network, CRM and sales programs.

**PUBLICATIONS**

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**Reinforcement learning to understand cooperation and unreliable reputation evolution in dynamic networks.**

Expected Early 2022

*Pablo Lozano, & Angel Sánchez.**Work in progress.***Climate change forces uncertain cooperation: an experiment**

Expected Late 2021

*Pablo Lozano, Alberto Antonioni & Angel Sánchez.**Work in progress.***Empirical evidence of verbal priming increasing cooperation**

Expected Mid 2021

*Pablo Lozano, Alberto Antonioni, Francesca Giardini,**Rafael Wittek & Siegwart Lindenber.**Work in progress.***Hierarchies and social norms: an experimental approach**

Expected Mid 2021

*Pablo Lozano, Alberto Antonioni & Angel Sánchez.**Under review.***Cooperation, social norms, and hierarchical societies**

Sep. 2020

*Pablo Lozano, Sergey Gavrilets & Angel Sánchez.**Scientific Reports 10, Article number: 15359.***Shall we turn off the media? Global information can destroy local cooperation in the one-dimensional ring**

Jun. 2019

*B. Aydin, M. Biondo, D. Gupta, M. Ivaldi, F. Lipari, Pablo Lozano, F. Parino,**E. Bilancini, L. Boncinelli, V. Capraro.**arXiv:1906.09133.***Cooperation on dynamic networks within an uncertain reputation environment**

Jun. 2018

*Pablo Lozano, Alberto Antonioni, Marco Tomassini & Angel Sánchez.**Scientific Reports 8, Article number: 9093.***CONTRIBUTIONS**

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**Reinforcement learning for cooperational dynamics in uncertain reputation networks**

Jul. 2021

*Carlos Hernández Hernández bachelor's thesis. Grade: 10.**Co-supervised with Anxo Sánchez.***An experimental approach to hierarchies: high ranked individuals exploit low ranked ones but act altruistically**

Oct. 2021

*Talk at 2021 Conference on Complex Systems (CCS).*

<b>SFI Complexity Interactive</b> <i>Summer school at Santa Institute, New Mexico (USA).</i>	<i>Jun.-Jul 2021</i>
<b>Hierarchies and cooperation: an experiment</b> <i>Talk at FisEs Joven 2021.</i>	<i>May 2021</i>
<b>Cooperation, social norm internalization, and hierarchical societies</b> <i>Talk at 8<sup>th</sup> Computational Social Science (CSS) Satellite event at the Conference on Complex Systems (CCS).</i>	<i>Dec. 2020</i>
<b>Hierarchies can arise spontaneously in egalitarian societies</b> <i>Poster at 5<sup>th</sup> International Conference in Computational Social Science (IC<sup>2</sup>S<sup>2</sup>).</i>	<i>Jul. 2019</i>
<b>Complexity 72 Hours</b> <i>Part of Ennio Bilancini's group researching on social physics. Derived from the three-day research event, there's a <u>pre-print</u> in arXiv.</i>	<i>Jun. 2019</i>
<b>SEEHB meeting</b> <i>Participant in the second edition of the Southern Eastern Evolutionary and Human Behavior meeting at Georgia State University, Georgia (Atlanta).</i>	<i>Apr. 2019</i>
<b>European Night of the Researchers</b> <i>Communication post: "Genre and technology: EU projects about Big Data."</i>	<i>Nov. 2018</i>
<b>Cine: críticas, ingresos y correlaciones</b> <i>Communication post at Periódico Expansión.</i>	<i>Dec. 2016</i>

## TEACHING

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### Second semester, course 20/21

Programming master class in experimental design for behavioral economics with oTree, Django, and Python. Aimed for Master in Economics Analysis students, part of the Economics PhD program.

### Course 20/21

Linear Algebra for Telecommunications Engineering, and Industrial Engineering.

### Course 19/20

Linear Algebra for Industrial Engineering, Telecommunications Engineering, and Data Science Engineering.

### Course 17/18

Calculus in one variable for Energy Systems Engineering, and Electrical Engineering degrees.

## LANGUAGES

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**Spanish:** native, **English:** professional/academic, **French:** intermediate/fluent, **German:** basic, **Italian:** basic, **Russian:** basic (self-taught).

## EXTRA-CURRICULAR

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Webmaster for Mathematics Department website at Universidad Carlos III de Madrid (2019-2021).

Linux sysadmin for Mathematics Department at Universidad Carlos III de Madrid (2019-2021).

Ph.D. student representative at Universidad Carlos III de Madrid (2016-2020).

Multiple hackathon winner: *IBM hackaton* at IE (2017), *Tech-Fest* (2018).

## TECHNICAL SKILLS

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<b>Programming</b>	Python (> 8 years), C (> 4y), R (> 4y), Scala (~ 2y), MATLAB (~ 2y), Haskell, Lisp, Javascript (all ~ 1y).
<b>Data analysis &amp; Machine Learning</b>	Numpy, Pandas, Plotly, Matplotlib and Seaborn, PostgreSQL, ML modeling with TensorFlow, Scikit, Keras, PyTorch.
<b>Web development</b>	<u>Full-stack</u> : Frontend with HTML, CSS/SASS, Javascript, Angular, and React; with Django, Flask backends.
<b>Frameworks &amp; practices</b>	Experimental design and data analysis using oTree software for behavioral economics experiments. Functional programming and object-oriented programming (> 6y). Agent-based modeling expertise: Python, MESA, NetLogo (> 6y). Git, Scrum, Agile.
<b>General software</b>	Linux administration certification (Udemy UC-9ORNNZ0Q). Experienced in BSD, GNU/Linux, OSX, and Windows systems.
<b>Writing &amp; editing</b>	Reviewer for Nature Scientific Reports, PLOS One, and IOP Science scientific journals. Stanford course <i>Writing in the Sciences</i> (Coursera W3NFWV7D7M9Y) <i>Software</i> : Latex, Scrively and Office suite.
<b>Engineering and desing</b>	Ansys, Catia and SolidEdge (~ 2y).