Curriculum Vitae – Roi Naveiro

Personal
Information

Roi Naveiro
GitHub: https://github.com/roinaveiro/
Website: https://roinaveiro.github.io/
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ORCID: https://orcid.org/0000-0001-9032-2465

Research
Interests

Bayesian statistics, probabilistic Machine Learning, Adversarial Machine Learning. Applications in molecular design, materials discovery and risk analysis.

Education

2016–2020 **PhD, *Cum Laude* and *International* distinctions**
Advisors: David Ríos Insua (ICMAT - Institute of Mathematical Sciences from the Spanish Research Council, CSIC and Spanish Academy of Sciences) and David Gómez-Ullate Oteiza (University of Cádiz & Complutense University of Madrid).
PhD program: *Mathematical Engineering, Statistics and Operational Research*, Complutense University of Madrid, Madrid, España.
Thesis title: *Contributions to the Security of Machine Learning.*

2015–2016 **Masters degree in theoretical physics**
Complutense University of Madrid, Madrid, España.
Thesis advisor: David Gómez-Ullate Oteiza (University of Cádiz & Complutense University of Madrid).
Thesis title: *Fraud Detection in Electronic Payments.*

2011–2015 **Bachelor degree in physics**
University of Salamanca, Salamanca, Spain.
Thesis advisor: David Rodríguez Entem (University of Salamanca).
Thesis title: *Resolution of the Nucleon-Nucleon scattering problem using the N/D method.*

Job experiences

2022 September
Ternure Track position at CUNEF Unoversity Madrid, Spain.

2021 January – 2022 August
Posdoctoral position at the Institute of Mathematical Sciences from the Spa-

nish Research Council (ICMAT-CSIC), Madrid, Spain.

2021 January – present
Scientific advisor and member of AItenea Biotech (spin-off from the Spanish National Research Council). https://aitenea.com/.

2016 October– 2020 October
PhD student in the Statistics, Probability and Operations Research group at the Institute of Mathematical Sciences (ICMAT-CSIC), Madrid, Spain.

2019 September – 2020 May
Co-founder of Komorebi AI Technologies, an AI start-up. https://komorebi.ai/.

2015 June – September 2015
Research assistant at the Astrophysical Institute of the Canary Islands (IAC), Tenerife, Canary Islands, Spain.
Working for the project *Searching for star clusters in the dwarf irregular galaxy IC1613*.

2014 September – 2015 June
Research assistant at the Institute of Fundamental Physics and Mathematics (IUFFyM), Salamanca, Spain.
Working for the project *Resolution of Nucleon-Nucleon scattering with the N/D method*.

RESEARCH STAYS IN
NATIONAL AND
INTERNATIONAL
CENTERS

2019 July – 2019 December
Research stay at the Statistical and Applied Mathematical Sciences Institute (SAMSI) and the department of Statistical Science of Duke University, Durham, North Carolina, USA.
Working in research programs on Deep Learning and Games, Decisions, Risk and Reliability.

2019 January
Research stay at University of Cádiz, Cádiz, Spain.

2018 August – 2018 December
Research stay at the department of Statistical Science of Duke University, Durham, North Carolina, USA.
Working with Professor David L. Banks.

Julio 2019

Funding for research stay at the *Statistical and Applied Mathematical Sciences Institute* (SAMSI) and the department of statistical Science of *Duke University*, Durham, Carolina del Norte, EEUU.
Awarded by the *Statistical and Applied Mathematical Sciences Institute.*

2018 September

Short term research scholarship for a research stay at Duke University, Durham, North Carolina, USA.
Awarded by the Spanish Ministry of Education.

2016 June

FPU scholarship for PhD studies.
Awarded by the Spanish Ministry of Education.

2015 May

Research scholarship for a research stay at the Astrophysical Institute of the Canary Island (IAC), Tenerife, Spain.
Awarded by the Astrophysical Institute of the Canary Island.

2014 October

Research scholarship for a research stay at the Institute of Fundamental Physics and Mathematics (IUFFyM), Salamanca, Spain.
Awarded by the Spanish Ministry of Education.

Augmented probability simulation for adversarial risk analysis in general security games (2022). **Naveiro, R.**, Insua, D. R., & Camacho, J. M. *International Defense and Homeland Security Simulation Worskhop*. I3M (To appear).

Augmented Probability Simulation Methods for Sequential Games (2022). Ekin, T., **Naveiro, R.**, Insua, D. R., & Torres-Barrán, A. *European Journal of Operational Research*, 49(3), 100768. https://doi.org/10.1016/j.ejor.2022.06.042

Evaluation of female sexual health in routine gynaecological practice (2022). Fuentes, M. N., Villena, R. B., **Naveiro, R.**, Sánchez, M. H., Roca, L. C., & Parra, J. F. *Clínica e Investigación en Ginecología y Obstetricia*, 49(3), 100768. https://doi.org/10.1016/j.gine.2022.100768

Artificial Intelligence in Tribology: Design of new dispersants using artificial intelligence tools (2022). Campillo, N., Talavante, P., Ponzoni, I., Soto, A.,

Martínez, M. J., **Naveiro, R.**, et. al. *In 23rd International Colloquium Tribology: Industrial and Automotive Lubrication (p. 423). expert verlag.*

Managing Driving Modes in Automated Driving Systems (2022). Ríos Insua, D., Caballero, W., & **Naveiro, R.** *Transportation Science.* https://doi.org/10.1287/trsc.2021.1110

Modeling Ethical and Operational Preferences in Automated Driving Systems (2022). Caballero, W., & **Naveiro, R.** & Ríos Insua, D. *Decision Analysis.* https://doi.org/10.1287/deca.2021.0441

Towards Acceptance of Automated Driving Systems (2021). Jamson, S. L., Risvas, K., **Naveiro, R.**, et. al. *Proceedings of the 5th International Conference on Computer-Human Interaction Research and Applications (CHIRA 2021).* 232–239. https://www.scitepress.org/Papers/2021/107213/107213.pdf.

Challenge 8: Smart Cybersecurity (2021). Arroyo Guardeño, D., Brox Jiménez, P., Godoy, J. A., Villagra, J., Mueller, H., Gallego, V., Kosgodagan, A., **Naveiro, R.**, et. al. *White Papers. CSIC Scientific Challenges: Towards 2030, vol. 11.* http://libros.csic.es/product_info.php?products_id=1493.

Adversarial attacks against Bayesian forecasting dynamic models (2021). **Naveiro, R.** *Proceedings of the 22nd European Young Statisticians Meetings (EYSM 2021).* https://www.eysm2021.panteion.gr/publications.html

AI in drug development: a multidisciplinary perspective (2021). Gallego, V., **Naveiro, R.**, Roca, C. et al. *Molecular Diversity.* https://doi.org/10.1007/s11030-021-10266-8

Perspectives on Adversarial Classification (2020). Ríos Insua, D., **Naveiro, R.**, & Gallego, V. *Mathematics*, 8(11):1957. https://doi.org/10.3390/math8111957

Adversarial Risk Analysis (Overview) (2020). Banks, D., Gallego, V., **Naveiro, R.**, & Ríos Insua, D. *WIREs Comput Stat*, e1530. https://doi.org/10.1002/wics.1530

Hydroxicloroquine for pre-exposure prophylaxis for SARS-CoV-2 (2020). Lopez de la Iglesia, J., Cubelos, N., **Naveiro, R.**, et. al. *Current Trends in Medicine.* https://doi.org/10.47726/ctm.1003

Adversarial Classification: An adversarial Risk Analysis approach (2019). **Naveiro, R.**, Redondo, A., Insua, D. R., & Ruggeri, F. *International Journal of Approximate Reasoning*, 113: 133–148. https://doi.org/10.1016/

j.ijar.2019.07.003

Large Scale Automated Forecasting for Monitoring Network Safety and Security (2019). **Naveiro, R.**, Rodríguez, S., & Ríos Insua, D. *Applied Stochastic Models in Business and Industry*, 35: 431–447. https://doi.org/10.1002/asmb.2436

Gradient Methods for Solving Stackelberg Games (2019). **Naveiro, R.**, & Ríos Insua, D. In: Pekeč S., Venable K.B. (eds) Algorithmic Decision Theory. ADT 2019. *Lecture Notes in Computer Science*, 11834: 126–140. Springer, Cham. https://link.springer.com/chapter/10.1007/978-3-030-31489-7_9

Reinforcement Learning under Threats. (2019). Gallego, V., **Naveiro, R.**, & Ríos Insua, D. *Proceedings of the AAAI Conference on Artificial Intelligence*, 33(01): 9939-9940. https://doi.org/10.1609/aaai.v33i01.33019939

BOOKS AND MONOGRAPHS

¿Qué sabemos de Análisis de Riesgos? (2022). Ríos Insua D. & **Naveiro R.**. *CSIC-La Catarata*. ISBN: 978-84-1352-458-0 .

SUBMITTED PAPERS

Poisoning Hidden-Markov-Model Inferences on Batch Data (2022). Camacho, J. M., Caballero, W., Ekin, T., & **Naveiro, R.**

Deep learning for novel drug development (2022). **Naveiro, R.**, Jimena, M., Soto, A., Ponzoni, I., Ríos Insua, D., & Campillo, N.

Design of new dispersants using machine learning and visual analytics (2022). Jimena, M., **Naveiro, R.** et. al.

Adversarial Machine Learning: Perspectives from Adversarial Risk Analysis (2021). Ríos Insua, D., **Naveiro, R.**, Gallego, V., & Poulos, J. *arXiv preprint arXiv:2003.03546* .

Protecting Classifiers from Attacks. A Bayesian Approach (2021). Gallego, V., **Naveiro, R.**, Redondo, A., Ríos Insua, D., & Ruggeri, F. *arXiv preprint arXiv:2004.08705* .

Data Sharing Games (2020). Gallego, V., **Naveiro, R.**, Ríos Insua, D., & Rozas W. *arXiv preprint arXiv:2101.10721* .

Opponent Aware Reinforcenment Learning (2019). Gallego, V., **Naveiro, R.**, & Ríos Insua, D. *arXiv preprint arXiv:1809.01560.*

DISSEMINATION
ARTICLES

Las matemáticas de las máquinas morales (2021). Ríos Insua, D., & **Naveiro, R.**. Café y Teoremas, El País. https://elpais.com/ciencia/cafe-y-teoremas/2021-11-26/las-matematicas-de-las-maquinas-morales.html

Que no te den gato por liebre... ¿o sí? (2019). Gallego, V., Gordo, D. & **Naveiro, R.**. Café y Teoremas, El País(spanish main newspaper). https://elpais.com/elpais/2019/05/29/ciencia/1559146396_616900.html

¿Cómo se ha convertido Matemáticas en la carrera universitaria más popular? (2018). Capel, A., Ocariz, J., **Naveiro, R.,** Contreras, P. Café y Teoremas, El País (spanish main newspaper). https://elpais.com/elpais/2018/06/25/ciencia/1529923839_750611.html?rel=mas

TEACHING
EXPERIENCE

2021 June − 2021 July
Course on Bayesian Methods in Artificial Intelligence for last year undergraduate students and master students.
Institute of Mathematical Sciences, Madrid, Spain.
Lecture notes at: https://roinaveiro.github.io/curso-Bayes-JAE/
Available at YouTube: https://www.youtube.com/watch?v=5M4BGyxg3_g

2021 June − 2021 July
Course on Machine learning: Foundations, Computations and Applications for last year undergraduate students and master students.
Institute of Mathematical Sciences, Madrid, Spain.
Lecture notes at: https://roinaveiro.github.io/curso-ml-JAE/
Available at YouTube: https://www.youtube.com/watch?v=2dP_tCaCbhk

2020 September − 2021 February
Teaching Assistant of Probability for undergraduate students in the second year of the degree in Mathematics.
Complutense University of Madrid, Spain.

2020 February − 2020 June
Lecturer of Applications of Stochastic Processes for undergraduate students in the last year of the degree in Mathematics.
Complutense University of Madrid, Madrid, Spain.
Lecture notes available at: https://roinaveiro.github.io/files/apres.pdf

2019 February − 2019 May
Course on Machine Learning with R targeted to researchers from the Instituto Nacional de Estadística (National Statistical Institute).
INE, Madrid, Spain.
Lecture notes at: https://github.com/roinaveiro/curso-ml-R

2019 February → 2019 May
Lecturer of Applications of Stochastic Processes for undergraduate students in the last year of the degree in Mathematics.
Complutense University of Madrid, Madrid, Spain.
Lecture notes available at: https://roinaveiro.github.io/files/apres.pdf

2018 June
Teaching assistant in the XII Modelling Week for master students of the *Master in Mathematical Engineering*.
Complutense University of Madrid, Madrid, Spain.

2017 November → 2017 December
Courses on Python and Data Science at *Dirección General de Ordenación del Juego (DGOJ)*.
DGOJ, Ministry of Finance, Madrid, Spain.

MASTER'S AND
UNDERGRADUATE
THESIS SUPERVISED

2022 February − present
Bayesian Methods in Molecular Design.
Student: Gustavo Rodríguez Rodríguez. (Awarded with JAE Intro scolarship by the National Research Council.)
MSc on Statistical and Computational Treatment of Information.
Complutense University of Madrid, Madrid, Spain.

2022 February − 2022 July
Models for conflict management in heteregeneous traffic situations.
Student: Eduardo Arrabal López.
BSc on Mathematics.
Complutense University of Madrid, Madrid, Spain.

2020 September − 2021 July
Latent Dirichlet Allocation Models to characterize users in social networks.
Student: Montserrat Muñoz.
MSc on Statistical and Computational Treatment of Information.
Complutense University of Madrid, Madrid, Spain.

TRANSFERENCE AND
RESEARCH PROJECTS

June 2022 − November 2022
TECA Project.
Industrial Partner: DISID CORPORATION.
Grant: 21,945.6 €.

Role: **Co - Principal Investigator**.

January 2021 − December 2021
Machine Learning for dispersants discovery.
Industrial Partners: AItenea Biotech and Repsol.
Grant: 10,000 €.
Role: **Principal Investigator**.

March 2021 − October 2021
Adversarial Risk Analysis for competitive decision making.
Industrial Partners: EVERIS Spain SLU y CaixaBank.
Grant: 60,000 €.
Role: **Principal Investigator**.

April 2020 − April 2022
Adversarial Machine Learning: Methods, Computations and Applications to
Malware, Fake News and Autonomous Vehicles.
Funding Entity: BBVA Foundation.
Grant: 100,000 €.
Role: Researcher.

May 2019 − July 2022
TRUSTONOMY. Building acceptance and trust in autonomous mobility.
Program: Horizon 2020: Smart, Green and Integrated Transport.
Reference: No. 815003. European Commission.
Total Grant: 3,920,000 €.
Grant for ICMAT-CSIC: 206,500 €.
Role: Researcher.

September 2014 − August 2022
Adversarial Risk Analysis.
Funding Entity: AXA RESEARCH FUND. Grant: 1,176,000 €.
Role: Researcher.

September 2019 − September 2021
Content Recommender Based on a User's Digital Profile.
Industrial Partner: XEERPA MARKETING SOLUTIONS, SL. Grant: 90,750
€.
Role: Researcher.

January 2018 − December 2021
Advances in Risk Analysis for Security.
Funding Entity: MICINN. Spanish Ministry of Science, Innovation and Universities.
Reference: MTM2017-86875-C3-1-R.
Grant: 32,186 €.
Role: Researcher.

October 2018 – December 2018

Innovative platform for Proximity Marketing and Payments at the Point of Sale, based on Bluetooth LE technology, which communicates with the user in a personalized way, in real time, in the right moment of the purchase decision and in the right place.
Industrial Partner: SIEM, Software & Security Services, SL Grant: 30,000 €. Role: Researcher.

May 2017 – April 2019

Explora JUDIES: Stochastic Differential Games: Breaking Fifty Years of the Paradigm.
Funding Entity: MICINN. Spanish Ministry of Science, Innovation and Universities.
Reference: MTM2015-72907-EXP.
Grant: 25,000 €.
Role: Researcher.

January 2017 – July 2017

Cyber-risks evaluation.
Industrial Partner: LEAP IN VALUE, SL. Grant: 31,127.25 €.
Role: Researcher.

SEMINARS, NATIONAL AND INTERNATIONAL CONFERENCES

Invited Speaker

July 6th 2022

EURO Conference. *Scalable methods for solving games in Adversarial Machine Learning.* Helsinki, Finland.

June 24th 2022

Advances in Decision Analysis Conference. *Decision Analytic Support in Non-Cooperative Sequential Games.* Arlington, Virginia, USA.

June 9th 2022

Spanish Society of Statistics and Operations Research National Congress. *An application of Bayesian methods in materials discovery.* Granada, Spain.

Abril 25th 2022

Young Online Seminar Series Machine Learning NeEDS Mathematical Optimization. *Adversarial attacks against Bayesian dynamic forecasting systems.*

Marzo 31st 2022

Texas State University. *Adversarial Machine Learning.* Texas State University, San Marco, Texas, USA.

March 22nd 2022

Workshop: The Mathematics of Living Matter. Life-Hub CSIC. *Machine Learning for Molecular Design.* ICMAT-CSIC. Madrid, Spain.

January 22nd 2022

Indoamérica Technological University. *Adversarial Machine Learning: Bayesian perspectives*. Indoamérica Technological University, Quito, Ecuador.

November 1st 2021

IMI-DSC Conference: Decision, Optimization and Data Science. *Adversarial Machine Learning: a probabilistic approach*. Complutense University of Madird. Madrid , España.

September 7th 2021

22nd European Young Statisticians Meeting EYSM 2021. *Protecting classifiers from attacks*. Bernoulli Society for Mathematical Statisctics and Probability. Athens, Greece.

July 7th 2021

WEBINAR on Applications of Artificial Intelligence in the discovery of intelligent materials and in the improvement of processes in the chemical industry. *Artificial Intelligence in Lubricant Design*. PET MSO-ED, SusChem-España y Materplat.

May 28th 2021

Twelfth Workshop on Bayesian Inference in Stochastic Processes. *Bayesian forecasting dynamic models under attacks*. **Discussant: Professor Mike West.**
CNR-IMATI, Milano, Italia.

November 1st 2019

The Institute for Integrating Statistics in Decision Sciences. Department of Decision Sciences. The George Washington University. *Security Games in the New Paradigm: Solution Techniques*. The George Washington University, Washington D.C., USA.

June 13th 2019

Eleventh Workshop on Bayesian Inference in Stochastic Processes. *Reinforcement Learning Under Threats*. Royal Academy of Sciences, Madrid, España.

Speaker

November 10th 2021

New Bridges between Mathematics and Data Science. *Augmented probability simulation for optimization in adversarial machine learning*. Spanish Network of Industrial Mathematics (Math-In) and University of Valladolid. Valladolid, España.

September 2nd 2021

4th International Congress on Transportation Research ICTR 2021. *Towards ethical decision support in automated driving systems*. Hellenic Institute of Transportation Engineers. Rodhes, Greece.

July 14th 2021

63rd ISI World Statistics Congress, *Managing driving modes in Automated Driving Systems*. International Statistical Institute (ISI).

June 9th 2021

2021 Workshop of the Spanish Society of Statistics and Operations Research *Protecting Classifiers From Attacks.*

October 26th 2019

Algorithmic Decision Theory. *Gradient Methods for Solving Stackelberg Games.* Duke Fuqua School of Business. Duke University, Durham, NC, USA.

August 6th 2019

Games, Decisions, Risk and Reliability Opening Workshop. *Augmented Probability Simulation Methods for Non-cooperative Games* (poster). Statistical and Applied Mathematical Sciences Institute. NC State University, Raleigh, NC, USA.

30 Julio 2019

Second Conference on Risk Analysis in the Digital Era. *Augmented Probability Simulation Methods for Non-cooperative Games* (poster). Society for Risk Analysis. University at Buffalo. Buffalo, NY, USA.

Spanish Society of Statistics and Operations Research

30 Mayo 2018

XXXVII Spanish Society of Statistics and Operations Research National Congress. *Adversarial Classification: An Adversarial Risk Analysis approach.* SEIO. Oviedo, Spain.

November 14th 2017

1st Spanish Young Statisticians and Operational Researchers Meeting (SYSORM). *Adversarial Classification: An Adversarial Risk Analysis approach.* Spanish Society of Statistics and Operations Research y University of Granada. Granada, Spain.

June 14th 2017

Bayesian Inference in Stochastic Processes (BISP10). *Monitoring for anomalous behaviour in massive traffic time series.* Bocconi University and International Society for Bayesian Analysis (ISBA). Milano, Italy.

June 8th 2017

Games and Decisions in Risk and Reliability Conference (GDRR). *Fraud detection in electronic payments.* Royal Academy of Sciences. Madrid, Spain.

October 27th 2016

Mathematical Solutions for Industry: Success Stories and perspectives. *Random Forest Algorithm in Fraud Detection* (poster). Institute of Mathematical Sciences (ICMAT-CSIC) y Spanish Network of Industrial Mathematics (Math-In). Madrid, Spain.

SUMMER SCHOOLS

July 23rd 2018 − July 27th 2018

2nd International Summer School on Deep Learning. University of Genoa and IRDTA - Brussels/London. Genoa, Italy.

September 4th 2017 − September 6th 2017

*Accelerating Data Science with HPC.*CSCS-ICS-DADSi. Lugano, Switzerland.

January 16th 2017 − January 20th 2017
   Memory School. Centre de Recerca Matematica. Barcelona, Spain.

November 3rd 2021 − November 5th 2021
   PhD Day organizer at the 7th International Conference on Algorithmic Decision Theory. University of Toulouse 1 Capitole. https://www.irit.fr/ADT2021/. Toulouse, France.

December 1st 2020 − December 4th 2020
   3rd BYMAT Conference: Bringing Young Mathematicians Together. University of Valencia. BYMAT Network and BBVA Foundation. https://bymat.webs.upv.es/index/ Valencia, Spain.

June 12th 2019 → June 14th 2019
   11th Workshop on Bayesian Inference in Stochastic Processes. Royal Academy of Sciences, Madrid, Spain.

May 20th 2019 − May 24th 2019
   2nd BYMAT Conference: Bringing Young Mathematicians Together. Institute of Mathematical Sciences ICMAT-CSIC. *BYMAT Network and BBVA Foundation.* https://www.icmat.es/congresos/2019/BYMAT/. Madrid, Spain.

May 7th 2018 − May 9th 2018
   Co-Founder of 1st BYMAT Conference: Bringing Young Mathematicians Together. Institute of Mathematical Sciences ICMAT-CSIC. *BYMAT Network and BBVA Foundation.* https://www.icmat.es/congresos/2018/BYMAT/ Madrid, Spain.

June 7th 2017 − June 9th 2017
   5th symposium on Games and Decisions in Reliability and Risk. Royal Academy of Sciences. Madrid. Spain.

May 15th 2017 − May 19th 2017
   Participant in the European Study Group with Industry: *ESGI 131.* Challenge: *Big Data in Sports: Predictive Models for Basketball Player's Performance.* Basque Centre for Applied Mathematics (BCAM) and Spanish Network of Industrial Mathematics (Math-In). Bilbao, Spain.

Programming languages
Python (PyTorch for deep learning), R and Bash.

Scripting and markup languages
R Markdown, LaTeX and Microsoft Office.

Operating systems
Advanced experience with most flavours of Linux.

Cluster Management System
Sun Grid Engine.

Databases
MongoDB.