

# Adrián Arnaiz Rodríguez

Phone upon email request  
Alicante, Spain  
adrian@ellisalicante.org

ELLIS PhD Student in ML

GitHub: AdrianArnaiz  
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Personal WWW & Google Scholar

**Me** – I'm a '97 Spanish ELLIS PhD Student focused on my 1st year PhD with a strong interest in Algorithmic Fairness using Causality and Graph theory. **ELLIS** is an AI research network focused on excellence, with **35 units** in 15 countries of Europe (Oxford, Cambridge, EPFL, ETH, Max plank, Alicante...). ELLIS has **199 PhD students** around Europe with an acceptance rate of <5%, and all of them have joint supervision from 2 different countries.

**Research Topic** – My current thesis addresses the ethical implications of ML decisions, including concepts such as privacy, transparency, accountability, reliability, autonomy, and fairness, which urgently need to be taken into account in critical decision-making scenarios. In this thesis, (1) we study what data might be the cause of unfairness or what data should look like in a “fair” world (2) fairness in graph data to capture complex data relationships and human-generated data, and (3) go beyond observational data and study the long term effects and feedback loops of these proposed algorithms using causality. Specifically, we first study the influence of each data point in a fairness metric for reducing the bias in ML models using *Data Valuation*. Second, we study *Graph Rewiring* methods that ensure fair graph data, and finally, we use *Causality* to improve these methods going beyond observational data for developing fair robust models. In sum, **what data causes unfairness, what data should look in a fair world, and their societal effects.**

## EDUCATION

### PhD Student / Fairness in ML

Dec 2021 — Present

ELLIS Alicante – Institute of Humanity-centric AI (European Laboratory for Learning and Intelligent Systems)

- Researching on Fairness in ML decision making leveraging graph theory, game theory and causality.
- Supervised by **Dr. Nuria Oliver** (ELLIS) and **Dr. Manuel Gómez Rodríguez** (MPI-SWS, Germany).
- 6-months exchange at **Max Plank Institute for Software Systems (MPI-SWS)**, Germany, 2024
- More info: [European Lab. for Learning and Intelligent Systems - ELLIS] [Research Topic]

### MSc in AI & Data Science

Jan 2020 — Jan 2021

Universitat Oberta de Catalunya

GPA:9.7/10

- Evaluated both Masters and Thesis with Honors
- **Thesis** supervised by **Dr. Baris Kanber** from University College of London: *Deep Convolutional Autoencoder for denoise T1 brain MRI*

### BSc in Computer Engineering

Sep 2015 — Jun 2019

University of Burgos

GPA:8.9/10

- Evaluated both Bachelors and Thesis with Honors
- **Extraordinary award**: best student in the promotion.
- **Thesis** carried out in **ADMIRABLE** research lab: *Use of biomarkers extracted from the voice for the detection of Parkinson*
- Press coverage: 1, 2, 3, 4, 5, 6, 7, 8.

## PROFESSIONAL EXPERIENCE

### Research Staff

Jan 2020 — Aug 2021

ADMIRABLE and DATAHES research labs

University of Burgos, Spain

- European project [2019-1-ES01-KA204-065615] Self-Regulated Learning: SmartArt.
- Behavioural VR data analysis and Platform *UBUMLaas*
- Academic production shown in *Publications* section (Topic: Network Science and Web mining)

### AI Consultant

Aug 2019 — Jan 2020

Ernst & Young

Madrid, Spain

- Building ML models for RPA integration: Intelligent Automation

### Research intern

Dec 2018 — Jun 2019

ADMIRABLE research lab

University of Burgos, Spain

- Research intern with collaboration scholarship. Research in the project *Use of biomarkers extracted from the voice for the detection of Parkinson* (BSc Thesis).

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## PRE PRINTS

- [1] **Adrian Arnaiz-Rodriguez**, Francisco Escolano, and Nuria Oliver. “FairShap: A Data Re-weighting Approach for Algorithmic Fairness based on Shapley Values”. Preprint. Jan. 2023. URL: <https://arxiv.org/abs/2303.01928>.
- [2] Georgina Curto, **Adrian Arnaiz-Rodriguez**, and Nuria Oliver. “Algorithms for Social Justice: Affirmative Action in Social Networks”. Preprint. Apr. 2023.
- [3] Piera Riccio, Zinyia del Villar, **Adrian Arnaiz-Rodriguez**, and Nuria Oliver. “SIA: Fighting Sexual and Gender-Based Violence with Machine Learning”. In process. Dec. 2023.

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## CONFERENCE PUBLICATIONS

- [1] **Adrián Arnaiz-Rodríguez**, Ahmed Begga, Francisco Escolano, and Nuria M Oliver. “DiffWire: Inductive Graph Rewiring via the Lovász Bound”. In: *The First Learning on Graphs Conference*. 2022. URL: <https://openreview.net/forum?id=IXvfIexOmX6f>.
- [2] **Adrián Arnaiz-Rodríguez**, José Miguel Ramírez-Sanz, José Luis Garrido-Labrador, and Alicia Olivares-Gil. “Computer Science doctoral research in Spain. A relational perspective”. In: *Actas de la XIX Conferencia de la Asociación Española para la Inteligencia Artificial*. Universidad de Málaga. Málaga, 2021, pp. 667–672. ISBN: 978-84-09-30514-8. URL: [https://caepia20-21.uma.es/inicio\\_files/caepia20-21-actas.pdf#page702](https://caepia20-21.uma.es/inicio_files/caepia20-21-actas.pdf#page702).
- [3] José Luis Garrido-Labrador, José Miguel Ramírez-Sanz, Virginia Ahedo, **Adrián Arnaiz-Rodríguez**, César García-Osorio, José Ignacio Santos, and José Manuel Galán. “Network analysis of co-participation in thesis examination committees in an academic field in Spain”. In: *Abstract book of the 14th International Conference on Industrial Engineering and Industrial Management and XXIV Congreso de Ingeniería de Organización*. Universidad Carlos III de Madrid. Burgos, 2020. URL: [https://eventos.uc3m.es/\\_files/\\_event/\\_43190/\\_editorFiles/file/BookOfAbstracts10.pdf](https://eventos.uc3m.es/_files/_event/_43190/_editorFiles/file/BookOfAbstracts10.pdf).

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## JOURNAL PUBLICATIONS

- [1] José Luis Garrido-Labrador, José Miguel Ramírez-Sanz, Virginia Ahedo, **Adrián Arnaiz-Rodriguez**, César García-Osorio, José Ignacio Santos, and José Manuel Galán. “Análisis de la red de co-participaciones en tribunales de tesis de un área científica en España”. In: *Dirección y Organización* 79 (2023), pp. 59–67. doi: 10.37610/dyo.v0i79.638.
- [2] Alicia Olivares Gil, **Adrián Arnaiz Rodríguez**, José Miguel Ramírez Sanz, José Luis Garrido Labrador, Virginia Ahedo García, César García Osorio, José Ignacio Santos Martín, José Manuel Galán Ordax, et al. “Mapping the scientific structure of organization and management of enterprises using complex networks”. In: *International Journal of Production Management and Engineering* 10.1 (2022), pp. 65–76. URL: <https://polipapers.upv.es/index.php/IJPME/article/view/16666>.
- [3] Esther Cubo, **Adrian Arnaiz-Rodriguez**, Álar Arnaiz-González, José Francisco Díez-Pastor, Meredith Spindler, Adriana Cardozo, Alvaro Garcia-Bustillo, Zoltan Mari, and Bastiaan R Bloem. “Videoconferencing Software Options for Telemedicine: A Review for Movement Disorder Neurologists”. In: *Frontiers in neurology* (2021), p. 1812. URL: <https://www.frontiersin.org/articles/10.3389/fneur.2021.745917/full>.
- [4] María Consuelo Sáiz-Manzanares, Ismael Ramos Pérez, **Adrián Arnaiz-Rodríguez**, Sandra Rodríguez Arribas, Leandro Almeida, and Caroline Françoise Martin. “Analysis of the learning process through eye tracking technology and feature selection techniques”. In: *Applied Sciences* 11.13 (2021), p. 6157. URL: <https://www.mdpi.com/2076-3417/11/13/6157/htm>.

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## HONORS & AWARDS

**Heidelberg Laureate Forum Young Researcher** [Link]

Heidelberg Laureate Forum Foundation, May 2023

Selected among 200 young researchers from around the world to participate in the 10th HLF with 25+ Laureates in CS, Physics and Mathematics.

**Top 10% Reviewer AISTATS 2023** [Link]

International Conference on Artificial Intelligence and Statistics, April 2023

Selected in the top 10% best reviewers in AISTATS 2023 Conference.

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## Top 10% Reviewer ICML 2022 [\[Link\]](#)

Selected in the top 10% best reviewers in ICML 2022 Conference.

*International Conference on Machine Learning, July 2022*

## FPU PhD Fellowship (Declined) - FPU20/03687

*Spanish Government - Ministry of Universities, Sep 2021*

Grants for pre-doctoral contracts in Spanish Universities.

## Extraordinary Award of Bachelors in Computer Engineering

*Council of the University of Burgos, Dec 2019*

Top 1 student the Degree in Computer Engineering of the University of Burgos.

## Prototype Award [\[Press coverage: 1, 2, 3\]](#)

*OTRI (Service for Technology Transfer University of Burgos), Feb 2019*

Project awarded: Use of bio-markers extracted from the voice for the detection of Parkinson.

## Undergraduated Research Fellowship

*University of Burgos, Dec 2018*

Assistant research Fellowship in the Civil Engineering department of the University of Burgos, research group **ADMIRABLE**

## Courses with honors

*Bachelor's and Master's*

8 out of 10 MSc courses evaluated with honours, included Thesis.

10 BSc courses evaluated with honours, included Thesis.

## TALKS

### [Chamber of Commerce] Round table about Sustainable AI

[\[Link\]](#) *Alicante, Jun 2023*

### [ELLIS-DMMLab (CMU) Workshop] Technical challenges of Algorithmic Fairness

[\[Link\]](#) *Alicante, Mar 2023*

### [European Parliament Committee on Legal Affairs (JURI)] Algorithmic Fairness for EU Parliamentarians [\[Link\]](#)

*Alicante, Feb 2023*

### [Tutorial on Learning on Graphs Conference] Graph Rewiring: From Theory to Applications in Fairness [\[Link\]](#)

*Online, Dec 2022*

### [SpainAI] Fairness in AI from Classic Approaches to Data Valuation and Social Networks [\[Link\]](#)

*Burgos (Spain), Dec 2022*

### [PERTE New economy of Language] Discrimination in AI and diversity [\[L1,L2,L3\]](#)

*Ministry of Economy (Spain), Oct 2022*

### A Fairness perspective in algorithmic decision-making [\[L1, L2\]](#)

*University of Burgos (online), Mar 2022*

### ELLIS + Qualcomm AI Research: Graph Neural Networks and Human-Centric Machine Learning [\[Link\]](#)

*Virtual, Feb 2022*

- Moderator and Panel Participant

- Panel: Pim de Haan, Carlos Castillo, Efstatios Gavves and Manuel Gómez Rodríguez

### [ELLIS Talks] Fairness in Machine Learning: From introduction to current approaches [\[Link\]](#)

*University of Alicante, Jan 2022*

### Data processing in Advance Learning Technology [\[Link\]](#)

*Self-Regulated Learning in SmartArt Learning conference, Jul 2021*

## SCIENTIFIC COMMUNITY SERVICES

### Reviewer or Program Committee member

[Reviewer] PeerJ 2023 - PeerJ Computer Science 2023

[Reviewer] TNNLS 2023 - IEEE Transactions on Neural Networks and Learning Systems 2023 - Graph Special Issue

[PC member] FAccT 2023 - ACM Conference on Fairness, Accountability, and Transparency (ACM FAccT)

[Reviewer] JMLR 2023 - Journal of Machine Learning Research

[Reviewer] AISTATS 2023 - Artificial Intelligence and Statistics 2023 - **Top 10% Outstanding Reviewer**

[PC member] NeurIPS 2022 - Workshop "Human Centered AI"

[Reviewer] NeurIPS 2022 - Workshop "Algorithmic Fairness through the Lens of Causality and Privacy"

[Reviewer] Journal of Complexity 2022.

[Reviewer] ICML 2022 - International Conference on Machine Learning - **Top 10% Outstanding Reviewer**

[PC member] ECML-PKDD 2022 - European Conference on ML and Principles and Practice of Knowledge Discovery in Databases (x4 papers reviewed)

[Reviewer] WWW 2022 - The Web Conference 2022, ACM, New York.

[Reviewer] TCSS'22 - IEEE Transactions on Computational Social Systems 2022.

### Scientific organization

Tutorial on *Learning on Graphs Conference* "Graph Rewiring: From Theory to Applications in Fairness"

*Online, Dec 2022*

Head of organization of **ELLIS Doctoral Symposium 2022**

*Alicante, Sep 2022*

Head of organization of **ELLIS HCML Reading Group**: guest sessions and round tables

*bi-weekly sessions*

Moderator of **Qualcomm+ELLIS Reading Group Session about GNN+HCML**

*Online, Feb 2022*

↔ Round table: Pim de Haan, Carlos Castillo, Efstatios Gavves and Manuel Gómez Rodríguez

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Volunteer at [NeurIPS Workshop "Human-Centered AI"](#)

*Virtual, Dec 2021*

## Open Source software

Open source code from all academic projects, an also both [BSc](#) and [MSc](#) final projects

Main contributor of [Lightly version 1.1.2](#) in [Lightly AI PyTorch-based library](#) for Self-Supervised Learning.

More open source codes in GitHub: applications, experiments and data analysis

## SKILLS

### Languages and libs

Python, R, Java, Tensorflow, PyTorch, PyGeometric, NetworkX

### More interests

Mathematical optimization, Mathematical Modeling, GNN, Reinforcement Learning

### Communication

Spanish (native), English (Fluent), German (A1)

