P+34 659540233
Alicante, Spain
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Adrián Arnaiz Rodríguez

ELLIS PhD Student in ML

Personal WWW
Google Scholar
GitHub & LinkedIn

Me – I am a PhD Student at ELLIS Alicante with a strong interest in Algorithmic Fairness using Causality and Graph theory supervised by Nuria Oliver (ELLIS) and Manuel Gomez Rodriguez (MPI-SWS). **ELLIS** is an AI research network focused on excellence, with 35 units in 15 countries of Europe. ELLIS has 200 PhD students around Europe with an acceptance rate of <5%.

Research Topic – My current thesis addresses concepts such as transparency, reliability, and fairness in Machine Learning, which urgently need to be taken into account in critical decision-making ML scenarios. We also delve in the decision making in Graph Neural Networls. In my 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) study effective deployment of AI in the real world on human-AI collaboration scenarios. 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 *Human-in-the-loop* methods to theoretically improve the human-AI teaming on specific tasks. Last but not least, we study the intersection of AI and Law for a *really* effective societal adoption of AI. In sum, **what data causes unfairness, what data should look in a fair world, it's efficient implementation in the real world and their societal effects**.

Education

PhD Student / Fairness in ML — ***Dec 2021 — Present***
ELLIS Alicante – (European Laboratory for Learning and Intelligent Systems) – Max Planck Institute

- 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, Feb-Aug, 2024.
- Funded by RESUMAIS (**Intel**), ELIAS (European Project [101120237-HORIZON-CL4-2022-HUMAN-02]), Bank Sabadell and GVA.
- 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 Collegue of London: *Deep CAE for denoising T1 brain MRI*

BSc in Computer Engeneering — ***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** and Julio Losada. "The Impact of AI in Business: Exploring Legal Implications of Causality in Algorithmic Decision Making, a Spanish Laboral Law Use Case". Submitted. 2024.

[2] Kajetan Schweighofer, **Adrian Arnaiz-Rodriguez**, Sepp Hochreiter, and Nuria Oliver. "The Disparate Benefits of Deep Ensembles". Submitted. 2024.

Conference Publications and Tutorials

[1] **Adrian Arnaiz-Rodriguez** and Ameya Velingker. "*Tutorial on* Graph Learning: Principles, Challenges, and Open Directions". In: *Proceedings of the 41st International Conference on Machine Learning (ICML 2024)*. **Tutorial**. Vienna, Austria, July 2024. URL: https://icml.cc/virtual/2024/tutorial/35233.

[2] **Adrian Arnaiz-Rodriguez**, Georgina Curto, and Nuria Oliver. "Structural Group Unfairness: Measurement and Mitigation by means of the Effective Resistance". In: *WWW 2024 2nd Workshop on Trustworthy Learning on Graphs (TrustLOG)*. 2024. URL: https://arxiv.org/pdf/2305.03223.pdf.

[3] **Adrian Arnaiz-Rodriguez** and Nuria Oliver. "Towards Algorithmic Fairness by means of Instance-level Data Re-weighting based on Shapley Values". In: *ICLR 2024 Workshop on Data-centric Machine Learning Research (DMLR)*. 2024. URL: https://openreview.net/forum?id=ivf1QaxEGQ.

[4] **Adrian Arnaiz-Rodriguez**, Francisco Escolano, Nuria Oliver, and Edwin Hancock. "*Tutorial on* Graph Rewiring: From Theory to Applications in Fairness". In: *Proceedings of the Learning on Graphs Conference (LoG 2022)*. **Tutorial**. Virtual Event, Dec. 2022. URL: https://ellisalicante.org/tutorials/GraphRewiring.

[5] **Adrián Arnaiz-Rodríguez**, Ahmed Begga, Francisco Escolano, and Nuria Oliver. "DiffWire: Inductive Graph Rewiring via the Lovász Bound". In: *The First Learning on Graphs Conference*. 2022. URL: https://openreview.net/forum?id=IXvfIex0mX6f.

[6] **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.

[7] 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.

Journal Publications

[1] José Luis Garrido-Labrador, José Miguel Ramírez-Sanz, Virginia Ahedo, **Adrián Arnaiz-Rodríguez**, 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**, Álvar 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.

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[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.

Honors & Awards

Selected for London Geometry and Machine Learning Summer School[Link] *Imperial College London, July 2024*
Selected to participate with Joshua Robinson.

Heidelberg Laureate Forum Young Researcher [Link] *Heidelberg Laureate Forum Foundation, Sep 2023*
Selected among 200 young researchers from around the world to participate in the 10th HLFF a highly competitive and prestigious platform, where a few students get the opportunity to interact with Turing Award winners, Abel Prize winners, and Fields Medalists.

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.

Top 10% Reviewer ICML 2022 [Link] *International Conference on Machine Learning, July 2022*
Selected in the top 10% best reviewers in ICML 2022 Conference.

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

[**Lecture @ DelveDeepLarning**] Graph Neural Networks [Link] *Online, Sep 2024*
[**Tutorial @ ICML**] Graph Learning: Principles, Challenges, and Open Directions [Link] *Vienna, Jul 2024*
↪ w/ A. Velingker (Google Research). Panelists: M. Bronstein (Oxford, DeepMind), M. Galkin (Intel), B. Perozzi (Google), C. Morris (Aachen Univ.)
[**TurstLoG wk @ WWW Conference**] Structural Group Unfairness in Social Networks [Link] *Singapore, May 2024*
[**Guest Lecture @ Univeristy of Notre Dame**] Polarization in Networks and Social Capital [Link] *Indiana , USA, Feb 2024*
[**Algorithmic Societies ERC @ CCCB**] Algorithmic Discrimination [Link] *Barcelona, Nov 2023*
[**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 Parlamentarians [Link] *Alicante, Feb 2023*
[**Tutorial @ LoG 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*
[**University of Burgos**] Fairness in algorithmic decision-making [L1, L2] *University of Burgos (online), Mar 2022*
[**ELLIS HCML Reading group**] ELLIS + Qualcomm AI Research: GNN and HCML [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

— Chair member
[**Co-Organizer**] 3rd LoG Conference 2024 *Virtual, Dec 2024*
[**Associate Chair**] ICML 2024 Associate Chair *Viena, Jul 2024*

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[**Co-Organizer**] Tutorial on *ICML 2024*: "Graph Learning: Principles, Challenges, and Open Directions" *Vienna, Jul 2022*
[**Co-Organizer**] Tutorial on *LoG 2022 Conference*: "Graph Rewiring: From Theory to Applications in Fairness" *Online, Dec 2022*
[**Co-Organizer**] ELLIS Doctoral Symposium 2022 *Alicante, Sep 2022*
[**Co-Organizer**] ELLIS HCML Reading Group: guest sessions and round tables *bi-weekly sessions*

— Program Committee member

NeurIPS 2024 - Thirty-eighth Annual Conference on Neural Information Processing Systems
NeurIPS 2024 - Workshop "Algorithmic Fairness through the Lens of Metrics and Evaluation"
IC2S2 2024 - International Conference on Computational Social Sciences
FAccT 2023 - ACM Conference on Fairness, Accountability, and Transparency (ACM FAccT)
AISTATS 2024 - Artificial Intelligence and Statistics 2024
NeurIPS 2023 - Workshop "Algorithmic Fairness Through the Lens of Time"
AISTATS 2023 - Artificial Intelligence and Statistics 2023 - **Top 10% Outstanding Reviewer**
NeurIPS 2022 - Workshop "Algorithmic Fairness through the Lens of Causality and Privacy"
ICML 2022 - International Conference on Machine Learning - **Top 10% Outstanding Reviewer**
NeurIPS 2022 - Workshop "Human Centered AI"
ECML-PKDD 2022 - European Conference on ML and Principles and Practice of Knowledge Discovery in Databases
WWW 2022 - The Web Conference 2022, ACM, New York.

— Journal Reviewer

PeerJ 2023 - PeerJ Computer Science 2023
TNNLS 2023/24 - IEEE Transactions on Neural Networks and Learning Systems 2023/24 - Graph Special Issue
JMLR 2023 - Journal of Machine Learning Research
Journal of Complexity 2022.
TCSS'22 - IEEE Transactions on Computational Social Systems 2022.

— More

Organizer and 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
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 on GH
Main contributor of *Lightly version 1.1.2* in Lightly AI PyTorch-based library for Self-Supervised Learing.
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, GNNs, Causality, Online Learning
Communication	Spanish (native), English (Fluent)

For pictures, and more information, please refer to my webpage.

Updated September 2024