

Patricia Alonso de Apellániz

Researcher Engineer at Universidad Politécnica de Madrid



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Languages

Spanish: Native
English: C1 level
German: A1 level

Technical Skills

Programming & Development
- Languages: Python, R, Matlab, Java, C++
- Deep Learning Frameworks: Pytorch, Tensorflow, Keras
- Software Development & Deployment: Docker, Git, Bash scripting, AGILE methodologies

Data Processing & Medical AI

- Data Processing
- Statistical & Probabilistic Modeling
- Explainable Artificial Intelligence: Model interpretability, feature importance

Model Deployment & Engineering:

- Containerization & Reproducibility: Docker
- Federated Learning Infrastructure: Flower Framework
- Real-world AI Deployments

PROFESSIONAL EXPERIENCE

➤ Researcher – ETSIT, UPM

Jan 2024 - Now

Worked on AI-Health projects ([Synthia](#), [Genomed4ALL](#), [Synthema](#), and [Repo4EU](#)) under Horizon Europe.

Developed deep generative models (e.g., VAEs) for critical medical tasks, such as Survival Analysis, enabling personalized medicine.

Implemented and validated synthetic data generation techniques using latent space exploration, enhancing model robustness in data-scarce and privacy-constrained environments.

Integrated Explainable AI methods, leveraging Shapley values to assess feature importance and model interpretability in medical predictions.

Deployed and tested federated models in real-world clinical environments, leveraging the Flower framework to address data heterogeneity, non-IID distributions, and privacy concerns.

Developed information-sharing strategies to optimize federated AI collaboration among decentralized healthcare entities.

Packaged AI models into Docker containers, ensuring scalability and seamless deployment across different environments.

Collaborated with interdisciplinary teams, including medical researchers and AI engineers.

Disseminated findings through scientific publications, webinars, and technical reports.

➤ Assistant Professor – ETSIT, UPM

Mar 2022 – Dec 2023

Taught laboratory sessions for undergraduate and graduate students in Probability, Statistics, Random Signals, Digital Signal Processing, and Audio Processing.

Designed practical assignments and exams, focusing on real-world applications of statistical and signal-processing methods.

Provided individual tutoring and academic mentoring for students in AI and data science-related courses.

➤ Business Consultant – Management Solutions

Sep 2021 – Jan 2021

Worked with Banco Santander's Risk division to develop a data extraction, transformation, and analysis tool for financial risk assessment.

Optimized data pipelines to enhance model interpretability and decision-making processes in the banking sector.

➤ Predoctoral Researcher – ETSIT, UPM

Oct 2019 – Jun 2020

Developed a pilot AI model for the [AI4EU](#) Consortium, focusing on deep learning for facial gesture transfer.

Processed large-scale multimedia datasets, extracting key features for AI-driven animation models.

Implemented and validated GAN architectures for video generation.

EDUCATION

Ph. D in Telecommunications Engineering – ETSIT, UPM

Mar 2021 – Apr 2025

Thesis: Deep Generative Models for Survival Analysis and Synthetic Data Generation in Healthcare

Master's Degree in Telecommunications Engineering – ETSIT, UPM

Sep 2018 - Jul 2020

Machine Learning and Multimedia Data Science specialization

Thesis: Analysis and implementation of deep learning algorithms for face-to-face translation based on audio-visual representations

Bachelor's Degree in Telecommunications Engineering – EPS, UAM

Sep 2012 - Jun 2018

Multimedia signal specialization

Thesis: Voice Activity Detection based on Neural Networks

PUBLICATIONS

Journal Publication

- ✓ **A. Apellániz P.**, Arroyo Galende, B., Jiménez, A., Parras J., and Zazo, S., *Advancing Cancer Research with Synthetic Data Generation in Low-Data Scenarios*, in IEEE Journal of Biomedical and Health Informatics, EARLY ACCESS, 2025, doi: [10.1109/JBHI.2025.3595371](https://doi.org/10.1109/JBHI.2025.3595371). *Journal metrics (2024): IF 6.8, Rank Q1 (92.1 in Computer Science, Information Systems; 87.3 in Computer Science, Interdisciplinary Applications; 96.3 in Mathematical & Computational Biology; and 88.5 in Medical Informatics).*
- ✓ **A. Apellániz P.**, Jiménez, A., Arroyo Galende, B., Parras J., and Zazo S., *Artificial inductive bias for synthetic tabular data generation in data-scarce scenarios*, in Neurocomputing, vol. 652, 131122, 2025, doi: [10.1016/j.neucom.2025.131122](https://doi.org/10.1016/j.neucom.2025.131122). *Journal metrics (2024): IF 6.5, Rank Q1 (82.1 in Computer Science, Artificial Intelligence).*
- ✓ Arroyo Galende, B., **A. Apellániz P.**, Parras J., Zazo S., and Uribe, S., *Membership Inference Attacks and Differential Privacy: a study within the context of Generative Models*, in IEEE Open Journal of the Computer Society, vol. 6, 801-811, 2025, doi: [10.1109/OJCS.2025.3572244](https://doi.org/10.1109/OJCS.2025.3572244). *Journal metrics (2024): IF 8.2, Rank Q1 (94.2 in Computer Science, Hardware & Architecture; 94.8 in Computer Science, Information Systems; 91.2 in Computer Science, Interdisciplinary Applications; 92.9 in Computer Sciences, Theory & Methods; and 92.0 in Engineering, Electrical & Electronic).*
- ✓ **A. Apellániz P.**, Parras J., and Zazo S., *Improving Synthetic Data Generation through Federated Learning in Scarce and Heterogeneous Data Scenarios*, in Big Data and Cognitive Computing, vol. 9(2), 18, 2025, doi: [10.3390/bdccc9020018](https://doi.org/10.3390/bdccc9020018). *Journal metrics (2024): IF 4.4, Rank Q2 (68.9 in Computer Science, Artificial Intelligence; 75.8 in Computer Science, Information Systems; 82.7 in Computer Science, Theory & Methods).*
- ✓ **A. Apellániz P.**, Parras J., and Zazo S., *Leveraging the variational Bayes autoencoder for survival analysis*, in Scientific Reports, vol. 14, 24567, 2024, doi: [10.1038/s41598-024-76047-z](https://doi.org/10.1038/s41598-024-76047-z). *Journal metrics (2024): IF 3.9, Rank Q1 (82.0 in Multidisciplinary Sciences).*
- ✓ Lahoz Navarro, M., Jehle, J.S., **A. Apellániz P.**, Parras, J., Zazo, S., Gerdtts, M. *Deep Learning as a New Framework for Passive Vehicle Safety Design Using Finite Elements Models Data*, in Applied Sciences, vol. 14, 9296, 2024, doi: [10.3390/app14209296](https://doi.org/10.3390/app14209296). *Journal metrics (2023): IF 2.5, Rank Q2 (48.7 in Chemistry, Multidisciplinary; 72.3 in Engineering, Multidisciplinary; 38.5 in Materials Science, Multidisciplinary; and 46.3 in Physics, Applied).*
- ✓ **A. Apellániz P.**, Jiménez A., Arroyo Galende B., Parras J., and Zazo S., *Synthetic Tabular Data Validation: A Divergence-Based Approach*, in IEEE Access, vol. 12, pp. 103895-103907, 2024, doi: [10.1109/ACCESS.2024.3434582](https://doi.org/10.1109/ACCESS.2024.3434582). *Journal metrics (2024): IF 3.6, Rank Q2 (64.1 in Computer Science, Information Systems; 64.8 in Engineering, Electrical & Electronic; 57.9 in Telecommunications).*
- ✓ D'Amico, S., Dall'Olio, L., Rollo, C., **Alonso, P.**, Prada-Luengo, I., Dall'Olio, D., et al., *MOSAIC: An Artificial Intelligence-Based Framework for Multimodal Analysis, Classification, and Personalized Prognostic Assessment in Rare Cancers*, in JCO Clinical Cancer Informatics, 8, e2400008, 2024, doi: [10.1200/JCO.24.0000](https://doi.org/10.1200/JCO.24.0000). *Journal metrics (2024): IF 2.8, Rank Q2 (51.4 in Oncology).*
- ✓ Parras, J., Almodóvar, A., **A. Apellániz P.**, Zazo, S. *Inverse reinforcement learning: a new framework to mitigate an Intelligent Backoff Attack*, in IEEE Internet of Things Journal, vol. 9 (24), 24790-24799, 2022, doi: [10.1109/JIOT.2022.3194694](https://doi.org/10.1109/JIOT.2022.3194694). *Journal metrics (2024): IF 8.9, Rank Q1 (95.9 in Computer Science, Information Systems; 93.9 in Engineering, Electrical & Electronic; and 92.1 in Telecommunications).*
- ✓ Parras, J., **A. Apellániz P.**, Zazo, S. *An online learning algorithm to play discounted repeated games in wireless networks*, in Engineering Applications of Artificial Intelligence, vol. 107, 104520, 2022, doi: [10.1016/j.engappai.2021.104520](https://doi.org/10.1016/j.engappai.2021.104520). *Journal metrics (2024): IF 8.0, Rank Q1 (91.6 in Automation & Control Systems; and 88.0 in Computer Science, Artificial Intelligence).*
- ✓ Parras, J., **A. Apellániz P.**, Zazo, S. *Deep Learning for Efficient and Optimal Motion Planning for AUVs with Disturbances*, in Sensors, vol. 21 (15), 5011, 2021, doi: [10.3390/s21155011](https://doi.org/10.3390/s21155011). *Journal metrics (2024): IF 3.5, Rank Q2 (66.2 in Chemistry, Analytical; 63.7 in Engineering, Electrical & Electronic; and 70.3 in Instruments & Instrumentation).*

Conference Publications

- ✓ Asti, G., Delleani, M., **Apellániz P.**, Isasa, I., et al., *Development and validation of synthetic data generation over a federated learning computing framework to accelerate innovation and boost personalized medicine in hematological diseases*, in Blood, 146 (Supplement 1), 4350, 2026, doi: [10.1182/blood-2025-4350](https://doi.org/10.1182/blood-2025-4350). *Journal metrics (2024): IF 23.1, Rank Q1 (98.5 in Haematology).*
- ✓ Casadei, F., Carota, L., Asti, G., D'Amico, S., Piscia, D., Zazo, S., **A. Apellániz P.**, Parras, J., et al., *Survival Model Optimization via Federated Learning: A Study Combining Simulations and Experiments*, in 2024 IEEE International Conference on Big Data (BigData), pp. 7658-7667, 2024, doi: [10.1109/BigData62323.2024.10825368](https://doi.org/10.1109/BigData62323.2024.10825368).
- ✓ Piscia, D., **Apellániz P. A.**, Arroyo, B., Barrio, S., Moreno, F., Parras, J., et al., *GenoMed4All, a federated learning platform for clinical and omics data*, Poster Abstract published in European Journal of Human Genetics, Vol. 32, pp. 1640-1640, 2024, doi: [10.1038/s41431-024-01734-4](https://doi.org/10.1038/s41431-024-01734-4). *Journal metrics (2024): IF 4.6, Rank Q2 (74.5 in Biochemistry & Molecular Biology; and 84.6 in Genetics & Heredity).*
- ✓ Collado Gimbert A., Reidel S., **A. Apellániz P.**, Álvarez F., Arroyo Galende B., et al., *Data Driven Research through the European RAdDeep Registry and the Use of Artificial Intelligence Towards Personalized Medicine in Sickle Cell Disease*, Poster Abstract published in Blood Journal, 144 (Supplement 1), p. 1138, 2024, doi: [10.1182/blood-2024-203331](https://doi.org/10.1182/blood-2024-203331). *Journal metrics (2024): IF 23.1, Rank Q1 (98.5 in Hematology).*
- ✓ Asti G., D'Amico S., Carota L., Piscia D., Casadei F., Saha Cyrille Merleau N., **Alonso De Apellániz P.**, et al., *An Artificial Intelligence-Based Federated Learning Platform to Boost Precision Medicine in Rare Hematological Diseases: An Initiative By GenoMed4all and Synthema Consortia*, Poster Abstract published in Blood Journal, 144 (Supplement 1), p. 4989, 2024, doi: [10.1182/blood-2024-205541](https://doi.org/10.1182/blood-2024-205541). *Journal metrics (2024): IF 23.1, Rank Q1 (98.5 in Hematology).*
- ✓ **Apellániz P.**, Parras J., and Zazo S., *CR-SAVAE: A Parametric Method for Survival Analysis with Competing Risks*, in the 32nd European Signal Processing Conference (EUSIPCO), Lyon, France, 2024, pp. 1526-1530, doi: [10.23919/EUSIPCO63174.2024.10715431](https://doi.org/10.23919/EUSIPCO63174.2024.10715431).
- ✓ **Apellániz P.**, Parras J., and Zazo S., *An Improved Tabular Data Generator with VAE-GMM Integration*, in the 32nd European Signal Processing Conference (EUSIPCO), Lyon, France, 2024, pp. 1886-1890, doi: [10.23919/EUSIPCO63174.2024.10715230](https://doi.org/10.23919/EUSIPCO63174.2024.10715230).
- ✓ D'Amico, S., Dall'Olio, L., Rollo, C., **Alonso, P.**, Prada-Luengo, I., Dall'Olio, D., et al., *Multi-modal analysis and federated learning approach for classification and personalized prognostic assessment in myeloid neoplasms*, in Blood, 140 (Supplement 1), pp. 9828-9830, 2022, doi: [10.1182/blood-2022-166802](https://doi.org/10.1182/blood-2022-166802). *Journal metrics (2024): IF 23.1, Rank Q1 (98.5 in Haematology).*