

# Juan Arturo Abaurrea Calafell

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## Education

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### Polytechnic University of Madrid

*Sep 2025 – Jun 2026, Madrid, Spain*

Master's Degree in Machine Learning and Big Data. Class representative.

- **Status:** Currently enrolled.
- **Relevant Coursework:** Management of Big Data Systems (9.8), Deep Learning for Natural Language Processing and Computer Vision, Reinforcement Learning and Generative Techniques, AI Models for Time Series, Evolutionary and Bio-inspired Computing, Research Methodology and Techniques.

### Beijing Institute of Technology

*Jan 2026 – Jan 2026, Zhuhai, China*

BIT (Zhuhai) Winter Program - Artificial Intelligence.

### University of the Balearic Islands

*Sep 2021 – Jun 2025, Palma de Mallorca, Spain*

Bachelor's Degree in Computer Engineering – Specialized in Artificial Intelligence and Computing.

- **Grade:** 8.3 out of 10 (8 honors).
- **Relevant Coursework:** Machine Learning (9.2), Artificial Intelligence (honor), Intelligent Systems (9.0), Data Mining (7.0), Advanced Algorithms (honor), Databases I & II (7.0 and honor), Statistics (8.5).

### Ulm University of Applied Sciences

*Mar 2024 – Jul 2024, Ulm, Germany*

Exchange semester. Completed Bachelor's thesis and three additional subjects.

- **Grade:** 9.7 out of 10.
- **Bachelor's Thesis (9.6):** Implemented a chatbot for colonoscopy preparation using NLP techniques.

## Experience

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### MTP, Entry Machine Learning Researcher

*Feb 2026 – Jun 2026, Madrid, Spain*

Researching backdoor detection and mitigation techniques in deep neural networks by analyzing internal activations and latent space representations. Developing model editing methods (pruning, selective unlearning) to identify and eliminate malicious patterns without full retraining.

### TravelgateX, Entry Software Engineer

*Oct 2024 – Dec 2024, Palma de Mallorca, Spain*

Backend development in C# and Visual Basic using Visual Studio, GitHub, Fiddler, Postman, Elasticsearch, and Grafana.

## Languages

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**Native:** Spanish, Catalan | **C1:** English (Cambridge certified) | **A1:** German

## AI & Data-Related Skills

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- **Programming Languages:** Python, R, SQL (MySQL, MariaDB, PostgreSQL), MATLAB
- **Machine Learning & AI:** PyTorch, Keras, TensorFlow, Scikit-learn, Transformers (Hugging Face), OpenCV, Ultralytics (YOLO), torchvision
- **Data Science:** NumPy, Pandas
- **Data Visualization:** Matplotlib, Seaborn, Plotly, Dash, Grafana
- **Tools & Platforms:** Docker, Git, GitHub Actions, Azure, Jupyter Notebook

## Relevant Projects

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<b>Backdoor Detection and Mitigation in Neural Networks</b>	<i>Nov 2025 – Dec 2025</i>
• Comprehensive survey of 70+ papers on neural network security, covering backdoor attacks, detection methods, and mitigation techniques.	
<b>Spiking Neural Networks: A Comprehensive Literature Review</b>	<i>Oct 2025 – Dec 2025</i>
• Analyzed 50+ research papers on brain-inspired computing, covering neuron models, learning algorithms, and neuromorphic hardware.	
<b>Cybersecurity AI Datathon - 2nd Place</b>	<i>Nov 2025</i>
• Achieved F1-score of 0.88424 on ransomware attack classification using ensemble stack of Random Forest and LightGBM models.	
• Jailbroke custom LLM with prompt engineering techniques to extract passwords from it, unlocking encrypted dataset columns.	
<b>Multi-Author Writing Style Analysis</b>	<i>Oct 2025 – Nov 2025</i>
• Developed transformer-based models for detecting authorship changes at sentence level for PAN@CLEF 2025 shared task.	
• Achieved 92.2% F1 score using fine-tuned DeBERTa-v3-small with weighted sampling and progressive fine-tuning strategies.	
<b>Interactive Earthquake Dashboard</b>	<i>Oct 2025 – Nov 2025</i>
• Built interactive Dash/Plotly dashboard visualizing 29 years of global earthquake data (23K+ events) with 3D globe, heatmaps, and temporal analysis.	
<b>Image Classification, Detection and Segmentation Using Neural Networks</b>	<i>Dec 2024 – Jan 2025</i>
• Implemented five deep learning models (ResNet50, VGG16, Inception v3, custom CNNs) achieving 90-96% F1-score with minimal training data.	
• Developed object detection and segmentation pipelines using YOLOv8m and Mask R-CNN.	
<b>Real Estate Price Analysis Using Data Mining</b>	<i>Dec 2024 – Jan 2025</i>
• Applied K-NN, Random Forest, and Linear Regression on 114K samples achieving <5% error for property predictions and clustering analysis.	
<b>Chatbot for Colonoscopy Preparation</b>	<i>Mar 2024 – Nov 2024</i>
• Developed NLP-based chatbot using Levenshtein distance, TF-IDF, BM25, and sentence embeddings.	

## Soft Skills

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- **Leadership & Initiative:** Class representative and international exchange participant.
- **Problem-Solving:** Methodical approach demonstrated through academic performance.
- **Perseverance and Patience:** Successfully balanced full-time internship with university coursework while maintaining high performance.
- **Teamwork and Communication:** Extensive group project experience and cross-cultural teamwork through exchange programs.

## Other Technical Skills

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- **Programming Languages:** Ada, Assembly, Bash, C, C#, C++, CSS, GoLang, HTML, Java, JavaScript, Lisp, PHP, Prolog, Visual Basic
- **Tools & Technologies:** Bootstrap, Docker, Fiddler, Git, GitHub, HubSpot, Insomnia, Jira, NetBeans, Postman, PyCharm, Visual Studio, Visual Studio Code, Wireshark, XAMPP