



# Tomás Sánchez Villaluenga

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## EDUCATION



### BSc Electronics and Automation Engineering Universidad Politécnica de Madrid - Spain

September 2018 - June 2023

- Patent granted based on my Bachelor's Thesis (P202331053)
- Authored two papers on microelectronics and low-power electronics (Frontiers)
- Member of the Robotics Club and Sports Club



### MSc Robotics and Automation Universidad Politécnica de Madrid - Spain

September 2023 - June 2025

- **Grade: 8.2 /10 (82%)**
- Relevant coursework: Computer Vision, Robot Guidance and Navigation, Optimal and Adaptive Control, Artificial Intelligence, Machine Learning, Deep Learning, Nonlinear Systems, Domotics, Advanced Automation.



### Advanced Artificial Intelligence: Deep Unsupervised Learning and Computer Vision University of Oxford - United Kingdom (UK)

June 2025 - August 2025

- **Grade: A+**
- Deep Unsupervised Learning
- Generative AI
- Computer Vision

## PROFESSIONAL EXPERIENCE

### Critical Embedded Systems Engineer

February 2023 - February 2024

Airbus Defense and Space - Capgemini Engineering



- Advanced training internship in Embedded Systems, Microelectronics, Real-Time systems (RTOS) and Advanced FPGAs to have complete knowledge as Embedded Systems Consultant.
- Verification and certification of **DAL-A Risk** requirements for software changes to the "Internal Processing" part of the 'Air Refueling MRTT' project.

### Sensor IoT Developer (Part-time)

April 2023 - December 2023

IMDEA Materials Institute



- Designed and implemented multiple **IoT** applications using signals from novel materials, including fire detection and alert systems, smart wearables based on TENGs (triboelectric nanogenerators), and an intelligent vest built entirely with **TENG technology**.

### Aerial Robotics Researcher Internship

March 2024 - August 2024

Computer Vision & Aerial Robotics Lab in UPM (CVAR UPM)



- Analysis and implementation of different types of **ROS2** nodes (Standard, Composable, Lifecycle) to monitor the resource consumption of current nodes in Aerostack2 (ROS2 framework). From the analysis, it was concluded that the nodes of the Aerostack2 missions should be modified to Composable Nodes since the consumption was much lower.

### Student Researcher & MSc Thesis (AI, CV)

September 2024 - March 2025

Technische Universität Dortmund (Chair of Material Handling and Warehousing, FLW) - Germany



- Automated preprocessing, segmentation, and labeling of **event-based data**, evaluating machine learning models to accelerate workflows and improve annotation precision and predictive performance.
- Created an event-based dataset for **logistics** and a **3D NeRF-based dataset** to enrich model training.
- Designed and implemented open-source software algorithms to replace physical position markers, simulating positional data with greater safety and accuracy.

## MAIN WORKS

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- **Patent:** Communicated system for detecting impacts and the status of an individual ([Ref.: P202331053](#))
- **Paper:** Geolocation and support electronical device for the humanitarian-military field (*Bachelor Thesis*)
- **Paper:** Wi-Fi/LoRa communication systems for fire, seismic-risk mitigation and health monitoring (*Collaboration with Materials Researching Institute of Madrid*)
- **Potential ICRA Paper:** Event-Based Prediction Model for Multiple Objects and 3D Annotations in Logistics Scenario (*Master Thesis – Application in progress*)

## LANGUAGES

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Spanish - Native

English - C1

German - A2

## TECHNICAL SKILLS

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### Programming and Development Languages

Python | C | C++ | Matlab & Simulink | KNK

### Embedded Systems and IoT

Microcontrollers (Arduino, STM32) | Low-power sensors and actuators | RTOS (Real-Time Operating Systems) | IoT (Communication networks and protocols) | Raspberry Pi | Communications Protocols (MQTT, SPI, I2C, UDP, TCP) | Sensor creation and data display

### Robotics and Simulation

ROS2 & Gazebo | Guidance and trajectory prediction algorithms | Event-based cameras | SLAM (Simultaneous Localization and Mapping) | LiDAR sensors | 3D vision systems

### Computer Vision and Artificial Intelligence

OpenCV | PyTorch | YOLO | Machine Learning | Deep Learning | NeRF | Image processing (labeling, segmentation, classification, object detection, prediction) | Supervised Learning | Semi-supervised Learning | Self-supervised Learning | CNNs | FCNs | RNNs | Transformers | ViT (Vision Transformers) | Natural Language Processing (NPL)

### Generative AI

Prompt Engineering | GPTs | LLM | VLM | Diffusion Models | Generative Models (GANs, VAEs, Ars) | Agents | MCP | Vibe Coding

### Design and Manufacturing Tools

3D Printina & Desian | Autodesk Fusion 360 | Autodesk AutoCAD