

# Miguel Laredo Barbadillo



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**Computer Science Student**

Formal Methods | Software Verification | Mathematics

## Education

**Universidad Politécnica de Madrid** (*September 2025 – Present*)

*PhD in Computer Science and Technologies*

**Universidad Complutense & Politécnica de Madrid** (*September 2024 – September 2025*)

*Master's degree in Formal Methods in Computer Science and Engineering*

**Universidad Politécnica de Madrid** (*September 2021 – July 2024*)

*Bachelor's degree in Computer Engineering*

## Experience

**ETSI Sistemas Informáticos** | *PhD in Computer Science and Technologies (September 2025 – Present)*

- Co-directing multiple final degree projects originating from my own proposals.

**Ventor Innovations** | *Part-time Flight Test Supervision for UAS (February 2023 – January 2024)*

- In charge of aircraft digital video feed using *uv4l*, *ffmpeg*, *GStreamer* and *Python*.
- Developed a first approximation to onboard real-time bird detection using convolutional neural networks in *PyTorch*, specifically single-shot detectors such as *YOLO*.
- Implemented real-time aircraft horizon awareness using classic segmentation methods and flight telemetry, using *OpenCV* in *C++*.

**Playedu** | *Teacher (February – June 2022)*

Conducted group reinforcement lessons in Physics and Mathematics at Nuestra Señora de las Nieves School, teaching classes of 20 or more students aged 13 to 16.

**Freelance** | *Private Tutor (2021 – Present)*

Private tutoring for students, mainly in Mathematics, Physics, and Programming.

**Framenet3** | *Introductory Internship, 4th ESO + Empresa 2017*

Computer assembly.

## Projects

**Type Theory and Categorical Models: A Unified Approach** | *Literature Review*

Link between *Type Theory* and *Category Theory*, exploring the *Curry-Howard-Lambek* correspondence and implementing key constructions in *Haskell*.

**Ray-Net** | *AI enhanced Real-Time Ray Tracing Engine*

Minimalistic Real-time Ray Tracing Engine enhanced by *FSRGAN* network to improve performance as part of my final degree project.

**PointlessOS** | *Proto-OS*

32-bit bootable Operating System for x86 architectures, showcasing familiarity with processor design and lower level toolchains.

## Languages

**Spanish:** Native

**English:** C1 Cambridge

**French:** A2-B1

## Licenses and Certificates

**Driver's License** | *Class B (Spain, 2022)*

## Skills and Interests

**Soft Skills:** Synergistic self-directed learner with an inquisitive mindset.

**Expertise:** Programming languages, type theory and formal methods.

**Interests:** Swimming, endurance sports and origami.

Taking mathematics courses at UNED toward the Mathematics degree.