David Cunha

PhD student & Researcher

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Professional Profile

I am an Electrical and Computers Engineer, currently doing my PhD at the University of Porto on Joint Radar Sensing and Communications for 5G/6G Fiber-Wireless networks. My main areas of interest are signal processing for telecommunications and space applications and RF and microwave engineering. I am an avid learner and driven to work at the frontiers of technology.

Projects and Professional Experience

Researcher **Oct 2024 - Present: INESC TEC Porto**

- Development of DSP algorithms and waveform design for joint radar sensing and 5G-NR/6G Communications.
- Development of Radar prototype integrated on 5G stack.
- Collaborating in research project for development of Optical Ground Station for Sattelite QKD-based communications (Quantum Key Distribution). Simulation design engineer, focused on optical coupling simulations with Photonic Crystal Fibers.
  - Skills: C programming Language, MATLAB, 5G-NR Layer 1, GNURadio, Ettus USRP SDR

Assistant Invited Lecturer **Sep 2020 - Present: FEUP**

- Teaching Electromagnetic Waves *(Ondas Electromagnéticas)* course, as part of Electrical and Computers Engineer undergraduate programme. It comprises free space and guided propagation of Electromagnetic waves, transmission line, waveguide and antenna principles (2023-Present).
- Teaching Mechanics and Waves *(Mecânica e Ondas)*, a course of the Electrical and Computers Engineering undergraduate programme. (2021/2022)
- Teaching assistance during C Programming course *(Programação I)* workshop classes (2020/2021).

ASIC Digital Design Senior Engineer **Mar 2023 - Oct 2024: Synopsys**

- Firmware and RTL development for SerDes IP products.
- Experience in FPGA-based RTL design and chip testing.
- Script development for automated chip testing.
  - Skills: C programming Language, Verilog, GNU/Linux, Git, Jira, MATLAB, Python, FPGA design, Office365.

Photonics Engineer **Jan 2022 - Feb 2023: Picadvanced**

- Design and simulation of photonic integrated circuits for Passive Optical Networks and space applications.
- Designed PICs in both Silicon and Indium Phosphide fabrication technologies.
- Laboratory testing of Photonic ICs.

- Participated in PHOAM project *"Photonic Assisted Multibeam Phased Array Antenna"*, a joint project between Picadvanced [9], **Instituto de Telecomunicações**, Sinuta and the **European Space Agency**. Development of a multi-beam phased array antenna, capable of handling Ka-band signals for communication in low-earth orbit satellite (LEO) constellations.
  - Skills: Integrated Photonics, Optical Communications, RF Design, Ansys Lumerical, Optodesigner, IPKISS, MATLAB, Python, Office365, Phase Array Antennas.

Researcher **Aug 2021 - Dec 2021: INESC TEC**

- Development of a Bluetooth Low Energy (BLE) indoor location system based on Angle-of-Arrival (AoA) estimation, as part of the SLID-Stock Live Identification project [8].
- RF IC design and testing.
- Development of signal processing algorithms for AoA estimation.
- Embedded software development and maintenance.
  - Skills: C programming Language, Embedded SW, GNU/Linux, Git, Python, GNU Radio, Machine Learning, Signal Processing, RF design, Office365.

Research Assistant **Oct 2020 - Apr 2021: Universidade do Porto**

- Research collaboration with the Smart Ops project [7], which stemmed from a partnership between academia and industry that aims at developing a smart monitoring system for large-scale equipment used in bridge construction.
- Web Server implementation.
- Real-time data processing for structural integrity assessment.
  - Skills: Apache HTTP, C programming Language, GNU/Linux, Git, Javascript, Python.

Event planner **Aug 2019 - Feb 2020: University of Twente**

- Activities committee member of the Erasmus Student Network Twente (Netherlands), responsible for event planning.
  - Skills: Office365, Public speaking.

Participant **Feb 2018 - Dec 2018: Rexus/Bexus**

- Participated in the Rexus/Bexus programme [6], which consists of a competition organised by the European Space Agency for rocket and balloon propelled experiments developed by university students.
  - Skills: Telecommunications, Synthetic Aperture Radar, Signal Processing, RF Design.

STEM Tutor **Feb 2018 - Jul 2019: Universidade do Porto**

- Tutor at the faculty's *Consultório de Física, Matemática e Programação*, helping bachelor students with their Mathematics, Physics and Programming courses.

Academic Qualifications

PhD in Telecommunications **Sep 2024 - Present: FEUP**

- Enrolled in the Doctoral Programme MAP-Tele in Telecommunications [3].
- My PhD work is dedicated to the development and study of Photonics Assisted ISAC systems for Fiber-Wireless Networks. The work is comprised by:
  - Development of waveform design and signal processing techniques for an efficient joint transmission and reception of data communication and radar sensing signals;
  - Design, simulation and testing of a Microwave photonics IC (or PIC) that meets the project's requirements;
  - Integration of photonic chip with RF front-end and DSP unit. Analysis of system performance.
- PhD is supervised by Professor Henrique Salgado.
- Completed a course on **Advanced Topics on Signal Processing** with a final grade of 19 out of 20.
  - Skills: Digital Signal Processing, 3GPP, 5G-NR, Radar, GNU Radio, Phase Array Antennas, Optical Communications.

Satellite Navigation Course **Jul 2025 - Sep 2025: Stanford University (Online Course)**

- Attending Stanford University online course entitled "GPS: An Introduction to Satellite Navigation, with an interactive Worldwide Laboratory using Smartphones".
  - Skills: GNSS, Signal Processing, MATLAB

International Radar/SAR Summer School **Jul 2025: Fraunhofer FHR**

- Participated in the 16th International Radar/SAR summer school organized by the Fraunhofer FHR institute, in Bonn, Germany.
  - Skills: Radar fundamentals, Waveform Design, Bistatic Passive Radar, Synthetic Aperture Radar, MATLAB/Python, Signal Processing.

Integrated Master's **Sep 2016 - July 2021: FEUP**

- Completion of Integrated Master's degree in Electrical and Computers Engineering at the Faculty of Engineering of the University of Porto [1] in 2021, with a final grade of 16 out of 20.
- Specialization in telecommunication technologies.
- Defended Master's thesis entitled *"Silicon Photonics Optical Beamformer for Broadband Phased Array Antennas"*, supervised by Professor Henrique Manuel de Castro Faria Salgado and co-supervised by Dr. Bilal Hussain, with a final grade of 19 out of 20.
  - Skills: ADS, RF design and testing, C programming, Embedded SW, Python, Optical Communications, Antenna design.

Erasmus Mobility **Aug 2019 - Feb 2020: FEUP**

- Studied for a semester at the University of Twente, in the Netherlands, as part of mobility program funded by the EU (Erasmus+).

Grants and Awards

- **CTM Award for Best Master Thesis 2021**, granted by the Centre for Telecommunications and Multimedia at INESC TEC Porto[4] - a major Portuguese research institute - for the best Master's dissertation in the areas of Telecommunications and Multimedia.
- PhD grant funded by FCT (*Fundação para a Ciência e Tecnologia*[5]).

Language skills

- Portuguese (Native)
- English: C2 (Cambridge CAE Certificate)
- French: A2 (Alliance Française Certificate)
- Dutch: A1 (University Twente Certificate)

Other Interests

- Music is an important part of my life, as I studied piano and music theory for 7 years. I also sing at *Schola Invicta Traditio*, an amateur choir dedicated to Gregorian Chant and Polyphonic works from Medieval and Renaissance authors.
- Judo is another passion of mine and I have been a member of Clube de Judo do Porto [10] and the Portuguese Judo Federation since 2011.
- Other than family, engineering work, music and sports, I was a member of the Portuguese Scout Corps (Corpo Nacional de Escutas [11]) for over 18 years.

References

[1] "Faculdade de engenharia da universidade do porto," https://fe.up.pt/ [Accessed: December 22, 2025].

[2] "University of twente," https://www.utwente.nl/en/ [Accessed: December 22, 2025].

[3] "Map-tele doctoral programme in telecommunications," https://sites.google.com/dsi.uminho.pt/map-teledoctoralprogrammeintel/home [Accessed: December 22, 2025].

[4] "Centre for telecommunications and multimedia, inesc tec," https://www.inesctec.pt/en/centres/ctm [Accessed: December 22, 2025].

[5] "Fundação para a ciência e tecnologia," https://https://www.fct.pt/ [Accessed: December 22, 2025].

[6] "Rexus/bexus programme," https://rexusbexus.net/ [Accessed: December 22, 2025].

[7] "Smartops: Smart monitoring system for large equipment used in bridge construction," https://smartops.berd.eu/en/ [Accessed: December 22, 2025].

[8] "Slid project documentation," https://wavecom.pt/wp-content/uploads/2019/12/SLID-45388.pdf [Accessed: December 22, 2025].

[9] "Picadvanced," https://picadvanced.com/ [Accessed: December 22, 2025].

[10] "Clube de judo do porto," http://clubejudoporto.weebly.com/ [Accessed: December 22, 2025].

[11] "Corpo nacional de escutas," https://escutismo.pt/ [Accessed: December 22, 2025].