



Ana Sofia Carmo

Biomedical Engineer · ML in Health Researcher

Europe

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Professional Summary

Biomedical engineer and machine learning researcher with 5+ years of experience in biosignal processing, wearable sensing, and clinical AI. Expertise in translating multimodal physiological signals (ECG, PPG, ACC, EMG) into predictive models for health monitoring and human-computer interaction. Experienced in end-to-end development of biosensor-based machine learning frameworks, bridging cross-functional teams of engineers and clinicians to deliver reproducible, product-ready solutions.

Professional Experience

Feb 2021–Present **Biomedical Researcher** at Telecommunications Institute (Lisbon, Portugal)

- Developed ML/DL algorithms for multimodal physiological data, including ECG, PPG, and motion sensors, for early risk prediction in epilepsy [1,2,3].
- Designed and implemented a modular framework for physiological signal analysis and ML deployment, accelerating model prototyping [1] ([codebase](#)).
- Led interdisciplinary research on physiological monitoring and AI-enabled epilepsy care, supporting evidence-driven insights for clinical decision support.
- Coordinated and validated two cross-functional projects, including a novel respiration wearable, now deployed in hospital and academic settings [4,5].
- Maintained research documentation, including ethical approvals, reproducible protocols, technical reports, and peer-reviewed publications.

Dec 2024–Present **Consulting Medical Data Scientist** at Hospital de Santa Maria (Lisbon, Portugal)

- Developed signal processing pipelines for cardiac data, including data cleaning and feature extraction, for time-series recordings.
- Conducted an end-to-end data analysis for clinical trial reporting, focusing on biomarker evaluation to support evidence-based clinical assessment.
- Built predictive models leveraging autonomic and cardiac biomarkers to assess cardiac instability following treatment [6].
- Collaborated closely with clinicians to ensure sensor-based models meet clinical evidence and usability standards, bridging engineering and healthcare.

Education

Feb 2021–Jan 2026 **PhD in Biomedical Engineering** at Instituto Superior Técnico (Lisbon, Portugal)

Sep 2015–Jan 2021 **Integrated MSc in Biomedical Engineering** at Instituto Superior Técnico

Additional Experience & Achievements

Mentorship

- Supervised 100+ MSc theses and undergraduate research projects focused on physiological signal processing, machine learning, and experimental validation.
- Delivered 80+ hours of hands-on labs in biomedical instrumentation, signal processing, and ML applied to health.

Academic Publishing

- Co-edited a Springer Nature book on *Open Biomedical Engineering* [7] and co-authored 4 book chapters.
- Published 6 peer-reviewed journal papers, 3 conference abstracts, and 2 preprints in biomedical engineering and AI in health.

Additional Skills

- Tech Stack:** Python, scikit-learn, PyTorch, ML experiment tracking (MLflow, upskilling), Docker
- Documentation:** Open Science practices, Standardized reporting, Version control (Git/GitHub)
- Outreach:** Event organization, Content creation (Canva, Figma), Poster preparation
- Languages:** Portuguese (native), English (C2), German (B1; eager to achieve fluency)

Selected Publications

- [1] **A. S. Carmo**, et al., "SeFEF: A Seizure Forecasting Evaluation Framework," Oct. 2025, *arXiv preprint* arXiv:2510.112751.
- [2] **A. S. Carmo**, et al., "Automatic Detection of Tonic-Clonic and Myoclonic Epileptic Seizures Using Prefrontal Electroencephalography (EEG)," in *IEEE 34th Int'l Symposium on Computer-Based Medical Systems (CBMS)*, Aveiro, Portugal: IEEE, June 2021, pp. 19-24.
- [3] J. Saraiva, M. Abreu, **A. S. Carmo**, et al., "Data Augmentation, Multimodality, Subject and Activity Specificity Improve Wearable Electrocardiogram Denoising with Autoencoders," presented at the *16th Int'l Conf. on Bio-inspired Systems and Signal Processing*, Aug. 2024, pp. 133–145.
- [4] **A. S. Carmo**, et al., "A Magnetic Field-Based Wearable Respiration Sensor for Real-Time Monitoring During Pulmonary Rehabilitation," *IEEE Transactions on Biomedical Engineering*, vol. 71, no. 7, pp. 2243-2252, Jul. 2024 (SJR Q1 and IF 4.5)
- [5] **A. S. Carmo**, et al., "EpiBOX: An Automated Platform for Long-Term Biosignal Collection," *Frontiers in Neuroinformatics*, vol. 16, p. 837278, May 2022 (SJR Q1 and IF 3.53)
- [6] S. Gago, **A. S. Carmo**, et al., "Autonomic nervous system modulation and cardiac instability evaluation in drug-resistant epilepsy patients submitted to VNS Therapy™," Proc. of the 36th Int'l Epilepsy Congress, Aug. 2025
- [7] H. P. Da Silva, P. J. Bota, and **A. S. Carmo**, Eds., *Open Source Biomedical Engineering: Bridging the Gap Between Sensing, Processing, and Visualization*. Cham: Springer Nature Switzerland, 2026. doi: 10.1007/978-3-032-03655-1.