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.

For a reference regarding my position at Institute of Telecommunications please contact Hugo Plácido da Silva, at hsilva@lx.it.pt.