

MSCA Postdoctoral Fellowship in AI for Digital Health and Well-Being

Research Theme Code: RLA-UPF-01

Areas of Application: Digital Health and Well-Being

Location: Pompeu Fabra University, Department of Engineering, Barcelona, Spain

UPF invites applications for a fellowship focused on advancing AI applications in Digital Health and Well-Being. This fellowship provides an exceptional opportunity to contribute to cutting-edge research at the intersection of artificial intelligence (AI) and healthcare. The selected candidate(s) will work on advancing quantum machine learning techniques or interpretable AI models to address critical challenges in medical imaging, clinical decision-making, and multimodal data integration. The goal is to design systems that enhance diagnostic accuracy, improve treatment personalization, and support surgical interventions by combining AI innovation with physiological and clinical insights.

Key research areas include the development of quantum machine learning algorithms for real-time analysis of medical images during surgery, as well as the creation of interpretable AI models for identifying actionable biomarkers from complex multimodal datasets. This work directly addresses issues of fairness and generalizability in clinical applications, ensuring that AI tools are reliable and unbiased for diverse patient populations.

As part of this role, the fellow will collaborate with interdisciplinary teams, including clinicians, data scientists, and AI researchers, to validate solutions in real-world clinical environments. The research outcomes will directly impact the fields of medical diagnostics, personalized medicine, and surgical support systems, contributing to better patient outcomes and more efficient healthcare delivery.

Key Responsibilities*:

- Develop and implement quantum machine learning algorithms for real-time medical image analysis and visualization.
- Create interpretable AI models for identifying biomarkers across multiple data modalities, ensuring alignment with physiological and clinical knowledge.

Qualifications:

- PhD in Computer Science, Biomedical Engineering, or a related field.

* Candidates are not expected to address all these items simultaneously; these represent the broader research directions of the role.



- Strong expertise in machine learning, medical image analysis, and data fusion.
- Experience working with healthcare datasets, including imaging and physiological data.
- Excellent communication and collaboration skills to work effectively with interdisciplinary teams.

Available Infrastructures: UPF houses infrastructure for both engineering work (computing, robotics and sensing, specialised audio-visual equipment - VR, audio, etc.) and experimentation with human subjects (experimental rooms with specialised equipment), complemented with links to hospitals and other external facilities.

Possible Principal Investigators:

- **Gemma Piella, Miguel Ángel González, and Jérôme Noailly** lead research on computer-based image processing modelling and cyber-physical methods for surgical interventions, which includes exploring quantum computing techniques.

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Possible Secondments: Sycal Medical.

Keywords: Quantum Machine Learning; Medical Image Analysis; Visual Analytics.

- **Gabriel Bernardino, Bart Bijmens, and Oscar Camara** lead research on explainable AI to identify relevant and interpretable biomarkers for clinical decisions from multimodal data.

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Keywords: Interpretability; Data Fusion; Computer Aided Diagnosis; Medical Image Analysis.

