Marie-Skłodowska-Curie Actions – Postdoctoral Fellowships 2024

INL Expression of Interest

Research Group Leader /Research Group name:	
João Piteira / Systems Engineer Group	
Scientist in charge:	
Name & surname	Hugo Oliveira
Contact email	hugo.oliveira@inl.int
Short description of the research group, including URL if applicable *(Strengths and scientific achievements (publications, patents, etc.), important infrastructure (up to 2000 characters with spaces)):*	

The focus of Systems Engineering group is to bring nanotechnology developed at INL into form-factors compatible with applications in the areas of ICT, health, agri-food and environment. The high levels of integration and miniaturization required for such applications can be often achieved via custom-designed microelectronics solutions, in particular CMOS technologies that enable both high-performance and mainstream adoption of the resulting devices. Our mission is to use electronics and microelectronics combined with nanotechnology to solve challenges within the above areas designing and implementing hardware applications that are power, size and cost efficient.

Our aim is to develop complete solutions and systems, either portable or handheld that enable meaningful applications of advanced sensing and actuating technologies in everyday work and life environments. The target level of complexity is integration of these functions into "smart" system-on-chip (SoC) or System-in-Package (SiP) hardware devices such as:

- Advances CMOS Hybrid devices
- Smart System Integration
- Ultra-low-power and Autonomous WSN

https://www.inl.int/research-groups/systems-engineering/

Illustrative publications:

H.M. Oliveira, A. Tugnolo, N. Fontes, C. Marques, Á. Geraldes, S. Jenne, H. Zappe, A. Graça, V. Giovenzana, R. Beghi, R. Guidetti, J. Piteira, P. Freitas, An autonomous Internet of Things spectral sensing system for in-situ optical monitoring of grape ripening: design, characterization, and operation, Computers and Electronics in Agriculture 217 (2024) 108599.

S. Jenne, A. Tugnolo, H. Oliveira, H. Zappe, Flexible microspectrometer for grape maturation monitoring in the vineyard, Journal of Optical Microsystems 4(1) (2024) 014004.

Project title:
Development of prediction models based on chemical sensors' information and its integration in Decision Support Systems.

Project description *(up to 2000 characters with spaces):*
Chemical information is key to support decisions in several areas (e.g. agri-food, biomedical, etc.). Nevertheless, the majority of the chemical information currently available is still originated by benchtop instrumentation, which makes it scarce and expensive. An alternative to this panorama is using chemical sensors (based on different transduction approaches, such as optical or electrochemical), which require significant effort in developing reliable calibration models and QA/QC of the information generated. The quality of the chemical information generated by the sensors is therefore critical for its inclusion in Decision Support Systems.
In this context, we encourage joint applications that aim to develop new Machine Learning / Chemometrics models capable to generate robust predictions for different chemical parameters, and use them as inputs to build Decision Support Systems. We envision the application of this strategy to the agri-food (e.g. plant irrigation needs, fruit quality) and biomedical areas (e.g. severity and/or prognostics of a disease).

Research fields *(You may choose more than one)*			
Chemistry (CHE)	x	Life Sciences (LIF)	
Economic Sciences (ECO)		Mathematics (MAT)	
Environment and Geosciences (ENV)		Physics (PHY)	x
Information Science and Engineering (ENG)	x	Social Sciences and Humanities (SOC)	

Expiration date for Expressions of Interest from postdoctoral fellows:	

Necessary documents to be submitted (in addition to the required CV and motivation letter):