Scientific Area	Synchrotron Light Applications		
Project Title	Automated interpretation of SR-based XRF and IR spectroscopic data using machine learning approach in archaeological sciences.		
Recruiting Institution	Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME), Jordan		
PhD awarding Institution	The Cyprus Institute (CyI)	**PhD Duration**	36 Months
Supervisor/Institution	Charalambos Chrysostomou / CyI - CASTORC		
Co-Supervisor/Institution	Messaoud Harfouche / SESAME Gihan Kamel / SESAME		
Secondment(s)	SESAME, Jordan European Synchrotron Radiation Facility (ESRF), France		

Project Description

Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) is a "third-generation" synchrotron light source that was officially opened in Allan (Jordan) in 2017. Currently, three beamlines are operational at SESAME (XAFS/XRF, IR, and MS) those are extensively implemented in the study of archaeological sciences. Quantitative and qualitative investigation of archaeological data is a very challenging procedure due to the complex nature of samples besides the existing technical limitations. This project will focus on exploring a large number of experimental data sets acquired at the XAFS/XRF and IR Microspectroscopy beamlines, as well as, the implementation of novel data acquisition, processing and interpretation procedures via Machine Learning (ML) approaches.

Project Objectives

- Use the IR and XAFS/XRF beamlines at SESAME for acquiring and analysing data on archaeological materials as well as interpreting the derived results.
- Development and advancement of ML routines and software optimizing the parameters used to fully automate the data acquisition, analysis and interpretation pipelines.
- Speeding up and enhancement of the quality of data processing and interpretation themes.
- Extending the applicability of the project focus to adapt other scientific domains and techniques.

Required Candidate Qualifications

- Degree allowing enrolment for a PhD such as MSc or equivalent, in chemistry, physics, or closely related field of science or engineering.
- Experience in computational science and software developing under Linux/Windows environments.
- Knowledge and experience in XRF and IR microspectroscopy will be an asset.
- Good English communication and writing skills.
- Ability to work as a member of an interdisciplinary team.

Desirable profile:

- Experience in Machine Learning libraries and techniques.
- Previous experience with synchrotron radiation facilities.