



MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2024 EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

NOVA - FCT

RESEARCH GROUP AND URL

LIBPhys – Laboratory of Instrumentation, Biomedical engineering and Radiation Physics SUPERVISOR (NAME AND E-MAIL)

Sofia Pessanha, sofia.pessanha@fct.unl.pt

SHORT CV OF THE SUPERVISOR

Sofia Pessanha obtained her PhD degree in Physics in December 2013, through funding awarded by the Portuguese Foundation for Science and Technology (FCT). During my research I became an expert in X Ray Fluorescence (XRF) and Raman spectroscopy. After completing my PhD, I applied again for funding to FCT and was awarded a postdoc grant in 2014 with the subject "Stratigraphy and thickness in layered systems – Art and Cultural Heritage as a challenge for X-Ray Spectrometry". During that period, I have developed and assembled the first ever portable EDXRF spectrometer with triaxial geometry, a setup with increased detection limits for low Z matrices and in 2018 she became coordinator of the Analytical Techniques Development and Application research group within LIBPhys research unit.

In 2019 she applied again to FCT through the CEEC program and was awarded an assistant researcher contract, my current position, with the project "Spectroscopic techniques in preventive medicine for in vivo diagnostics of hydroxyapatite-based tissues: overcoming technical and biological limitations".

In 2021 I she became a member of the Advisory Board of X Ray Spectrometry journal and in 2022 I became Editor for X Ray Spectroscopy in Encyclopedia of Analytical Chemistry.

During her career she has co-authored over 100 scientific publications (1230 citations, h-index=19), and presented over 35 communications in international conferences: I was invited speaker at the main conferences X ray Spectroscopy: European X-Ray Spectrometry conference (Belgium, 2022), Denver X-ray Conference (USA, 2018) and Latin American Conference of Analysis by X-ray Techniques (Chile, 2018 and Brasil 2024). My supervising/co-supervising duties include 2 completed and 2 ongoing PhD theses and 18 master theses in Biomedical Engineering and Physics Engineering at FCT-NOVA.





5 SELECTED PUBLICATIONS

<u>S.Pessanha</u>, Iulian Otel, Valentina Vassilenko, João Miguel Silveira, Paulo Riveiro, **Expanding the horizons: Raman probe** development and spectra preprocessing evaluation for recognition of large hydroxyapatite-based samples, accepted in Journal of Raman Spectrometry

S. Pessanha, D. Braga, A. Ensina, J. Silva, J. Vilchez, C. Montenegro, S. Barbosa, M. L. Carvalho, A. Dias,

A non-destructive X-ray fluorescence method of analysis of formalin fixed-paraffin embedded biopsied samples for biomarkers for breast and colon cancer

Talanta, 260, 124605

https://www.sciencedirect.com/science/article/pii/S0039914023003569

S. Pessanha, A. Veiga, D. Doutel, F. Silva, J. Silva, P. M. Carvalho, S. Barbosa, J. P. Santos, A. Félix, J. Machado,

Evaluation of the influence of the formalin fixation time on the elemental content of tissues measured with X-ray fluorescence Spectrochimica Acta - Part B 205, 106704

https://www.sciencedirect.com/science/article/pii/S0584854723000915

R. R. Lima, M. K. M. Ferreira; D. Souza-Monteiro; L. O. Bittencourt; J. M. Matos-Sousa; V. S. Chemelo; V. N. Santos; G. S. Balbinot; A. F. Prado; F. M. Colares; F. J. Ager; I. Ortega-Feliu; M. A. Respaldiza; <u>S. Pessanha</u>

Fluoride exposure during intrauterine and lactation periods promotes changes in the offspring rats' alveolar bone Chemosphere, 307, 136053.

https://pubmed.ncbi.nlm.nih.gov/35977563/

S. Pessanha, M. Alves, J. M. Sampaio, J. P. Santos, M. L. Carvalho, M. Guerra, A novel portable Energy Dispersive X-ray Fluorescence spectrometer with triaxial geometry, Journal of Instrumentation, 12 (2017) P01014

http://iopscience.iop.org/article/10.1088/1748-0221/12/01/P01014/meta

PROJECT TITLE AND SHORT DESCRIPTION

Development of a time-gated Raman spectrometer for the analysis and diagnostic of dental enamel

Lasers are used in dentistry, for example, for cavity preparation making use of the ablating potential to remove hard tissue. But, depending on the energy and density of the laser, other non-invasive interactions can be stimulated - Raman scattering of radiation by molecules. The diagnostic of demineralized tissues has been already achieved, *in vitro*, through the inspection of Raman active vibrational modes, however, a major hurdle of *in vivo* analysis is the hindering of the Raman signal due to fluorescence background caused by organic compounds and measurements under ambient light. Our solution to overcome this problem is to use Raman time-gating detection: the detector is able to collect the Raman signal during short laser pulses while unwanted fluorescent emission is rejected. We propose a novel device that by changing the laser conditions accomplishes a highly specific evaluation of the tissue and diagnose early lesions in dental enamel.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*





Physics

*Scientific Area where the project fits best – Please select/indicate the scientific area according to the panel evaluation areas: Chemistry (CHE) • Social Sciences and Humanities (SOC) • Economic Sciences (ECO) • Information Science and Engineering (ENG) • Environment and Geosciences (ENV) • Life Sciences (LIF) • Mathematics (MAT) • Physics (PHY)