



MRes SCHOLARSHIP

PROJECT DESCRIPTION

PROJECT DETAILS
Project Title
On-spot identifications of drugs in mixtures of low dosage forms using surface enhanced Raman spectroscopy
Project Summary
<p>This part-time MRes Scholarship is associated with a post at Elodiz.</p> <p>The use of Raman spectroscopy for identification of chemicals needs the development of libraries to correlate (pure chemicals), the drug Raman signature with libraries with that signature. However, there is still limitation with Raman having low sensitivity in detecting signature of chemicals present in low dosage forms in mixtures. Surface enhanced Raman spectroscopy (SERS) can overcome this limitation. The use of SERS alters the position of Raman peaks in supported drugs, consequently, new libraries under SERS conditions require the development of new and specific Raman-SERS libraries. The signature of a chemical under Raman spectroscopy by SERS could be affected by a large variety of factors such as the type solvent, the nature of the nanoparticles (gold, silver etc.), the form and size of the nanoparticles, the response of tandem substrate-particle, the presence of additionally aggregate agents, etc.</p> <p>In this collaborative project, we will focus on understanding how the Raman signature of drugs under SERS analysis will be affected by the presence of other chemicals. The knowledge on Raman SERS libraries is limited today, but the expansion on new nanoparticles suitable for Raman SERS is increasing dramatically these days. To have a better understanding on how to use the data obtained under SERS will be extremely beneficial for the correct development of the SERS libraries. This project will further target the effect on the Raman signature of a series of chemicals in a mixture of chemicals and analyse the possible effect on the Raman signature as well as the possible effect on limit of detection. The study will create models to understand the effects on the analysis of mixtures under SERS conditions.</p> <p>This project will be conducted in collaboration with Dr Enrique Lozano, Elodiz Limited, UK. Due to the nature of the project, the candidate will be expected to work at multiple locations if needed. A driving licence is essential. The successful candidate should have an Honours Degree at 2.1 or above (or equivalent) in chemistry/forensic science/pharmacy or equivalent. The student must have an appetite for significant experiments in chemistry and spectroscopy.</p>
Academic Impact
<p>The development of controlled models to tackle better understanding on how mixtures of chemicals affect the detection under SERS is critical to move forward the development of new Raman libraries. All parameters on the modelling but the chemical mixtures will be fixed and statistical and spectroscopic data analysis will be conducted. This will point towards what effects those mixtures do have on the Raman signature and those models will be able to introduce corrections on the algorithms for SERS libraries.</p> <p>This understanding will help as well researchers on the development of nanotechnology, that is at the core of how the SERS technology operates.</p>
Societal Impact
<p>Raman technology is receiving a strong public interest recently, as Raman analysers have been massively introduced into the pharmaceutical and security sectors such police and airports security checks. The use of Raman analysers into police forces has been recently introduced. This works targets to understand, if the use of mixture of chemicals could affect the use of these analysers on operational conditions.</p>
Training Opportunities
<p>The student will receive training in Raman spectroscopy, SERS, data management and data analysis, creation of control models, etc. The candidate will develop research skills that will help to critically analyse problems and infer</p>

trends and solutions to problems, these skills and on high demand on the market, for both, public to private sectors.

The student will be offered the possibility to operate under real professional conditions, which will prepare them to start more effectively into the work market.

SUPERVISORY TEAM	
First Supervisor	Dr Sulaf Assi
Additional Supervisors	Prof David Osselton, Dr Enrique Lozano (BWTek)
Recent publications by supervisors relevant to this project	<p>Assi, S. and Fortunato, L. (2017). Optimising the method for authenticating pharmaceutical products of different dosage forms using dual laser handheld Raman spectroscopy, American Pharmaceutical Review, article in press.</p> <p>Assi, S., (2016). Authentication of medicines using dual laser Raman spectroscopy, European Pharmaceutical Review, 21 (6), 30-34.</p> <p>Assi, S., Wallis, B. and Osselton, D. (2016). The evaluation of dual laser handheld Raman spectroscopy for identification of novel psychoactive substances, American Pharmaceutical Review, September.</p> <p>Sulaf Assi (2016), Evaluating handheld spectroscopic techniques for identifying counterfeit branded and generic medicines worldwide. American Pharmaceutical Review, 19, 3.</p> <p>Sulaf Assi (2015), Identification of Counterfeit Drugs using dual laser handheld Raman spectroscopy. European Pharmaceutical Review, Issue 6, October 2015.</p> <p>Sulaf Assi (2015). Countering counterfeit medicines little by little, The analytical scientist, 402 (0715).</p> <p>Assi, S., Guirguis, A., Halsey, S., Fergus, S. and Stair, J.L. (2015). Analysis of legal high substances and common adulterants using handheld spectroscopic techniques, Analytical Methods, 7(2), 736-746.</p> <p>Sulaf Assi (2014), Investigating the quality of medicines using handheld Raman spectroscopy, European Pharmaceutical Review, 19 (5), 55-60.</p>

INFORMAL ENQUIRIES

To discuss this opportunity further, please contact Dr Sulaf Assi on sassi@bournemouth.ac.uk

ELIGIBILITY CRITERIA

This MRes Scholarship is open to UK & EU candidates, who must demonstrate outstanding qualities and be motivated to complete an MRes in 24 months part-time.

The successful applicants must have a proven previous academic excellence (First Class Honours/Upper Second Class Honours or equivalent) in chemistry/forensic science/pharmacy or equivalent. An IELTS (Academic) score of 6.5 minimum (or equivalent) is essential for candidates for whom English is not their first language.

In addition to satisfying the basic entry criteria, BU will look closely at the qualities, skills and background of each candidate and what they can bring to their chosen research project in order to ensure successful completion.

Additional Eligibility Criteria:

The successful applicant will be required to hold a UK driving licence. The student must have an appetite for

significant experiments in chemistry and spectroscopy.

HOW TO APPLY

Please complete the online application form by **15 January 2018**