

Project proposal template

Graduate School studentships

March 2015

<i>Project title</i>	<input type="text" value="Trace Analysis of Cosmetics for Forensic Applications"/>
<i>First Supervisor</i>	Dr <input type="text" value="Baljit Ghatora"/>
<i>Second Supervisor</i>	<input type="text" value="Dr John Fletcher"/>
<i>School</i>	<input type="text" value="Pharmacy and Chemistry"/>
<i>Other member of supervisory team (no more than three KU supervisors in total)</i>	<input type="text"/>
<i>Specific requirements beyond 2:1 degree</i>	<input type="text"/>

**Project summary
(max 4,000 characters)**

Locard's exchange principle states that whenever a criminal comes into contact with a crime scene, objects or a victim, a transfer of evidence takes place. Forensic scientists are assigned the task to examine the physical evidence with a range of analytical techniques to potentially identify trace amounts of evidence. Analysis of cosmetic traces from crime scenes can be used to establish physical contact between two individuals, such as a victim and a suspect, or to place an individual at a crime scene. The majority of techniques which are employed in current forensic investigations, such as gas chromatography and Fourier transform infrared spectroscopy are destructive techniques, techniques which are likely to introduce contaminants in the analysis [1].

Current cosmetics are mass produced by a range of manufacturers, and each manufacturer will list generic ingredients on the packaging, which are common amongst all their competitors. Some of these generic ingredients include organic dyes, inorganic pigments, oils, minerals, waxes and emollients. However the quantitative composition which each manufacturer uses will vary. Analysis of cosmetic products will therefore require a multivariate approach.

Data generated through non-invasive and non-destructive spectroscopic techniques will be analysed using a variety of tools including principal component analysis and partial least squares analysis. The application of these tools to the case assessment and interpretation model used in the interpretation of evidence will be evaluated, with the aim to increase the evidential value and robustness of trace cosmetic evidence used in court.

There is literature to support the use of these techniques in the analysis of lipsticks [2], and these techniques have a track record within the pharmaceutical industry.

References

1. A.Gordon, S.Coulston, The evidential value of cosmetic foundation smears in forensic casework, Journal of Forensic Sciences, 2004; 49(6):1244-52
2. P. Gardner, M.F. Bertino, R. Weimer, E. Hazelrigg, Analysis of lipsticks using Raman spectroscopy, Forensic Science International, 2013; 232 (1-3): 67-72

