



## 2015 YCCSA SUMMER SCHOLARSHIP PROJECT SUBMISSION

This form is for prospective project supervisors to submit their projects to be included in the YCCSA Summer Scholarships Programme for 2015.

It is the purpose of the Summer School that any projects submitted are interdisciplinary in nature.

|  |   |
|--|---|
| <b>Date</b>                                    | 4/2/15  |
| <b>Main Supervisor's Name</b>                  | <i>Julie Wilson</i>   |
| <b>Main Supervisor's Department</b>            | <i>Mathematics and Chemistry</i>  |
| <b>Co-supervisors' name(s) and Departments</b> | <i>Dawn Coverley<br/>Biology</i>  |
| <b>Project Title</b>                           | <b>Identification of diseased cells using image analysis and multivariate statistics</b>  |
| <b>Project Description</b>                     | <p>Chromatin is a complex of DNA and proteins that forms chromosomes within the nucleus of eukaryotic cells and its three-dimensional organization plays a central role in the regulation of cell functions. The arrangement of chromatin includes periodic attachment to a structure referred to as the nuclear matrix. There is strong evidence that key nuclear processes take place at the base of these chromatin loops, but there is limited information on the changing relationship between chromatin and the nuclear matrix during development and disease. Fluorescence imaging shows the chromatin loops as a halo around the nuclear matrix and this halo differs in size and intensity between different cell types and states.</p> <p>We have images from cells that relate to different stages of cancer and the aim of this project is to use image analysis techniques to extract useful information from images. Quantifiable variables such as halo radius, intensity statistics or area of nuclear matrix will then be used with pattern recognition techniques to identify consistent differences between cell states.</p> |
| <b>Required skills</b>                         | Some computer programming experience is essential.  |
| <b>Project dates</b>                           | <i>Monday, 13 July 2015 to Friday, 11 September 2015.</i>   |
| <b>Other information</b>                       |   |
| <b>References</b>                              | 1 Wilson, R. H. & Coverley, D. <i>Genes to Cells</i> 18, 17-31, (2013).   |

2 Vogelstein, B., Pardoll, D. M. & Coffey, D. S. *Cell* 22, 79-85, (1980).

3 Buongiorno-Nardelli, M., Micheli, G., Carri, M. T. & Marilley, M. *Nature* 298, 100-102, 1982.

When complete, please email the form to [sarah.christmas@york.ac.uk](mailto:sarah.christmas@york.ac.uk)