

## 2013 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 2013.

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

<b>Date</b>	<i>5<sup>th</sup> March 2013</i>
<b>Main Supervisor's Name</b>	<i>Dr Steven Johnson</i>
<b>Main Supervisor's Department</b>	<i>Electronics</i>
<b>Co-supervisors' name(s) and Departments</b>	<i>Dr. Roland Kröger (Physics)</i>
<b>Project Title</b>	<i>The synthesis of nanoparticles on-surface via biomineralisation</i>
<b>Project Description</b>	<p><i>Many micro-organisms have the ability to synthesise inorganic, nanostructured materials by mineralising ions sequestered from the local environment. Notable examples include the intricate silica shells mineralised by simple diatoms and the formation of highly ordered magnetic oxide nanoparticles inside magnetotactic bacteria. The resulting nanoparticles typically exhibit an exceedingly tight size and shape distribution, are of high purity and often present physical and chemical properties that exceed those manufactured through synthetic chemical approaches. Furthermore, biomineralisation occurs under ambient conditions and is not reliant on the toxic and environmentally damaging reagents required by chemical synthesis.</i></p> <p><i>Nanoparticle synthesis via biomineralisation offers an additional and critical advantage over traditional chemical approaches; the proteins that direct biomineralisation can be immobilised at precise, spatial locations on a surface facilitating integration and assembly of individual nanoparticles into complex nanoscale devices. The aim of this summer scholarship project is to develop approaches for immobilising functional biomineralisation proteins onto semiconductor surfaces and to investigate the process of biomineralisation in-situ using a novel atmospheric scanning electron microscope. This project is highly inter-disciplinary requiring interactions with the York Bioscience Technology Facility and York Jeol Nanocentre and will provide the successful student with experience in electron microscopy, biophysics, surface chemistry and nanoanalysis.</i></p>
<b>Required skills</b>	<i>The project would suit a student with a background in physics and with an interest in inter-disciplinary research. Experience of electron microscopy would be an advantage. Training, tailored to their particular degree background will be provided as required.</i>
<b>Project dates</b>	<i>Monday, 15 July 2013 and finishing on Friday, 13 September.</i>

<b>Other information</b>	<a href="http://www-users.york.ac.uk/~sdj507/BiomolecularElectronics/home_page.html">http://www-users.york.ac.uk/~sdj507/BiomolecularElectronics/home_page.html</a> <a href="http://www.york.ac.uk/biology/technology-facility/imaging-cytometry/ic-equipment/clairscope/">http://www.york.ac.uk/biology/technology-facility/imaging-cytometry/ic-equipment/clairscope/</a>
<b>References</b>	<i>Galloway, J. M. and Staniland, S. S., (2012), Journal of Materials Chemistry 22 (25), 12423</i> <i>Nuraje, N., Samia M., Linglu Y. Hiroshi M. (2009), Angewandte Chemie International Edition 48 (14), 2546–2548.</i> <i>Naik, R. R., Stringer, S. J., Agarwal, G., Jones, S. E., Stone, M. O., (2002), Nature Materials 1 (3), 169–172.</i>

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