



Ysgoloriaethau Sgiliau Economi Gwybodaeth  
Knowledge Economy Skills Scholarships



**\*This scholarships is part funded by the Welsh Government's European Social Fund (ESF) convergence programme for West Wales and the Valleys.\***

**PhD Scholarship for UK or EU applicants in the field of: Nanotechnology**

**Subject study: Enhanced graphene/metal nanoparticles composites for highly efficient hydrogen fuel cells.**

#### **Brief Summary of project**

The project seeks to develop highly efficient hydrogen fuel cells based on graphene/metal nanoparticles/enzyme composites. Currently, the only high energy output fuel cells manufactured consist of precious metals used at high solid content. This implies highly costing fuel cells. Currently, Perpetuus Carbon Technologies (PCT, the industrial partner of the proposed PhD project) is generating a catalogue for functionalised graphene materials in large quantities. PCT have identified a number of market driven needs for low cost metallised functional graphene materials for use in the automotive and medical sector. The aim of the proposed research will include (i) the ability to generate a number of metallised graphene layers with high efficiency of coverage and batch to batch reproducibility; (ii) the immobilisation and stabilisation of the biofuel enzymes cellobiose dehydrogenase and laccase; (iii) the fabrication of highly reproducible devices delivering optimal active electrode surface and thickness for optimal enhanced performances. The PhD student will be trained in: (i) surface characterisation techniques such as XPS, SEM, FTIR and particle sizing techniques for further incorporation of the particles into screen printing ink; (ii) electrochemical characterisation techniques in order to evaluate a fully working fuel cell.

Scholarships are collaborative awards with external partners including SME's and micro companies, as well as public and third sector organisations. The scholarship provides 3 years of funding with a 6 month period to complete the thesis. The achievement of a postgraduate skills development award, PSDA, is compulsory for each KESS II scholar and is based on a 60 credit award.

### **Eligibility Criteria –**

Candidates should have a 2.1 or above in their undergraduate degree **chemistry/physics/engineering** or a related subject.

For more information on eligibility criteria please refer to section C of the KESS II Participant Proposal Form

Any queries relating to Section C – Eligibility, please contact [KESSstudentenquiries@swansea.ac.uk](mailto:KESSstudentenquiries@swansea.ac.uk)

### **Funding**

The studentship covers the full cost of UK/EU tuition fees, plus a stipend. The bursary will be limited to a maximum of £14,198 p.a. dependent upon the applicants financial circumstances assessed in section C point 4 in the KESS II participant proposal form. See attached.

There will also be additional funds available for research expenses.

### **How to Apply**

Applicants are strongly advised to contact **Dr. Paolo Bertoncello** regarding information on the area of research, particularly via email ([p.bertoncello@swansea.ac.uk](mailto:p.bertoncello@swansea.ac.uk))

To apply:

1. Complete the KESS II Participant Proposal Form
2. Complete the KESS II Supplementary Application Form
3. You will also need to provide copies of the following documentation:

Degree certificates

References

CV

English Language certificate (if required)

All supporting documentation as detailed in Section C of the KESS II Participant Proposal form

Please return both application forms and supporting documentation to the KESS Office at the address stated on the KESS II Participant Proposal Form (original ink signatures only).

For any queries please contact [KESSstudentenquiries@swansea.ac.uk](mailto:KESSstudentenquiries@swansea.ac.uk)

The deadline for applications **by 4pm** **????????????????????**