PhD Studentship in Artificial Photosynthesis

Centre of New Technologies, University of Warsaw

Graphene-derived electrodes for bio-inspired solar-to-fuel device

Applications are invited for a PhD studentship in the Centre of New Technologies, University of Warsaw, Poland. The studentship has been funded by the Polish National Centre for Research and Development (NCBiR) within the 1st bilateral Polish-Turkish scheme, POLTUR/GraphESol. The funding is available for 2 years in the first instance, with the possibility of renewal for a further year subject to satisfactory progress. The successful candidate will have the opportunity to register for the prestigious Inter-Faculty Interdisciplinary Doctoral Studies in Mathematics and Natural Sciences at the University of Warsaw.

The aim of this PhD project will be to construct a novel biohybrid 'green' biophotoelectrode with significant potential to outperform presently available electrode prototypes for photoconversion and solar fuel generation. The successful candidate will work on nanoengineering of extremely stable natural photosynthetic complexes in order to specifically attach them to the electrodes obtained using functionalized graphene materials. Graphene with its unique electron transport properties and flatness of the surface is close to an ideal electrode to promote energy transfer from ultrastable and highly active natural photosynthetic systems, such as those purified from an extremophilic red microalga *Cyanidioschyzon merolae*. In clear contrast to previously engineered electrodes, we anticipate to obtain much more homogenous coverage of the electrode, as well as better control of orientation of the light harvesting proteins, both factors being the major limitations of the currently available technology. The performance of such a biohybrid device will be further improved by adding metallic nanoparticles in order to selectively enhance absorption of the light-harvesting complexes, and, as a result, increase the product output of photoconversion.

The highly interdisciplinary project will be conducted in the Solar Fuels Laboratory of Dr hab. Joanna Kargul (solar.biol.uw.edu.pl) at the Centre of New Technologies, University of Warsaw, in collaboration with the world-class Polish and Turkish laboratories specialising in optophysics (Prof. Sebastian Maćkowski, Nicolaus Copernicus University) and nanomaterials engineering (Dr. hab. Kasim Ocakoglu, Mersin University, Turkey). As part of the project, frequent travel to the collaborating partners is expected. Additional funds are available to attend relevant workshops and international conferences.

Additional Job Details

PhD bursary: **2,000 PLN/month**
Start date: **15 December 2017 or as soon as possible afterwards**
PhD candidates should:

- hold an MSc or equivalent in biochemistry, molecular biology, biophysics, materials engineering or a related field
- provide a transcript from the last completed cycle of studies (with a cumulative average grade)
- provide a list of publications and conference abstracts (if applicable)

Successful PhD candidates will have the opportunity to enrol for a PhD programme at the University of Warsaw.

Previous experience with protein engineering/covalent modification, molecular biology, protein biochemistry and biophysics (HPLC/FPLC, absorption and fluorescence spectroscopy) will be a major advantage. A fluent command of spoken and written English is essential. Knowledge of Polish is not a requirement.

Applicants should send a curriculum vitae, including a list of publications, cover letter, and contact details of 2 referees to Dr. Joanna Kargul (j.kargul@uw.edu.pl), quoting POLTURPhD in the subject line. Informal enquiries are welcome. The closing date for the receipt of applications is **30 November 2017**. Interviews of shortlisted candidates will be scheduled for the week beginning on **4 December 2017**.

The University of Warsaw is committed to equality and diversity, and encourages applications from all sections of the community.