

EPSRC Centre for Doctoral Training in Sustainable Materials and Manufacturing

Title: Development of a novel atmospheric pressure plasma system for the reduction of water use in the cleaning of mirrors in Concentrating Solar Power plants

Research Supervisor at Cranfield: Dr Chris Sansom, Associate Professor in Concentrated Solar Power

Supporting Company: Adtec Europe Ltd., London, UK

Cranfield University and Adtec Europe are seeking a top class candidate to undertake research leading to the award of an International Engineering Doctorate awarded jointly by the Universities of Warwick, Exeter and Cranfield.

As a 'research engineer' on our International Doctorate programme you will have unrivalled access to some of the best teaching and industrial expertise in the world, across three universities: including the UK Centre for Concentrating Solar Power at Cranfield. Your work will be principally based in the laboratory at Cranfield University, with some work being conducted at Adtec Europe in London; additionally, there will be international travel to Concentrating Solar Power plants and conferences at exciting global locations. You will emerge from the four-year programme more confident and better equipped to make a difference to your company and the global marketplace.

This opportunity also provides a substantial tax free stipend equivalent to many graduate salaries.

Project

The project will investigate the following stages which are novel for the supporting company.

- 1) methods of modeling and simulation for the deposition of sand and dust onto mirror surfaces at different geographical locations
- 2) characterisation of mirror surfaces by interferometry, scanning electron microscopy, reflectometry, and contact angle measurements
- 3) development of a novel atmospheric pressure plasma system for the in situ surface cleaning of mirror surfaces
- 4) testing and optimisation of the plasma system for different mirror surfaces at different international CSP locations

Business Need and Opportunity

The Global Concentrating Solar Power (CSP) market was valued at over \$3 Billion US in 2016 and is anticipated to grow by 13% by 2025. CSP plants generate electricity by concentrating sun light with large arrays of mirrors and these mirrors are located in desert regions. Consequently, the mirrors get covered in sand and dust regularly, and require cleaning on a weekly or even daily basis. Currently lots of water is used to clean the mirrors: a typical CSP plant uses 40 million litres of water a year. This is clearly a problem not only in terms of the cost, but also the fact that water in a desert is a valuable commodity. The aim of this project is to develop a novel atmospheric pressure plasma system, which when employed, will be capable of reducing the amount of water used in the cleaning process.

There is also a significant business desire to undertake this project. The development of a novel atmospheric pressure plasma system, will be a significant game changer in the CSP market. Consequently, such a disruptive technology is anticipated to yield significant profit.

Entry Requirements

Qualifications

Candidates should have a minimum of an upper second (2.1) honours degree (or equivalent) preferably in Physics but candidates from other degrees in Engineering, Materials Science or Physical Sciences would be considered.

A background in Plasma Physics or CNC motion control systems would be desirable.

Attributes

- High levels of innovative thought and lateral thinking
- Excellent analytical and reporting skills
- Excellent communication skills
- Strong computer skills and the ability to learn new software quickly
- Self-motivated, capable of working with minimal guidance and supervision, and within a team.
- Enthusiasm for the subject

Due to funding regulations this project is open to Home/EU students only.

The Studentship

Qualifying students receive an attractive enhanced stipend which could be tax and NI free depending on your personal circumstances, paid by the Centre and topped up by a contribution from Adtec Europe. For 2018 this totals approximately £20,000 tax free per annum.

The funding is for four years and will also cover University tuition fees and all course fees as well as a generous travel allowance to attend conferences and CSP sites around the world.

Apply

To apply please complete our [online enquiry form](#) and upload your CV.