Research Centre
Post title
Level
Post duration

National Centre for Plasma Science and Technology
Postdoctoral Researcher: Nitrogen Fixation using Plasma
Level 1
Fixed Term Contract up to Three years

Research Career Framework
As part of this role the researcher will be required to participate in the DCU Research Career Framework [http://dcu.ie/hr/ResearchersFramework/index.shtml](http://dcu.ie/hr/ResearchersFramework/index.shtml). This framework is designed to provide significant professional development opportunities to researchers and offer the best opportunities in terms of a wider career path.

DCU has a strong record in attracting both Irish and European Union research funding under Horizon 2020 (and previous Framework Programmes), Marie Curie Actions and Erasmus. We offer a dynamic and internationally-focused environment in which to advance your career.

Background & Role
Nitrogen Fixation using Plasmas
Agricultural productivity has increased by around fifty percent in the last century, largely by the use of nitrate fertilisers. The loss of this food supply would have disastrous effects in many parts of the world. However, nitrate fertilisers are presently produced by consuming fossil fuels and emitting greenhouse gases, which practice is also likely to have unfortunate consequences during the present century. There is therefore a dilemma, to which the only clear solution is to produce nitrate fertiliser without greenhouse gas emissions. The process of converting atmospheric nitrogen to nitrate is known as nitrogen fixation. This project aims to show that nitrogen fixation can be accomplished using a plasma process on a scale and with an efficiency likely to lead to
a competitive industrial process, however powered by renewable electricity and not fossil fuels.

**The Project**

This basic science project is supported by Science Foundation Ireland and Teagasc (an agricultural research agency) through the Investigators Programme ([http://www.sfi.ie/funding/funding-calls/sfi-investigators-programme/](http://www.sfi.ie/funding/funding-calls/sfi-investigators-programme/)). The objective is to show that an electron beam sustained discharge, with variable electron temperature and the potential to scale to large volume at atmospheric pressure, can support an efficient conversion starting from atmospheric gases to produce in the first case nitric oxide, from which further processing can form a nitrate fertiliser. This will involve fundamental studies of the chemical behaviour of the plasma, which will be linked to a programme of modelling. The designed endpoint is to sufficiently understand the basic properties of the plasma and its chemistry that the potential of this approach to address the dilemma mentioned above can be clearly seen. A parallel project in Teagasc will explore the agronomic aspects of this approach.

**Principle Duties and Responsibilities**

Reporting to his/her PI, this researcher will:

- Taking a leading role in the design, construction and operation of an electron beam sustained plasma experiment. (Since the electron beam system will be a commercial device, no special expertise in electron beam technology is needed.)
- Have a strong background in low-temperature plasma physics, with a particular emphasis on plasma chemistry and electron kinetics
- Be familiar with a wide range of plasma diagnostic techniques, such as optical and mass spectroscopy
- Be aware of (but not necessarily highly expert in) the techniques involved in modelling low-temperature plasma
- Participate in the supervision of research students
- Work with researchers in Teagasc in exploring the agricultural aspects of the project
- Contribute to the teaching activities of the School of Physical Sciences, in ways to be agreed with the Head of the School.
- Engage with appropriate training and development opportunities
Minimum Criteria
Applicants should have a PhD in low-temperature plasma science, with a particular emphasis on diagnostics and modelling.

Discipline Knowledge & Research skills – Demonstrates the ability to design and/or implement a substantial programme of research including initiating and leading new research ideas (for example by using critical judgement and an understanding of new research methodologies)
Understanding the Research Environment – Demonstrates a thorough understanding of the research environment both nationally and internationally, the ability to secure significant research funding and where relevant the ability to apply for intellectual property rights and/or patents for their research
Communicating Research – Demonstrates excellence in communicating their research nationally and internationally (for example by publishing in high quality peer reviewed journals of international standing and through invitation to participate in commercial research) and the ability to deliver teaching based on their own research
Managing & Leadership skills – Successfully leads and manages research programmes including the management and supervision of a small research team and the financial management of research programmes.

Salary: €36,854 - €47,728
*Appointments will be commensurate with qualifications and experience and will be made on the appropriate point of the salary scales, in line with current Government pay policy.

Closing date: 22 March 2018

Informal enquiries to:
Professor Miles Turner, School of Physical Sciences and National Centre for Plasma Science & Technology, DCU, Dublin 9, Ireland.
E-mail: miles.turner@dcu.ie Phone: +353 (0)1 700 5298

Please do not send applications to this email address, instead apply as described below.
Application Procedure

Application forms are available from the DCU Current Vacancies (open Competitions) website at http://www.dcu.ie/vacancies/current.shtml and also from the Human Resources Department, Dublin City University, Dublin 9. Tel: +353 (0) 1 7005149.

Please clearly state the role that you are applying for in your application and email subject line: Job Ref 806 Post-Doctoral Researcher: Nitrogen Fixation using Plasma, NCPST

Applications should be submitted by email to hr.applications@dcu.ie or by Fax: +353 (0)1 7005500 or by post to the Human Resources Department, Dublin City University, Dublin 9. Human Resources Department, Dublin City University, Dublin 9. Tel: +353 1 700 5149; Fax: +353 1 700 5500 Email: hr.applications@dcu.ie

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