

PI name & contact details:	Prof James G Lunney
School:	Physics
<i>Has project been agreed with head (or nominee) of proposed registration school?</i>	<i>yes</i>
Research Centre / group affiliation:	Trinity College Dublin School of Physics and CRANN
Research group / centre website:	http://www.tcd.ie/Physics/photonics/index.php http://www.crann.tcd.ie/
PI website / link to CV:	http://www.tcd.ie/Physics/photonics/people/james.lunney.php
Brief summary of PI research / research group / centre activity (2 or 3 lines max):	
<p>We study in the physics of laser ablation of solids with both nanosecond and femtosecond lasers, with a particular emphasis on ablation plume dynamics both in vacuum and gas environments. We use pulsed laser deposition to make a wide variety of solid and nanoparticle thin films of functional materials for research.</p>	
Title & brief description of PhD project (suitable for publication on web):	
<p>Atmospheric pulsed laser deposition of thin films</p> <p>Pulsed laser deposition (PLD) is widely used as a simple and effective technique for the preparation of wide range thin solid films of functional materials for research. In PLD a pulsed laser is used to heat and vapourise a small quantity of solid material which expands rapidly away from the solid and is condensed on a solid substrate to build up a thin film. In recent years, the technique has been extended to include the deposition of nanoparticle materials for surface enhanced Raman spectroscopy and catalysis. Normally PLD is done in a chamber in vacuum or low pressure gas. In this project we wish to explore the feasibility of doing PLD in a gas atmospheric pressure. We will explore various techniques to convey the ablated material to a substrate. The project will involve Langmuir probe and spectroscopic techniques to investigate the ablation plasma dynamics and comprehensive characterization of the materials produced.</p>	
Unique selling points of PhD project in TCD:	
<p><i>projects should offer something that's not available in Brazil – specific equipment, multi-disciplinarity, aspects of structured programme, links with industry, placements, links with other research groups etc.</i></p> <p>The Trinity PhD is a structured PhD and students can access discipline-specific training, as well as generic and transferable skills. All PhD students are eligible to participate in the Innovation Academy which offers a Postgraduate Certificate in Innovation and Entrepreneurship to assist PhD students identify and exploit the value within their research. The School of Physics and CRANN offer world-class expertise and facilities for the study of nanomaterials.</p>	
Name & contact details for project queries, if different from PI named above:	
Please indicate the graduates of which disciplines that should apply:	
Physics, Materials Science.	

Ciência sem Fronteiras / Science Without Borders Priority Area:

Please indicate the specific programme priority area under which the proposed PhD project fits- choose only one (tick box):

Engineering and other technological areas	
Pure and Natural Sciences (e.g. mathematics, physics, chemistry)	
Health and Biomedical Sciences	
Information and Communication Technologies (ICTs)	
Aerospace	
Pharmaceuticals	
Oil, Gas and Coal	
Renewable Energy	
Minerals	
Biotechnology	
Nanotechnology and New Materials	x
Technology of prevention and remediation of natural disasters	
Biodiversity and Bioprospection	
Marine Sciences	
Creative Industry	
New technologies in constructive engineering	